

# Service Manual



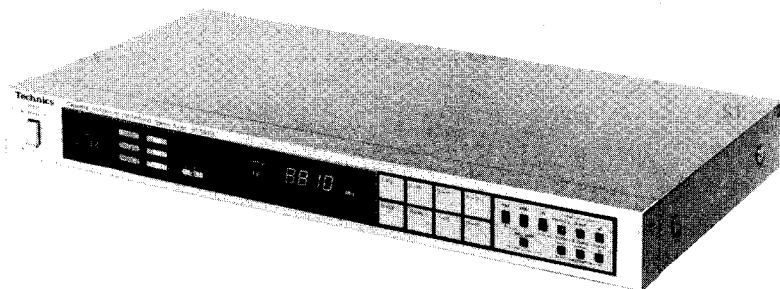
Synthesizer FM/MW/LW Stereo Tuner

## ST-S505L

[EX], [EF], [EB]

## ST-S505L(K)

[EX]



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

### Areas

- \* [EX] is available in Switzerland and Scandinavia.
- \* [EF] is available in France.
- \* [EB] is available in Belgium.

## Specifications

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

### (DIN 45 500)

#### ■ FM TUNER SECTION

Frequency range	87.50~108.00 MHz
	87.525~108.025 MHz (+25 kHz shift)
Sensitivity	
S/N 30 dB	0.95 $\mu$ V (75 $\Omega$ )
S/N 26 dB	0.85 $\mu$ V (75 $\Omega$ )
S/N 20 dB	0.75 $\mu$ V (75 $\Omega$ )
IHF usable sensitivity	0.95 $\mu$ V (IHF '58)
IHF 46 dB stereo quieting sensitivity	22 $\mu$ V/75 $\Omega$
Total harmonic distortion	
MONO (normal)	0.04%
STEREO (normal)	0.05%
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 $\pm$ 400 kHz	55 dB
super narrow $\pm$ 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)	$\pm$ 1.0 dB
Limiting point	0.75 $\mu$ V
Bandwidth	
IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	75 $\Omega$ (unbalanced)

#### ■ AM TUNER SECTION

Frequency range	
MW	522 kHz~1611 kHz (9 kHz)
LW	530 kHz~1620 kHz (10 kHz)
	153 kHz~353 kHz (9 kHz)
	151 kHz~351 kHz (-2 kHz shift)
Sensitivity (S/N 20 dB)	
MW	20 $\mu$ V, 290 $\mu$ V/m
LW	50 $\mu$ V
Selectivity ( $\pm$ 9 kHz)	
MW	55 dB
LW	55 dB
Image rejection	
MW (at 999 kHz)	40 dB
LW (at 254 kHz)	40 dB
IF rejection	
MW (at 999 kHz)	60 dB
LW (at 254 kHz)	35 dB

#### ■ GENERAL

Output voltage	0.3V (0.6 IHF)
Power consumption	9W
Power supply	AC 50 Hz/60 Hz, 220V
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).

# Technics

MC-Service

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

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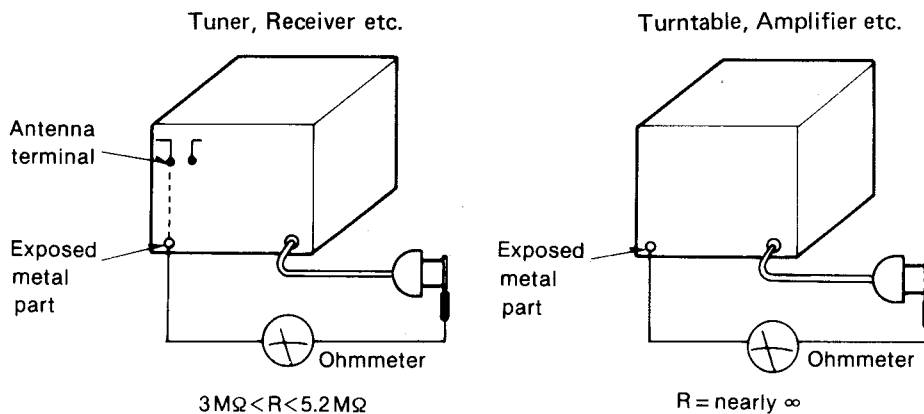
## SAFETY PRECAUTION

1. Before servicing (such as replacement of components), unplug the power supply cord to prevent an electric shock.
2. Use only manufacturer's recommended components for safety. Check condition of power cord and replace if wear or damage is evident.
3. After servicing, be sure to restore the following to the condition in which they were originally installed.
  - (1) the lead dress and
  - (2) insulation barriers, insulation papers, shields and the like.
4. Before returning a serviced apparatus to a customer, make the following insulation resistance test to prevent a customer from being exposed to a shock hazard.

### Insulation resistance test (See figure below.)

1. Unplug the power supply cord and connect a jumper wire between the two prongs on the plug.
2. Turn on the power switch of the apparatus.
3. Measure the resistance value (with an ohmmeter) between the jumpered AC plug and each exposed metallic cabinet part on the apparatus, such as screwheads, antenna, control shafts, handle brackets, etc.

The reading should be as shown in figure below. In case a measurement is outside of the limits specified, there is a possibility of a shock hazard, and the apparatus should be repaired and rechecked before it is returned to a customer.



where, R: resistance value

## FEATURES

- Computer quartz DC (auto pilot canceller, jitter distortion eliminator, sub-carrier eliminator) tuner featuring wave-form transmission.
- Automatic IF selector circuit built in.
- Auto scan/auto memory/FM/AM 8-station preset tuning.
- FM signal input strength is indicated every 2 dB.
- High monitor that gives the indication when the input signal is sufficient.
- Tuning control terminal for audio programmable timer (SH-4060) attached.
- FM wing antenna automatic control terminal attached.

**QUARTZ** Synthesizer  
FM/MW/LW Stereo Tuner

# ST-S505L/ST-S505L(K)

FRANÇAIS

- This booklet contains the specifications and adjusting procedures for ST-S505L, written in French.
- File this manual together with the ST-S505L service manual (Order No. SD83012367C2).
- Cette brochure contient les spécifications et pour les procédures de mises au point pour le ST-S505L écrites en français.
- Lcasser ce manuel en même temps qu'avec le manuel de service du ST-S505L (N° d'ordre: SD83012367C2).

## FRANÇAIS

### ■ CARACTERISTIQUES (DIN 45 500) (Sujet à changement sans préavis.)

#### ■ SECTION SYNTONISATEUR FM

<b>Gamme de fréquence</b>	87,50~108,00 MHz 87,525~108,025 MHz (+25 kHz shift)
<b>Sensibilité</b>	
S/B 30 dB	0,95 $\mu$ V (75 $\Omega$ )
S/B 26 dB	0,85 $\mu$ V (75 $\Omega$ )
S/B 20 dB	0,75 $\mu$ V (75 $\Omega$ )
<b>Sensibilité utilisable IHF</b>	0,95 $\mu$ V (IHF '58)
<b>Sensibilité stéréo au seuil de 46 dB, IHF</b>	22 $\mu$ V/75 $\Omega$
<b>Distorsion harmonique totale</b>	
MONO (normal)	0.04%
STEREO (normal)	0.05%
<b>Signal/Bruit</b>	
MONO	70 dB (78 dB, IHF)
STEREO	65 dB (70 dB, IHF)
<b>Réponse de fréquence</b>	5 Hz~18 kHz, +0,2 dB~ -0,5 dB
<b>Sélectivité alternée par canal</b>	
normal $\pm$ 400 kHz	55 dB
super narrow $\pm$ 200 kHz	25 dB
<b>Taux de capture</b>	1,0 dB
<b>Rejection d'image à 98 MHz</b>	75 dB
<b>Rejection FI à 98 MHz</b>	100 dB
<b>Rejection de réponse parasite à 98 MHz</b>	100 dB
<b>Suppression AM</b>	55 dB
<b>Séparation stéréophonique</b>	
1 kHz	60 dB
10 kHz	45 dB
<b>Fuite de porteuse</b>	
19 kHz	-65 dB (-70 dB, IHF)
38 kHz	-48 dB (-50 dB, IHF)
<b>Equilibrage de canaux (250 Hz~6,300 Hz)</b>	$\pm$ 1,0 dB
<b>Point de limite</b>	0,75 $\mu$ V
<b>Largeur de bande</b>	
Amplificateur FI	180 kHz
Démodulateur FM	1000 kHz
<b>Bornes d'antenne</b>	75 $\Omega$ (asymétrique)

#### ■ SECTION SYNTONISATEUR AM

<b>Gamme de fréquence</b>	522 kHz~1611 kHz (9 kHz)
<b>PO (MW)</b>	530 kHz~1620 kHz (10 kHz)
<b>GO (LW)</b>	153 kHz~353 kHz (9 kHz)
	151 kHz~351 kHz (-2 kHz shift)
<b>Sensibilité (S/B 20 dB)</b>	
PO (MW)	20 $\mu$ V, 290 $\mu$ V/m
GO (LW)	50 $\mu$ V
<b>Sélectivité</b>	
PO (MW)	55 dB
GO (LW)	55 dB
<b>Réjection d'image</b>	
PO (MW) (à 999 kHz)	40 dB
GO (LW) (à 254 kHz)	40 dB
<b>Réjection FI</b>	
PO (MW) (à 999 kHz)	60 dB
GO (LW) (à 254 kHz)	35 dB

#### ■ DIVERS

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

#### Remarque:

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

## 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

<ul style="list-style-type: none"><li>• Réglage et équipement utilisé</li></ul> <div><div><div>1. Voltmètres électronique de courant alternatif et de courant continue (VTVM).</div><div>2. Générateur du signal AM (AM-SG)</div><div>3. Sélecteur de gamme . . . . . AM</div><div>4. Régler le sélecteur d'attribution AM sur la position "9KHz step".</div></div><div><div>5. Conserver la tension du secteur à la tension nominale.</div><div>6. Le signal du générateur ne doit pas être plus élevé qu'il n'est nécessaire à obtenir une lecture en sortie.</div><div>7. Utiliser un tournevis non-métallique pour la réglage.</div></div></div>						
AM GENERATEUR		FREQUENCE D'AFFICHAGE PAR PREREGLAGE	PREPARATIONS	ELEMENTS REGLES	PROCEDURE DE REGLAGE	
BRANCHEMENT	FREQUENCE					
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 sous puissante) (Se référer à la Fig. 6.)	450KHz (modulé à 30% par 400Hz)	Point sans signal	C.A. voltmètre électronique ou oscilloscope sur prise de sortie de l'appareil.	T201 (Transfor FI)	1. Régler la fréquence d'entrée et les points de réglage de tels sorte que la sortie devienne maximale.
REGLAGE DE RF-MW						
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. 6.)	612kHz (modulé à 30% par 400Hz)	612KHz	Brancher le voltmètre à courant alternatif et l'oscilloscope aux borne de sortie (OUTPUT) de l'appareil.	L202 (Bobine Ant.)	1. Régler au maximum de signal de sortie. 2. Régler le noyau ferrite de L202 à l'aide d'un tournevis
3		1503KHz (modulé à 30% par 400Hz)	1503KHz		CT201 (Trimmer Ant.)	1. Régler au maximum de signal de sortie. 2. Refaire les étapes (3) et (4) jusqu'à ce que le fréquence s'aligne correctement avec l'affichage du cadran.
REGLAGE DE RF-LW						
4	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. 6.)	155kHz (modulé à 30% par 400Hz)	155kHz	Brancher le voltmètre à courant alternatif et l'oscilloscope aux borne de sortie (OUTPUT) de l'appareil.	L253 (Bobine Ant.)	1. Régler au maximum de signal de sortie. 2. Régler le noyau ferrite de L253 à l'aide d'un tournevis.
5		353kHz (modulé à 30% par 400Hz)	353kHz		CT251 (Trimmer Ant.)	1. Régler au maximum de signal de sortie. 2. Refaire les étapes (3) et (4) jusqu'à ce que le fréquence s'aligne correctement avec l'affichage du cadran.

### REGLAGE DE FM

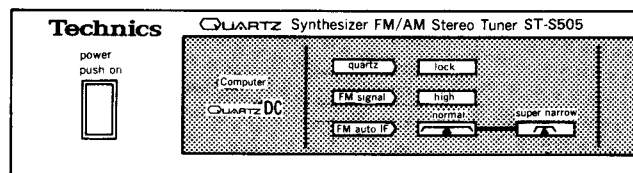
<ul style="list-style-type: none"><li>• <b>Réglage et équipement utilisé</b><ol style="list-style-type: none"><li>1. Générateur du signal FM (FM-SG)</li><li>2. Commande de réglage stéréophonique (ou vu-mètre de séparation).</li><li>3. Jauge de distorsion.</li><li>4. Oscilloscope.</li><li>5. Voltmètres électronique de courant alternatif et de courant continue (VTVM).</li><li>6. Compteur de fréquence (19kHz et 108MHz mesurable).</li><li>7. Sélecteur d'entrée sur la position "FM".</li><li>8. Placer le sélecteur de mode FM sur la position "mono".</li><li>9. Les autres réglages sont les mêmes que pour la mise au point de l'amplitude modulée (AM).</li></ol></li><li>• <b>Préparatifs pour le générateur de signaux FM (FM-SG).</b><ol style="list-style-type: none"><li>1. L'entrée normale de l'appareil est de 60 dB (1 mV), 400 Hz, modulation de 100%. (Du fait de l'atténuation, utiliser des câbles coaxiaux. La sortie du générateur de signaux devra être de plus de 6 dB. C'est-à-dire, que lorsque l'entrée est de 60 dB, la sortie du générateur de signaux devra être de 66 dB.)</li></ol></li></ul>						
FM GENERATEUR		FREQUENCE D'AFFICHAGE PAR PREREGLAGE	PREPARATIONS	ELEMENTS REGLES	PROCEDURE DE REGLAGE	
BRANCHEMENT	FREQUENCE					
REGLAGE DE LA DISTORSION FM EN MONO						
6  7  2	Raccorder le générateur de signaux FM à la borne d'antenne FM, en se référant à la Fig. 7. (Niveau de sortie du générateur 60dB).	100.10MHz (modulé à 100% par 400Hz)	100.10MHz	Brancher le voltmètre électronique a c.c. aux bornes TP101 et TP102 (Voir la Fig. 7)	T101 (Transfor FI discri.)	1. Régler le noyau T101 de telle sorte que le voltage mesuré dans le mode sans signal, soit de 0mV dans la gamme des 300mV.
				Brancher un distorsion mètre sur les bornes de haut-parleur de appareil.	T102 (Transfor FI discri.)	1. Régler le noyau T102 de telle sorte que la distorsion des canaux droit et gauche soit la plus faible.

FM GENERATEUR		FREQUENCE D'AFFICHAGE PAR PREREGLAGE	PREPARATIONS	ELEMENTS REGLES	PROCEDURE DE REGLAGE
BRANCHEMENT	FREQUENCE				
RÉGLAGE PILOTE MULTIPLEX FM					
AVEC UN FRÉQUENCÈMÈTRE			EN UTILISANT UN SYSTÈME ALTERNATIF		
1. Signal mono de 100.10MHz 60dB non modulé appliqué à l'appareil. 2. Commutateur de mode/accord silencieux FM sur "FM auto". 3. Branchez le fréquencesmètre sur TP301 par l'intermédiaire d'une résistance (100kΩ). (Voir Fig. 8.) 4. Régler VR301 sur 19kHz ± 30Hz.			1. Appliquer un signal stéréophonique à l'appareil ou recevoir une émission stéréophonique. 2. Ajuster VR301 et régler le contact à glissement de VR301 au milieu de la plage en circuit de l'indicateur stéréophonique. (Voir Fig. 9)		
ANNULATION DU SIGNAL PILOTE					
Raccorder le générateur de signaux FM à la borne d'antenne FM, en se référant à la Fig. 10. (Niveau de sortie du générateur 60dB)	100.10MHz (modulé à 100% par 400Hz)	100.10MHz	Brancher le voltmètre électronique a C.A aux bornes TP302 et masse.	L301 VR302 (Annulation du signal pilote)	1. Régler au minimum de gnal de sortie.
REGLAGE DU COURANT PORTEUR DE DISPERSION DE SORTIE					
Raccorder le générateur de signaux FM à la borne d'antenne FM, en se référant à la Fig. 11. (Niveau de sortie du générateur 60dB)	100.10MHz (modulé à 100% par 400Hz)	100.10MHz	Oscilloscope sur prise de sortie du tuner. <b>(Nota)</b> 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. 12-1. <b>(Nota)</b> La Fig. 12-2 représente une forme d'onde provoquée du fait d'un réglage incorrect de VR303. La Fig. 12-3 représente un forme d'onde crée par un réglage inapproprié de VR301 ou VR302.
REGLAGE DE LA DISTORSION STEREO					
Raccorder le générateur de signaux FM à la borne d'antenne FM. (Niveau de sortie du générateur 60dB) (Signal stéréo pilote à 10% de modulation)	100.10MHz (modulé à 100% par 400Hz) (Mode G ou D.)	100.10MHz	Brancher le filter passebas (fc = 15 ~ 19 kHz) à la borne de sortie (OUTPUT) de l'appareil par un distorsion à courant alternatif.	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					
Raccorder le générateur de signaux FM à la borne d'antenne FM. (Signal stéréo pilot à 10% de modulation)	100.10MHz (modulé à 100% par 1KHz) (Mode G ou D.)	100.10MHz	Brancher le filter passebas (fc = 15 ~ 19 KHz) à la borne de sortie (OUTPUT) de l'appareil par un voltmètre à courant alternatif.	VR304 (Separation)	Régler VR304 de telle sortie droite soit minimale quand la commande d'accord stéréophonique est dans le mode gauche (modulation du canal gauche) et que la sortie gauche soit minimale dans mode droit.
INDICATEUR D'INTENSITE DES SIGNAUX FM					
Raccorder le générateur de signaux FM à la borne d'antenne FM. (Niveau de sortie du générateur 54dB).	100.10MHz (modulé à 100% par 400Hz)	100.10MHz	_____	VR501 (Indicateur d'intensite des signaux)	1. Régler VR501 de façon à ce que 54dB soit indiqué. 2. S'assurer que le niveau d'intensité des signaux soit de 22 ~ 38dB lorsque l'entrée est de 30dB.

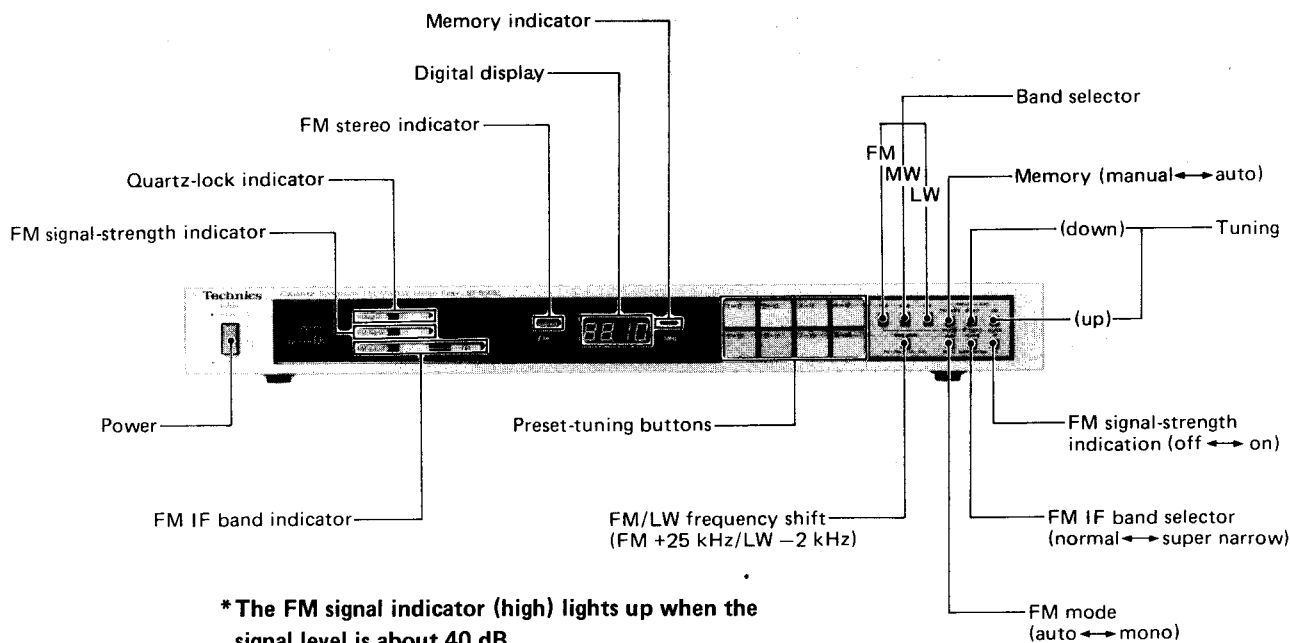


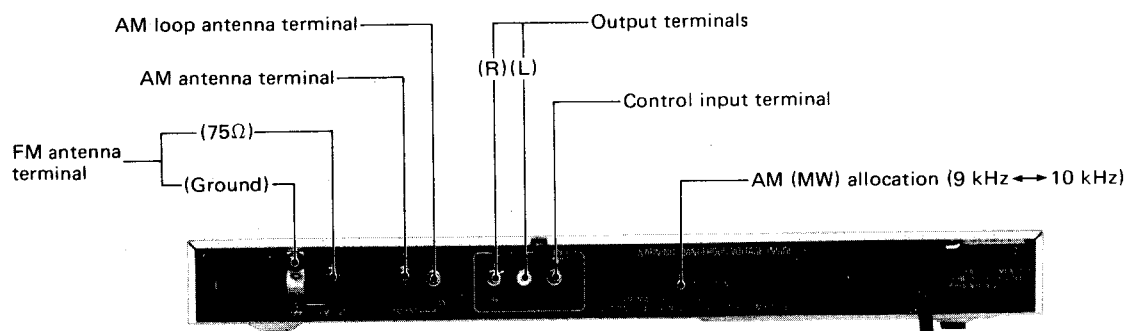
Introducing the DC configuration that has been used in the world of power amplifier into the field of tuner, this unit has realized the technique of more perfect reproduction "To transmit the atmosphere as it is" or as for wave-form transmission in a physical way of expression, the purpose has been achieved by making the best use of quartz synthe in a wide range from DC to extra-low frequency.

- Computer quartz DC tuner featuring wave-form transmission "To transmit the atmosphere of the concert hall as it is". Titler distortion (generated as sub-carrier signal is vibrated by large amplitude or high frequency audio signal) eliminator circuit; auto level adjuster in 19 kHz pilot signal cancel circuit, minimizing carrier leakage to improve the performance of the linear circuits; and the incomparably flat and wide range frequency response (5 Hz ~ 18 kHz, +0.2 dB, -0.5 dB) is one of the excellent characteristics.
- Auto IF circuit utilizing computer technology to improve the signal receiving performance — auto IF selector circuit to cope with the operations of normal IF circuit featuring audio characteristic and of super-narrow IF circuit featuring elimination of interference. The IF circuit in this unit is intended to ensure both selectivity and audio characteristic. The normal IF circuit is the result of general study of group delay characteristic. And the super-narrow IF circuit having 25 dB effective selectivity in 200 kHz detuning is able to cope with stronger interference signal. The circuit selection is made by the computer in accordance with the interference signal and input signal levels.
- Multi-function one-touch selection quartz synthe, auto tuning/auto scan memory, CH number indication. Step-by-step manual tuning; high-speed scanning starts with the key depressed, and the mode is shifted to auto tuning when the key is released near the desired frequency. Also, auto scanning starts with the memory key depressed, and the receivable station is stored into the memory when the key is released. When the preset station key is depressed, the CH number appears in the FL display tube for 1.7 sec.
- Audio quartz synthe in which the reference frequency is set at 25 kHz outside the audible frequency band.
- FM prescaler based upon the swallow-in counter system of 1/16 and 1/17 frequency division which hardly causes spurious interference.
- FM front end of single/double tuning circuit improved in RF IM characteristic, employing the newly developed 4-pole MOS FET.
- FM signal strength digital indication — the original technology of Technics. (Accurate indication up to 54 dB by 2 dB each.)
- It is batteryless, employing a liquid electrolyte double layer capacitor of 3.3F (farad). Memory backup of over 1 week in case of power failure.
- AM loop antenna that can be set in the optimum position. Highly selective and sensitive AM section to cope with 9 kHz.
- Auto tuning FM antenna terminal to which FM wing antenna of Technics. original can be directly connected.
- Input terminal that allows free selection of stations in combination with weekly programmable timer SH-4060, (It can be controlled with serial signal.)



## ■ LOCATION OF CONTROLS





## ■ HOW TO OPERATE

### • Listening to radio broadcasts

#### Important!



If this antenna is not installed, AM broadcasts will not be received.

- 1 Turn the amplifier on, and prepare it for listening to radio broadcasts.

- 2 Power: "on" ( )

#### 3-1 Station selection by using the manual tuning buttons:

- ① Press either "FM", "MW", or "LW".
- ② Press the left button to change the frequency downward, and press the right button to change the frequency upward.

##### • 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.



#### 3-2 Station selection by using preset tuning buttons:

##### • To select the front channels (CH 1~8):

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



##### • To select 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.



- 5 If the broadcast signal is weak, or if there is a large amount of interference in a stereo broadcast, set to the mono position. Note that the FM stereo indicator will not illuminate in this position.

#### 4 Station selection:

To listen to a broadcasting station whose frequency is located on a 0.025 MHz step, such as 98.025 MHz or 98.075 MHz, or to shift -2 kHz to listen to an LW broadcast, first select the station using the preset tuning button or the tuning button, and then press this button.





## • Manual memory presetting

Stations can be freely preset to any desired channel.

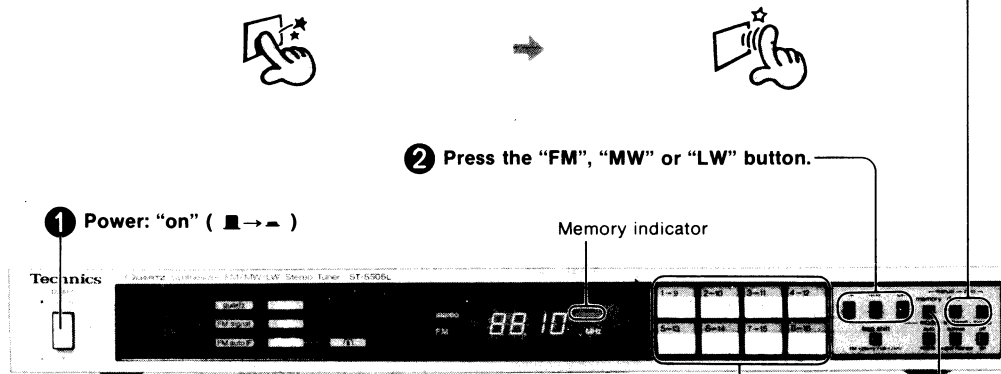
### ③ Press the appropriate tuning button to tune to the desired broadcast.

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



### ② Press the "FM", "MW" or "LW" button.

### ① Power: "on" ( )

### ⑤ 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.

### 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. In order to stop the automatic selection, press either the "up" button or the "down" button.

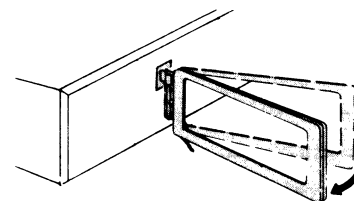
### ⑥ Enter the name (call sign, etc.) of the preset broadcasting station on the file sheet.

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).

Pay attention to the following points when attaching the antenna.

- 1) Do not attach it horizontally (to do so would impair reception).
- 2) Do not attach it close to metal surfaces (to do so would result in noise).
- 3) Do not attach it close to power cords, speaker wires, etc. (to do so would result in noise).
- 4) Do not attach it close to a tape deck (when the tape deck is being used, chirping or beeping sounds may be received).

3. Move the antenna toward the right or left to find the point of best reception.



## ■ DISASSEMBLY INSTRUCTIONS

When repairing the FM front-end pack, replace it with the adjusted pack for repair.

### • How to remove the printed circuit board

1. Remove the 4 setscrews (1 ~ 4 in Fig. 1) of the cabinet.
2. Move the cabinet in the direction of the arrow A in Fig. 1.
3. Remove the 5 setscrews (5 ~ 7 in Fig. 1 and 8, 9 in Fig. 2) of the front panel and the 8 setscrews (10 ~ 15) in Fig. 2 and 16, 17 in Fig. 3) of the bottom board or rear panel.
4. Pressing the 2 claws on the right and left sides of front panel in the direction of arrow B (Fig. 4), remove the front panel along with the P.C.B. in the direction of arrow C (Fig. 4).

(Raise the printed circuit board when repairing.)

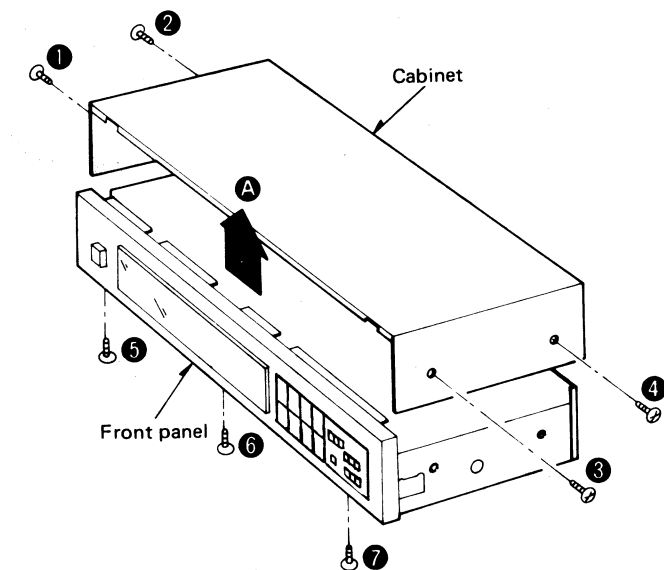


Fig. 1

### • How to remove the front sub-panel

1. Remove the printed circuit board. (Refer to "How to remove the printed circuit board".)
2. Remove the set screw (18 in Fig. 4) which fastens the bracket of FL. Next, remove the bracket by pushing it in the direction of arrow D with a screwdriver.
3. The claws projected (at 8 portions) from the front sub-panel are engaged with the front panel. Disengage the claws from by screwdriver or the like to remove the front sub-panel. (See Fig. 5)

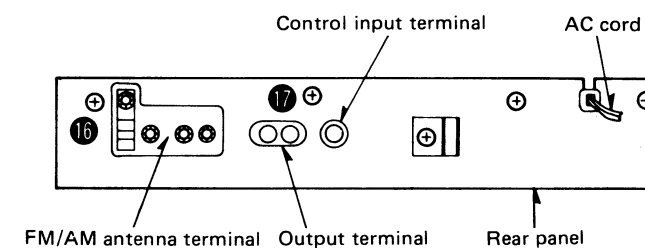


Fig. 3

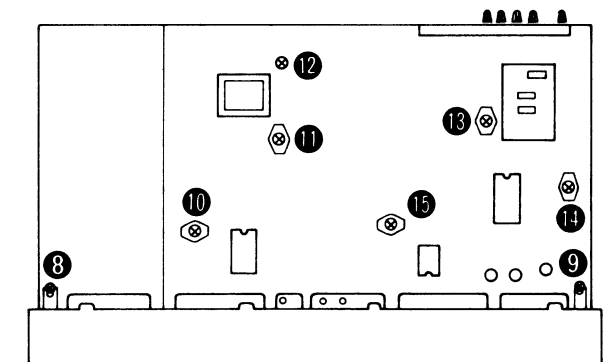


Fig. 2

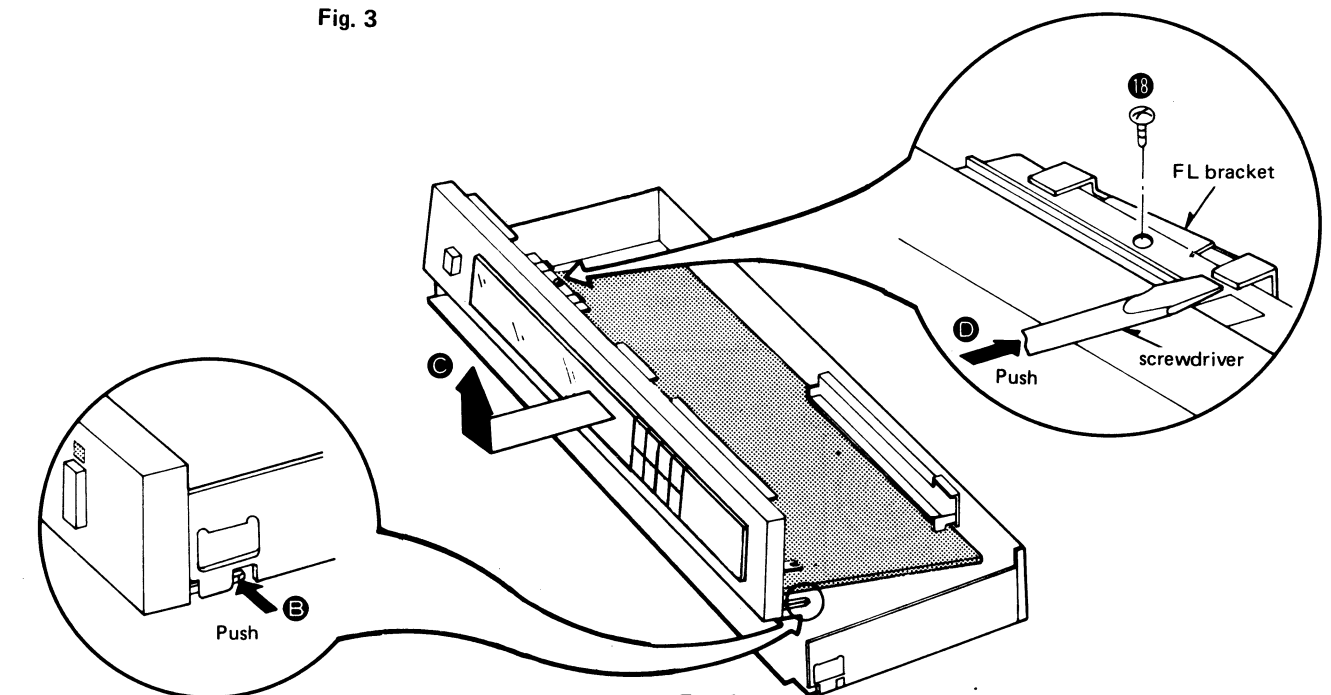


Fig. 4

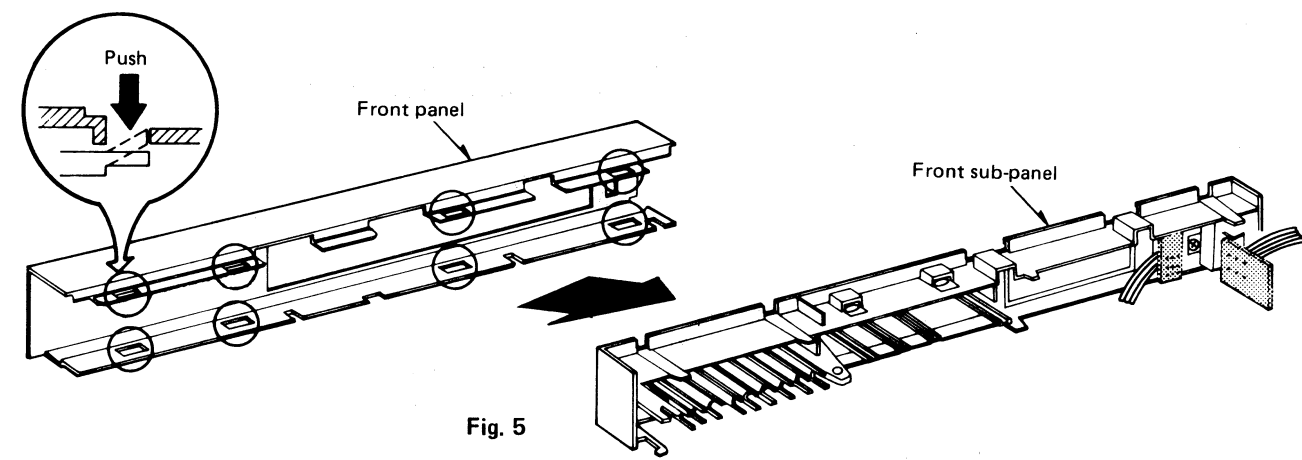


Fig. 5

# MEASUREMENTS AND ADJUSTMENTS

Note: AM OSC coil (L203) and LW ANT trimmer (L251) have been already adjusted, and require no adjustment.

AM ADJUSTMENT					
<div><div><div><div>* Setting and Equipment used</div><div>1. AC electronic voltmeters (VTVM).</div><div>2. AM signal generator (AM-SG).</div><div>3. Set Band selector to "AM" position.</div><div>4. Maintain line voltage at rated voltage.</div></div><div><div>5. Output of signal generator should be no higher than necessary to obtain an output reading.</div><div>6. Use a non-metal screwdriver for the adjustment.</div></div></div></div>					
AM SIGNAL GENERATOR		DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
CONNECTION	FREQUENCY				
LW/MW-IF ADJUSTMENT					
Connect AM-SG to AM antenna terminal through 200 pF capacitor. Common to chassis. (Powerful input)	450 kHz (30% Mod. with 400 Hz)	Frequency of non-interference	Connect AC VTVM or scope to "OUTPUT" terminals.	T201 (AM IFT)	* Adjust the input frequency and adjustment points so that the output becomes maximum.
MW-RF ADJUSTMENT					
Connect AM-SG to AM antenna terminal through 200pF capacitor. Common to chassis. (Weak input) (Refer to Fig. 6)	612 kHz (30% Mod. with 400 Hz)	612 kHz	Connect AC VTVM 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 VTVM 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.
LW-RF ADJUSTMENT					
Connect AM-SG to AM antenna terminal through 200pF capacitor. Common to chassis. (Weak input) (Refer to Fig. 6)	155 kHz (30% Mod. with 400 Hz)	155 kHz	Connect AC VTVM or scope to "OUTPUT" terminals.	L253 (OSC Coil)	1. Adjust for maximum output. 2. Adjust core of L253 by screwdriver.
	353 kHz (30% Mod. with 400 Hz)	353 kHz	Connect AC VTVM or scope to "OUTPUT" terminals.	CT251 (ANT Trimmer)	1. Adjust for maximum output. 2. Repeat steps (4) and (5) until the frequency correctly matches the frequency display.

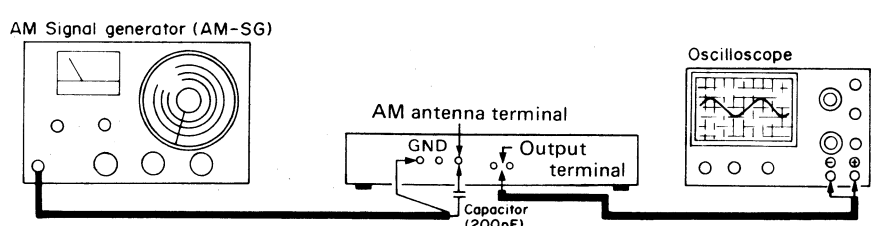
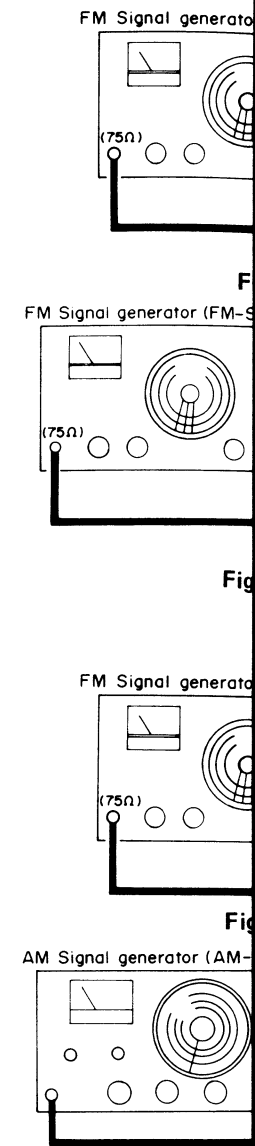


Fig. 6 (Adjustment of AM)

FM ADJUSTMENT						
<b>* Setting and Equipment used</b> 1. FM signal generator (FM-SG). 2. Distortion analyser 3. Oscilloscope 4. DC electronic voltmeters (VTVM). 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. Other setting are the same as in AM adjustment.			<b>* Preparation of FM signal generator (FM-SG)</b> 1. The standard input of the set is 60 dB (1 mV), 400 Hz, 100% modulation (Because of attenuation, using coaxial cables. SG output must be 6 dB plus. That is, when input 60 dB, SG output is to be 66 dB.)			
FM SIGNAL GENERATOR		DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE	
CONNECTION	FREQUENCY					
FM MONO DISTORTION ADJUSTMENT						
Connect FM-SG to FM antenna terminal referring to Fig. 7. (Apply 60 dB to antenna terminal.)	100.10 MHz (100% Mod. with 400 Hz)	100.10 MHz	Connect DC VTVM or between <b>TP101</b> and <b>TP102</b> through choke coil. (Refer to Fig. 7)	T101 (Discr. 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.	
	100.10 MHz (100% Mod. with 400 Hz)	100.10 MHz	Connect distortion analyser to "OUTPUT" terminals.	T102 (Discr. IFT)		
FM MPX V.C.O. ADJUSTMENT						
USING A FREQUENCY COUNTER			USING ALTERNATE SYSTEM			
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 <b>TP301</b> through resistor (100kΩ) referring to Fig. 8. 4. Adjust <b>VR301</b> to 19 kHz ± 30 Hz.			1. Apply stereo signal from generator or stereo station to tuner. 2. Adjust <b>VR301</b> until stereo indicator lights up. Cement arm of <b>VR301</b> as shown in Fig. 9.			
FM SIGNAL GENERATOR		DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE	
CONNECTION	FREQUENCY					
PILOT CANCEL (19 kHz) ADJUSTMENT						
Connect FM-SG to FM antenna terminal referring to Fig. 10. (Apply 60 dB to antenna terminal.)	100.10 MHz (100% Mod. with 400 Hz)	100.10 MHz	Connect AC VTVM or scope to between <b>TP302</b> and ground.	L301 (Pilot cancel 19 kHz) VR302 (Pilot cancel 19 kHz)	Adjust for minimum output.	
OUTPUT LEAK CARRIER ADJUSTMENT						
Connect FM-SG to FM antenna terminal referring to Fig. 11. (Apply 60 dB to antenna terminal.)	100.10 MHz (100% Mod. with 400 Hz)	100.10 MHz	Connect scope to "OUTPUT" terminals. <b>Note:</b> 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)	Adjust VR303 so that output wave-form is as shown in Fig. 12-1. <b>Note:</b> Fig. 12-2 is the wave-form caused due to improper adjustment of VR303. Fig. 12-3 is the wave-form caused due to improper adjustment of VR301 or VR302.	
STEREO DISTORTION ADJUSTMENT						
Connect FM-SG to FM antenna terminal. (Apply 60 dB to antenna terminal.) (Pilot 10% Mod. stereo signal.)	100.10 MHz (100% 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						
Connect FM-SG to FM antenna terminal. (Pilot 10% Mod. stereo signal.)	100.10 MHz (100% Mod. with 1 kHz) (L or R mode)	100.10 MHz	Connect AC VTVM 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						
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.	



# ADJUST

## FM ADJUSTMENT

## \* Setting and Equipment used

1. FM signal generator (FM-SG).
2. Distortion analyser
3. Oscilloscope
4. DC electronic voltmeters (VTVM).
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. Other setting are the same as in AM adjustment.

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

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

Step No.

## FM SIGNAL GENERATOR

## DISPLAY FREQUENCY

## PREPARATIONS

## PARTS ADJUSTED

## ADJUSTING PROCEDURE

## CONNECTION

## FREQUENCY

## FM MONO DISTORTION ADJUSTMENT

6

Connect FM-SG to FM antenna terminal referring to Fig. 7. (Apply 60 dB to antenna terminal.)

100.10 MHz  
(100% Mod.  
with 400 Hz)

100.10 MHz

Connect DC VTVM or between TP101 and TP102 through choke coil. (Refer to Fig. 7)

T101 (Discri. IFT)

1. Adjust T101 core so that voltage measured in signal mode is 0 mV in 300 mV range.

7

Connect distortion analyser to "OUTPUT" terminals.

100.10 MHz  
(100% Mod.  
with 400 Hz)

100.10 MHz

Connect distortion analyser to "OUTPUT" terminals.

T102 (Discri. IFT)

2. Adjust T102 core so that distortion of right and left channels are minimized.

## FM MPX V.C.O. ADJUSTMENT

## USING A FREQUENCY COUNTER

## USING ALTERNATE SYSTEM

8

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 resistor (100k $\Omega$ ) referring to Fig. 8.
4. Adjust VR301 to 19 kHz  $\pm$  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. 9.

## FM SIGNAL GENERATOR

## DISPLAY FREQUENCY

## PREPARATIONS

## PARTS ADJUSTED

## ADJUSTING PROCEDURE

## CONNECTION

## FREQUENCY

## PILOT CANCEL (19 kHz) ADJUSTMENT

9

Connect FM-SG to FM antenna terminal referring to Fig. 10. (Apply 60 dB to antenna terminal.)

100.10 MHz  
(100% Mod.  
with 400 Hz)

100.10 MHz

Connect AC VTVM or scope to between TP302 and ground.

L301 (Pilot cancel 19 kHz)  
VR302 (Pilot cancel 19 kHz)

Adjust for minimum output.

## OUTPUT LEAK CARRIER ADJUSTMENT

10

Connect FM-SG to FM antenna terminal referring to Fig. 11. (Apply 60 dB to antenna terminal.)

100.10 MHz  
(100% 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)

Adjust VR303 so that output wave-form is as shown in Fig. 12-1.  
**Note:** Fig. 12-2 is the wave-form caused due to improper adjustment of VR303. Fig. 12-3 is the wave-form caused due to improper adjustment of VR301 or VR302.

## STEREO DISTORTION ADJUSTMENT

11

Connect FM-SG to FM antenna terminal. (Apply 60 dB to antenna terminal.) (Pilot 10% Mod. stereo signal.)

100.10 MHz  
(100% 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  $\sim$  19 kHz)

T1 (IFT)

Adjust T1 core so that distortion of right and left channels are minimized.

## SEPARATION ADJUSTMENT

12

Connect FM-SG to FM antenna terminal. (Pilot 10% Mod. stereo signal.)

100.10 MHz  
(100% Mod.  
with 1 kHz)  
(L or R mode)

100.10 MHz

Connect AC VTVM to "OUTPUT" terminals of the set through low-pass filter. (fc = 15 kHz  $\sim$  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

13

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  $\sim$  38 dB when the input is 30 dB.

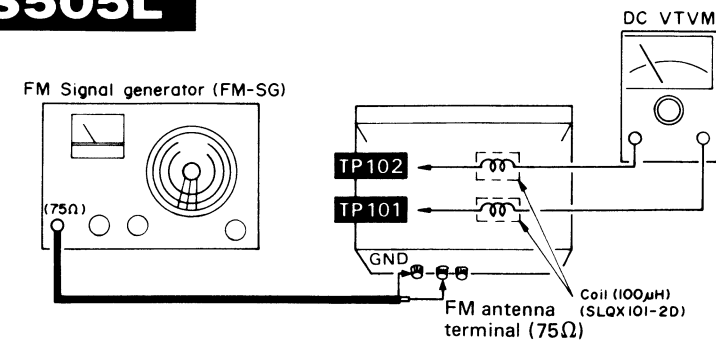


Fig. 7 (Adjustment of FM offset)

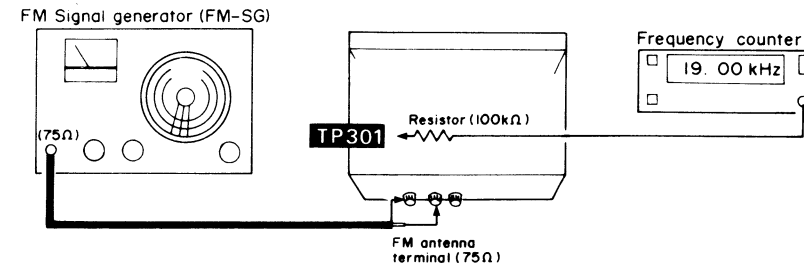


Fig. 8 (Adjustment of FM MPX VCO)

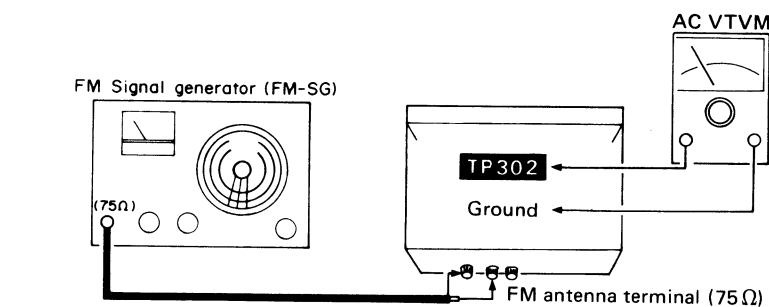


Fig. 10 (Adjustment of pilot cancel)

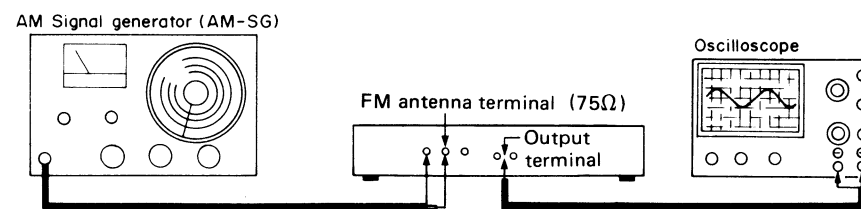


Fig. 11 (Adjustment of output leak carrier)

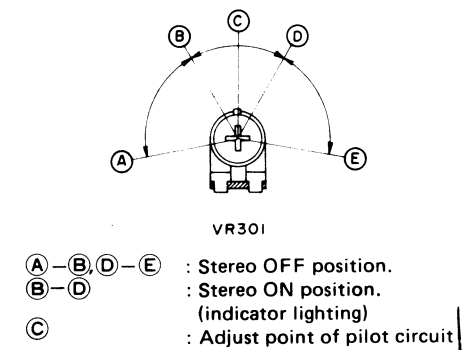


Fig. 9 (Adjustment of FM MPX VCO)

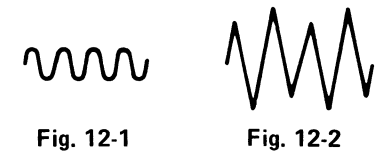


Fig. 12-1

Fig. 12-2

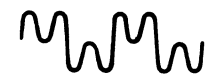
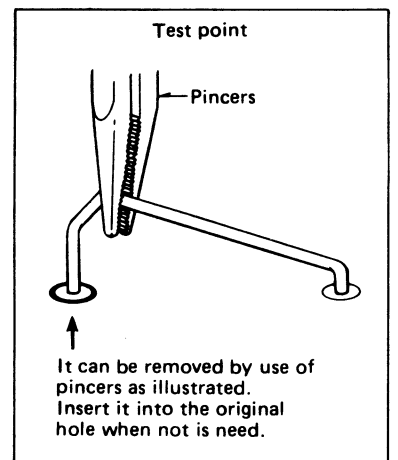
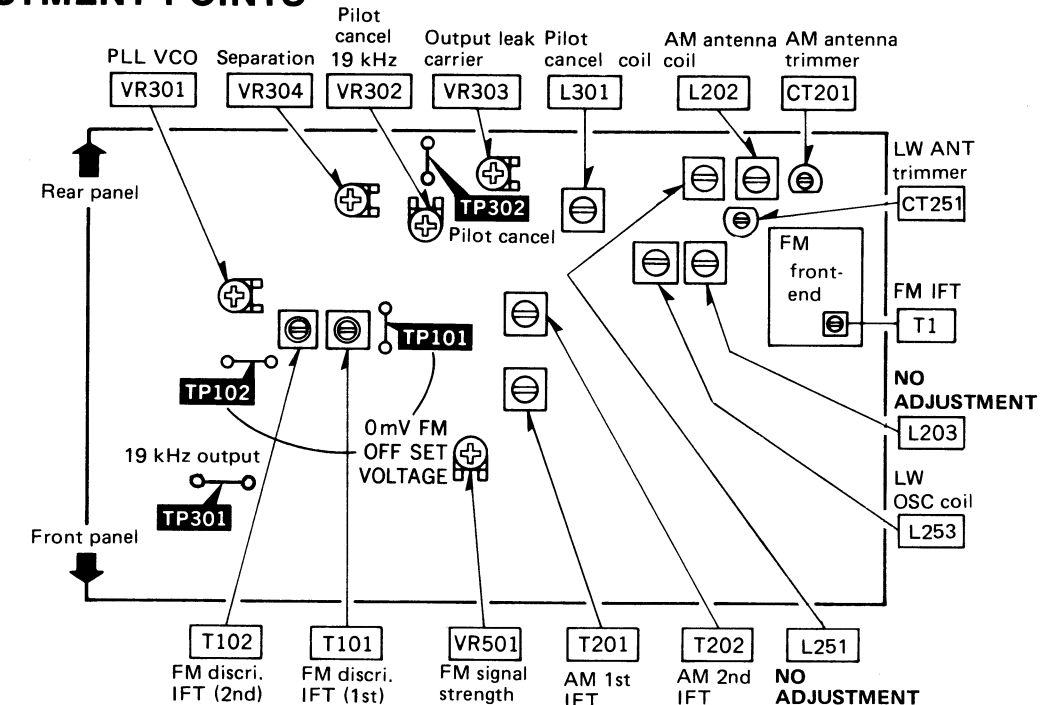


Fig. 12-3



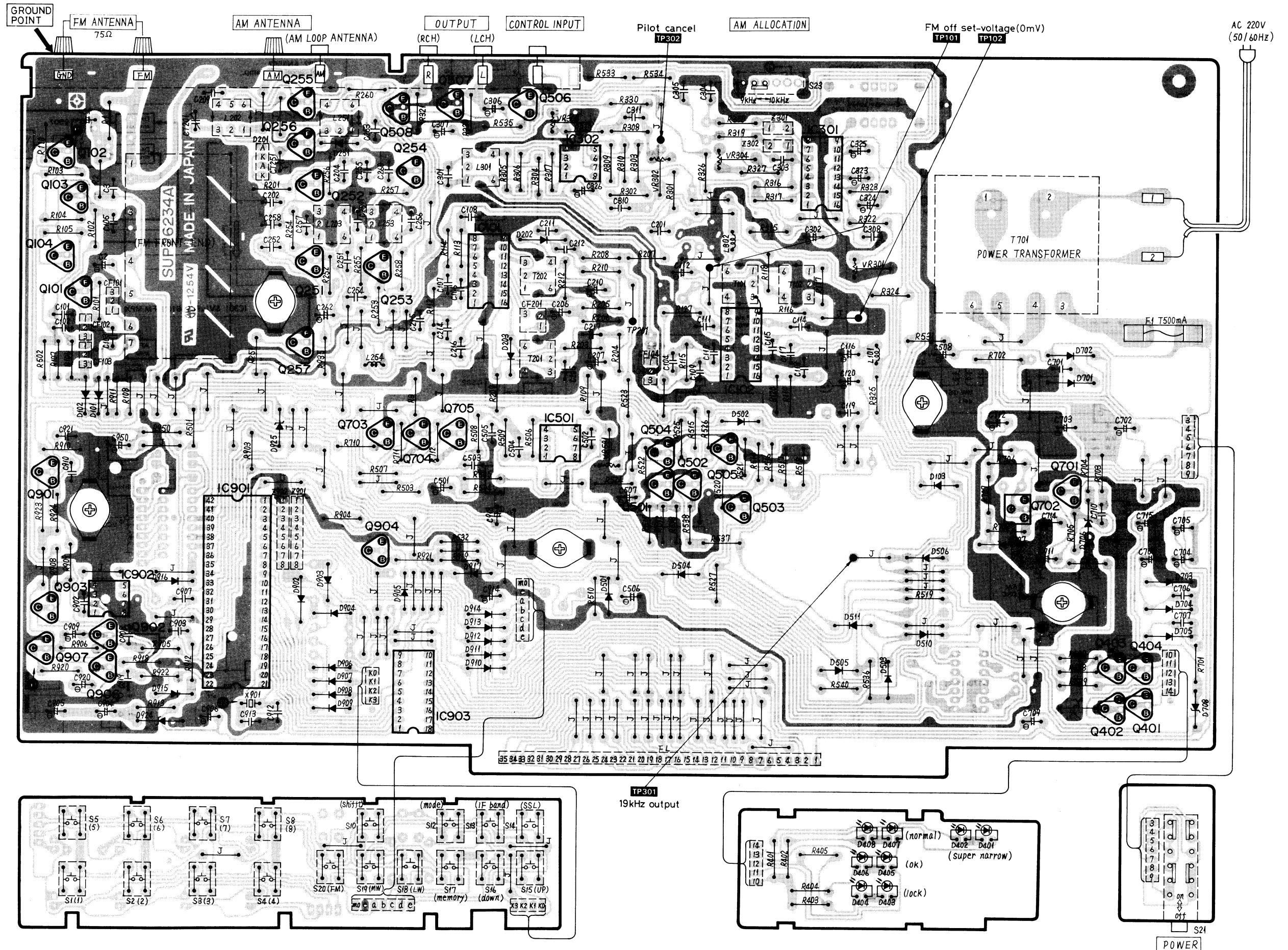
## ADJUSTMENT POINTS





■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

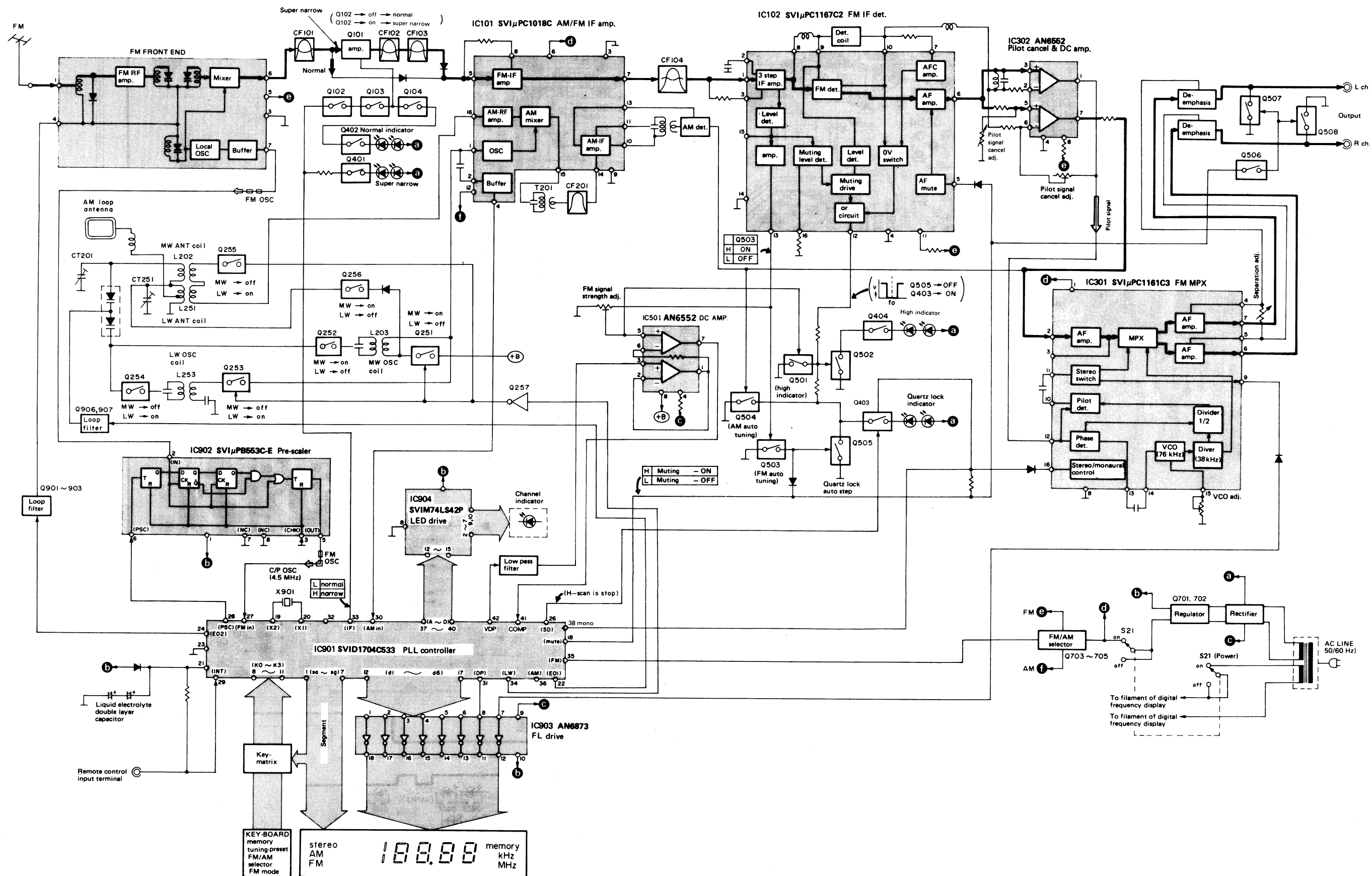
Ground (Earth) lines

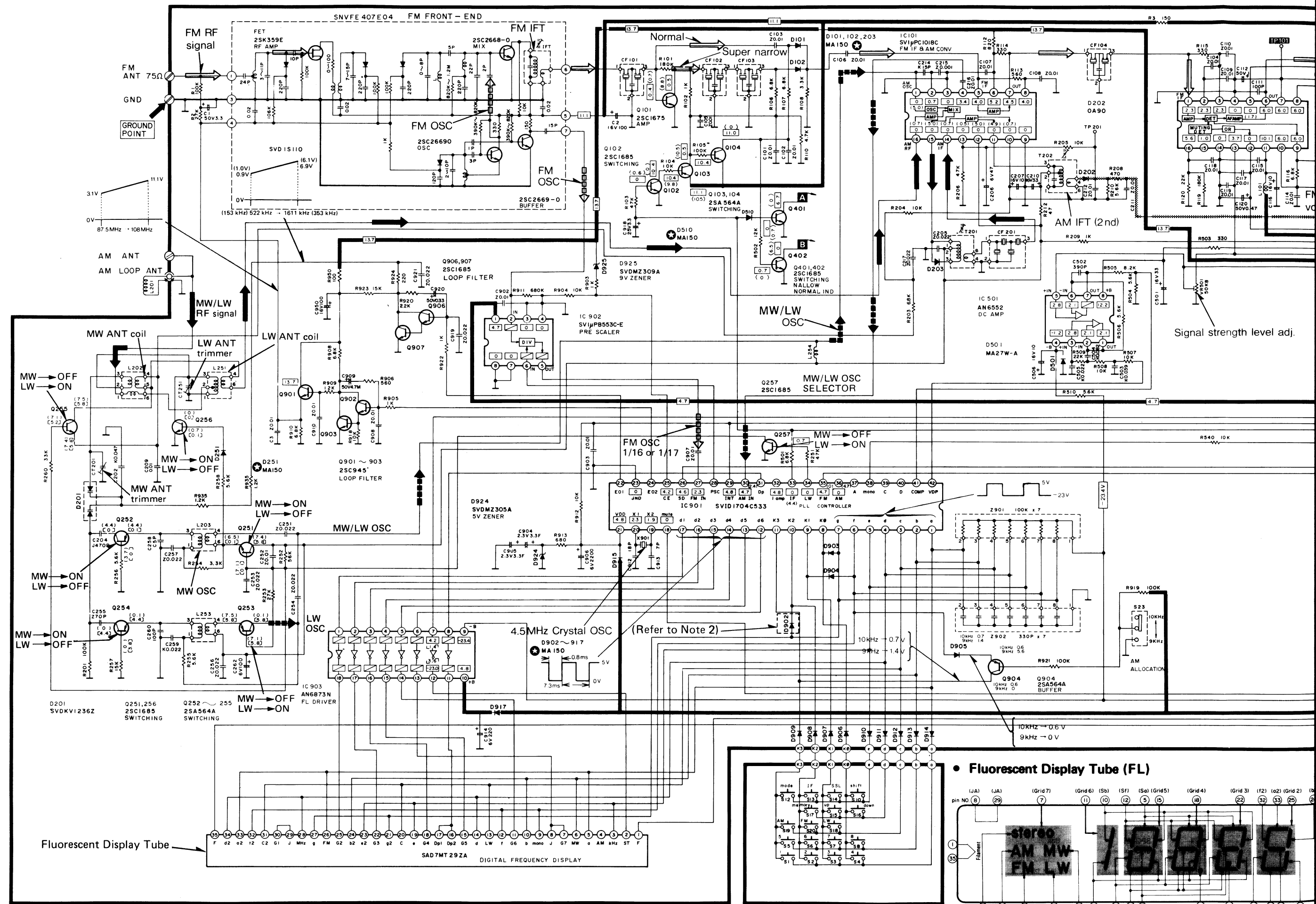


11

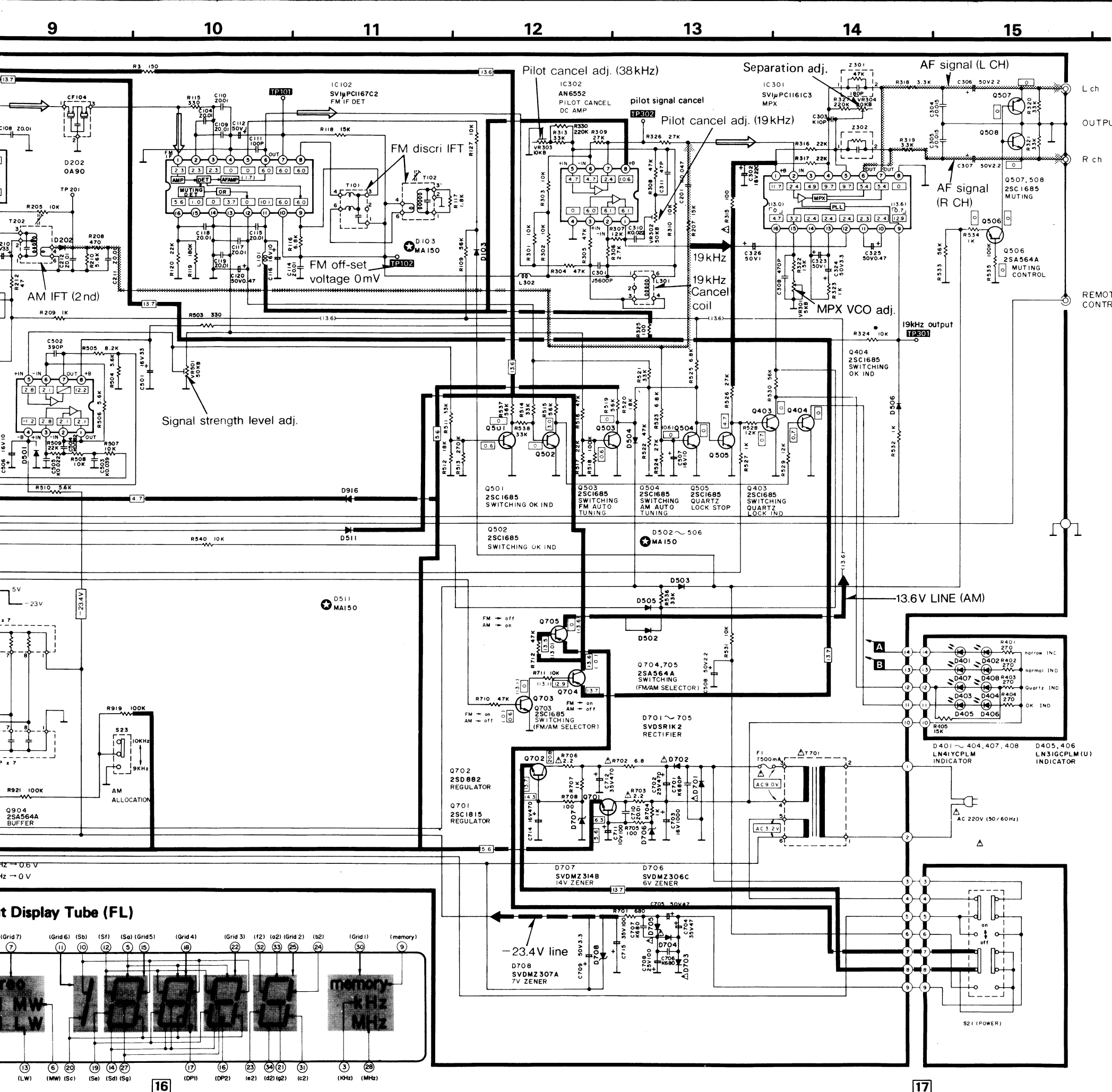
12

## ■ 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  $\Delta$  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.

### Note 1:

- S1 ~ S8** : Preset tuning switch.  
1 ~ 16 CH
  - S10** : FM frequency shift switch. (off  $\leftrightarrow$  25 kHz)
  - S12** : FM mode switch. (auto  $\leftrightarrow$  mono)
  - S13** : FM IF band selector switch.  
normal  $\leftrightarrow$  super narrow
  - S14** : FM signal strength level call switch.  
off  $\leftrightarrow$  on
  - S15** : Tuning (up) switch. (manual  $\leftrightarrow$  auto)  
[up : tuning to higher frequency]
  - S16** : Tuning (down) switch. (manual  $\leftrightarrow$  auto)  
[down : tuning to lower frequency]
  - S17** : Memory switch. (manual  $\leftrightarrow$  auto)
  - S18** : LW select switch.
  - S19** : AM selector switch.
  - S20** : FM selector switch.
  - S21** : Power source switch in "on" position.
  - S23** : AM (MW) allocation switch in "10 kHz step" position.  
9 kHz step  $\leftrightarrow$  10 kHz step
14. 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  $\square$  stand for DC voltage in FM signal (monaural) reception mode.
  - \* Figures in  $\square$  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.
  - \* Figures in  $[ ]$  stand for DC voltage in LW signal reception mode.
15.  $\longrightarrow$  Positive voltage lines.  $\longrightarrow$  AF signal lines  
 $\longrightarrow$  FM signal  $\longrightarrow$  FM OSC  
 $\longrightarrow$  AM signal  $\longrightarrow$  AM OSC
16. Important safety notice:  
 Components identified by  $\Delta$  mark have special characteristics important for safety.  
 When replacing any of these components, use only manufacturer's specifications.

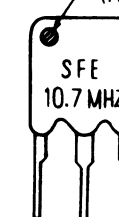
### Note 2:

#### • Use of ceramic filters in pairs

The ceramic filters (CF101 ~ CF104) for FM-IF circuit 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.

Color marking  
(Red or Black)



RANK (Color)	D902	CENTER FREQUENCY
Black	O	10.65 MHz
Red	X	10.70 MHz

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



## ■ RESISTORS & CAPACITORS

(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:**

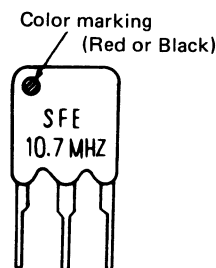
1. **S1 ~ S8** : Preset tuning switch.  
1 ~ 16 CH
  2. **S10** : FM frequency shift switch. (off ↔ 25 kHz)
  3. **S12** : FM mode switch. (auto ↔ mono)
  4. **S13** : FM IF band selector switch.  
normal ↔ super narrow
  5. **S14** : FM signal strength level call switch.  
off ↔ on
  6. **S15** : Tuning (up) switch. (manual ↔ auto)  
[ up : tuning to higher frequency ]
  7. **S16** : Tuning (down) switch. (manual ↔ auto)  
[ down : tuning to lower frequency ]
  8. **S17** : Memory switch. (manual ↔ auto)
  9. **S18** : LW select switch.
  10. **S19** : AM selector switch.
  11. **S20** : FM selector switch.
  12. **S21** : Power source switch in "on" position.
  13. **S23** : AM (MW) allocation switch in "10 kHz step" position.  
9 kHz step ↔ 10 kHz step
14. 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 (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
  - \* Figures in [ ] stand for DC voltage in LW signal reception mode.
15. Positive voltage lines. AF signal lines
- FM signal      FM OSC
- AM signal      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.

**Note 2:**

- **Use of ceramic filters in pairs**

The ceramic filters(CF101 ~ CF104) for FM-IF circuit 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.



<b>RANK (Color)</b>	<b>D902</b>	<b>CENTER FREQUENCY</b>
Black	○	10.65 MHz
Red	X	10.70 MHz

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

**Notes:** 1. Part numbers are indicated on most mechanical parts.

**Please use this part number for parts orders.**

2. Important safety notice:

Components identified by  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.

5. The unit of resistance is OHM ( $\Omega$ )

K = 1000  $\Omega$ , M = 1000K $\Omega$

6. The unit of capacitance is MICROFARAD ( $\mu F$ )  
 $P = 10^{-6} \mu F$

## 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 : $\pm 5\%$

### Numbering System of Capacitor

Example				
ECKD	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	
ECEA : Electrolytic	OJ : 6.3V	1H : 50V DC	C : $\pm 0.25\mu\text{F}$
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 : $+80\%, -20\%$
ECQP : Polypropylene	1H : 50V		
EECW : Liquid electrolyte double layer capacitor	50 : 50V 25 : 25V 1V : 35V		

Ref. No.	Part No.	Value
<b>RESISTORS</b>		
R1	\$ ERD25TJ104	100K
R2	\$ ERD25TJ273	27K
R3	\$ ERD25FJ151	150
R101	\$ ERD25TJ184	180K
R102	\$ ERD25FJ102	1K
R103	\$ ERD25TJ473	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	\$ ERD25FJ331	330
R116	\$ ERD25FJ682	6.8K
R117	\$ ERD25FJ182	1.8K
R118	\$ ERD25TJ153	15K
R119	\$ ERD25TJ184	180K
R120	\$ ERD25TJ223	22K
R127	\$ ERD25FJ103	10K
R201	\$ ERD25TJ104	100K
R203	\$ ERD25FJ682	6.8K
R204,205	\$ ERD25FJ103	10K
R206	\$ ERD25TJ473	47K
R207	\$ ERD25TJ153	15K
R208	\$ ERD25FJ471	470
R209	\$ ERD25FJ102	1K
R210	\$ ERD25FJ562	5.6K
R212	\$ ERD25FJ470	47
R251	\$ ERD25TJ473	47K
R252	\$ ERD25TJ563	56K

Ref. No.	Part No.	Value
<b>RESISTORS</b>		
R253	\$ ERD25TJ273	27K
R254	\$ ERD25FJ332	3.3K
R255,256	\$ ERD25FJ562	5.6K
R257	\$ ERD25TJ153	15K
R258	\$ ERD25FJ562	5.6K
R260	\$ ERD25TJ333	33K
R301,302	\$ ERD25FJ103	10K
R303	\$ ERD25FJ103	10K
R304,305	\$ ERD25TJ473	47K
R306	\$ ERD25FJ272	2.7K
R307	\$ ERD25TJ123	12K
R308	\$ ERD25TJ473	47K
R309	\$ ERD25TJ273	27K
R310	\$ ERD25FJ103	10K
R313	\$ ERD25TJ333	33K
R315	△ ERD25FJ101	100
R316,317	\$ ERD25TJ223	22K
R318,319	\$ ERD25FJ332	3.3K
R320,321	\$ ERD25TJ333	33K
R322	\$ ERD25TJ153	15K
R323	\$ ERD25FJ102	1K
R324	\$ ERD25FJ103	10K
R325	\$ ERD25FJ101	100
R326	\$ ERD25TJ273	27K
R327	\$ ERD25TJ224	220K
R330	\$ ERD25TJ224	220K
RA01,402	\$ ERD25FJ271	270
RA03,404	\$ ERD25FJ271	270
RA05	\$ ERD25TJ153	15K
R501	\$ ERD25FJ682	6.8K
R502	\$ ERD25TJ123	12K
R503	\$ ERD25FJ331	33K

Ref. No.	Part No.	Value
<b>RESISTORS</b>		
R504	\$ ERD25FJ562	5.6K
R505	\$ ERD25FJ822	8.2K
R506	\$ ERD25FJ562	5.6K
R507, 508	\$ ERD25FJ103	10K
R509	\$ ERD25TJ223	22K
R510	\$ ERD25FJ562	5.6K
R511	\$ ERD25TJ333	33K
R512	\$ ERD25TJ183	18K
R513	\$ ERD25TJ274	270K
R514	\$ ERD25TJ333	33K
R515	\$ ERD25TJ563	56K
R516	\$ ERD25TJ473	47K
R517	\$ ERD25TJ223	22K
R518	\$ ERD25TJ104	100K
R519	\$ ERD25TJ563	56K
R520	\$ ERD25TJ183	18K
R521	\$ ERD25TJ333	33K
R522	\$ ERD25TJ473	47K
R523	\$ ERD25FJ682	6.8K
R524	\$ ERD25TJ273	27K
R525	\$ ERD25FJ682	6.8K
R526	\$ ERD25TJ273	27K
R527	\$ ERD25FJ102	1K
R528, 529	\$ ERD25TJ123	12K
R530	\$ ERD25TJ563	56K
R531	\$ ERD25FJ103	10K
R532	\$ ERD25FJ102	1K
R533	\$ ERD25TJ563	56K
R534	\$ ERD25FJ102	1K
R535	\$ ERD25TJ104	100K
R536	\$ ERD25TJ333	33K
R537	\$ ERD25TJ563	56K

Ref. No.	Part No.	Value
<b>RESISTORS</b>		
R538	\$ ERD25TJ333	33K
R540	\$ ERD25FJ103	10K
R701	\$ ERD25FJ681	680K
R702	△ \$ ERD25FJ68R	6.8K
R703	△ \$ ERD25FJ102	1K
R704	\$ ERD25FJ102	1K
R705	\$ ERD25FJ101	100K
R706	△ \$ ERD25FJ2R2	2.2K
R707	△ \$ ERDS1FJ102	1K
R708	\$ ERD25FJ101	100K
R710	\$ ERD25TJ473	47K
R711	\$ ERD25FJ103	10K
R712	\$ ERD25TJ473	47K
R903	\$ ERD25FJ102	1K
R904	\$ ERD25FJ103	10K
R905	\$ ERD25FJ102	1K
R906	\$ ERD25FJ561	560K
R908	\$ ERD25FJ682	6.8K
R909	\$ ERD25TJ123	12K
R910	\$ ERD25FJ682	6.8K
R911	\$ ERD25TJ684	680K
R912	\$ ERD25FJ103	10K
R913	\$ ERD25FJ681	680K
R918	\$ ERD25FJ103	10K
R919	\$ ERD25TJ104	100K
R920	\$ ERD25FJ222	2.2K
R921	\$ ERD25TJ104	100K
R922	\$ ERD25FJ102	1K
R923	\$ ERD25TJ153	15K
R924	\$ ERD25FJ221	22K
R935	\$ ERD25FJ122	1.2K
R950	\$ ERD25FJ101	10K

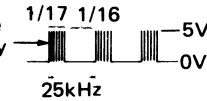
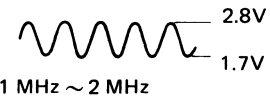

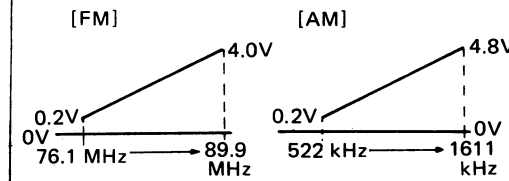
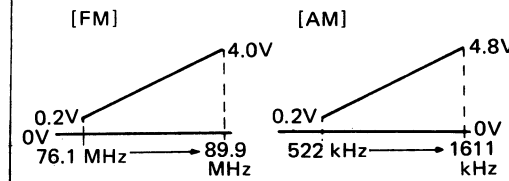
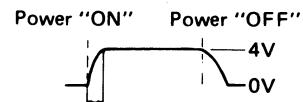
Ref. No.	Part No.	Value
<b>CAPACITORS</b>		
C1	\$ ECEA50Z3R3	3.3
C2	\$ ECEA1ES101	100
C3	\$ ECKD1H103ZF	0.01
C101,102	\$ ECKD1H103ZF	0.01
C103,104	\$ ECKD1H103ZF	0.01
C105,106	\$ ECKD1H103ZF	0.01
C107,108	\$ ECKD1H103ZF	0.01
C109,110	\$ ECKD1H103ZF	0.01
C111	\$ ECCD1H101K	100p
C112	\$ ECEA50Z1	1
C114,115	\$ ECKD1H103ZF	0.01
C116	\$ ECEAS100	10
C117,118	\$ ECKD1H103ZF	0.01
C119	\$ ECKD1H103ZF	0.01
C120	\$ ECEA50ZR47	0.47
C201,202	\$ ECGM14H73JZ	0.047
C204	\$ ECPQ141J47	470p
C205	\$ ECKD1H223ZF	0.022
C206	\$ ECEA1AS470	470
C207	\$ ECEA1HS100	10
C209	\$ ECKD1H103ZF	0.01

Ref. No.	Part No.	Value
<b>CAPACITORS</b>		
C210	\$ ECEA1CS330	33p
C211,212	\$ ECKD1H103ZF	0.01
C214	\$ ECCD1H150KC	15p
C215	\$ ECKD1H102ZF	0.001
C216	\$ ECKD1H103ZF	0.01
C217	\$ ECKD1H223ZF	0.022
C251	\$ ECKD1H223ZF	0.022
C252	\$ ECKD1H103ZF	0.01
C253	\$ ECKD1H223ZF	0.022
C254	\$ ECQM1H223JZ	0.022
C255	\$ ECQP1271JZ	270p
C256,257	\$ ECKD1H223ZF	0.022
C258	\$ ECCD1H050CC	5p
C259	\$ ECQM1H223JZ	0.022
C260	\$ ECCD1H101KC	100p
C262	\$ ECEA1AS101	100p
C301	\$ ECQP1562JZ	5600p
C302	\$ ECEA1CS221	220p
C303	\$ ECCD1H100KC	10p
C304,305	\$ ECQM1H153JZ	0.015
C306,307	\$ ECF5A072R2	2.2

Ref. No.	Part No.	Value
<b>CAPACITORS</b>		
C308	ECQP1471JZ	470P
C310	\$ ECQM1H223JZ	0.022F
C311	\$ ECGD1H470K	470P
C323	\$ ECEA50Z1	
C324	\$ ECEA50Z3R3	
C325	\$ ECEA50Z4R7	3.3F
C326	\$ ECEA50Z1	
C501	\$ ECEA1CS330	330P
C502	\$ ECKD1H391KB	390P
C503	\$ ECQM1H393JZ	0.039F
C504	\$ ECQM1H823JZ	0.082F
C505	\$ ECQM1H223JZ	0.022F
C506,507	\$ ECEA1HS100	100P
C508	\$ ECEA50Z2R2	2.2F
C701	\$ ECKD2H681KB	680P
C702	\$ ECEA1ES471	470P
C703	\$ ECEA1CS102	100P
C704	\$ ECEA1HS470	470P
C705	\$ ECEA1HS470	470P
C706,707	\$ ECKD2H681KB	680P
C708	\$ ECEA1ES101	100P

Ref. No.	Part No.	Value
<b>CAPACITORS</b>		
C709	\$ ECEA50Z3R3	3.3F
C710	\$ ECKD1H103ZF	0.01
C711	\$ ECEA1AS101	100
C712	\$ ECEA1VS471	470
C714	\$ ECEA1CS471	470
C715	\$ ECEA1VS101	100
C902,903	\$ ECKD1H103ZF	0.01
C904,905	\$ EECW2R3A3R3	3.3F
C906	\$ ECEA0JS222	2200
C907,908	\$ ECKD1H103ZF	0.01
C909	\$ ECEA50M47R7R	4.7
C910	\$ ECKD1H103ZF	0.01
C912	\$ ECCD1H180KC	18p
C913	\$ ECCD1H070CC	7p
C914	\$ ECEA1AS221	220
C918	\$ ECEA50Z3R3	3.3
C919	\$ ECKD1H223ZF	0.0222ZF
C920	\$ ECEA1HSR33	0.33
C921	\$ ECKD1H223ZF	0.022
C950	\$ ECEA1ES101	100

FUNCTION OF TERMINAL (PLL CONTROLLER IC901)

Pin No.	Mark	Description of terminal	Pin No.	Mark	Description of terminal
1	Sa	Segment signal output terminal for display. (Refer to Fig. 13)	26	SD	This input terminal detects the reception of a broadcasting station. The voltage is 4.2V during reception, and otherwise 0V.
2	Sb		27	FM	Input terminal for FM OSC output frequency-divided to 1/16 or 1/17 by pre-scaler.
3	Sc		28	PSC	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. 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. 
4	Sd		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.
5	Se		30	AM	Input terminal for AM OSC output. 
6	Sf		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.
7	Sg		32	Lamp	
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. 	33	IF	4-Bit output port. FM (35) is FM/AM output terminal; 5V in FM and 0V in AM. IF (33) terminal level is "H" at "L" narrow in normal mode. LW (34) is the MW/LW selector output terminal, which is 5V in LW, and 0V in MW. AM (36) not used in this unit.
9	K1		34	LW	
10	K2		35	FM	
11	K3		36	AM	
12	D6	Digit signal output terminal for display. (Refer to Fig. 13)	37	A	4-bit output port. A (37), C (39) and D (40) are not used in this unit.
13	D5		38	B	
14	D4		39	C	
15	D3		40	D	
16	D2		41	COMP	1-bit input port. Comparison voltage input terminal, regulating the duty pulses to let it follow the signal voltage. 
17	D1		42	VDP	Variable duty pulse at 1.34 kHz is delivered to compare it with signal voltage. 
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	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.			
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.			

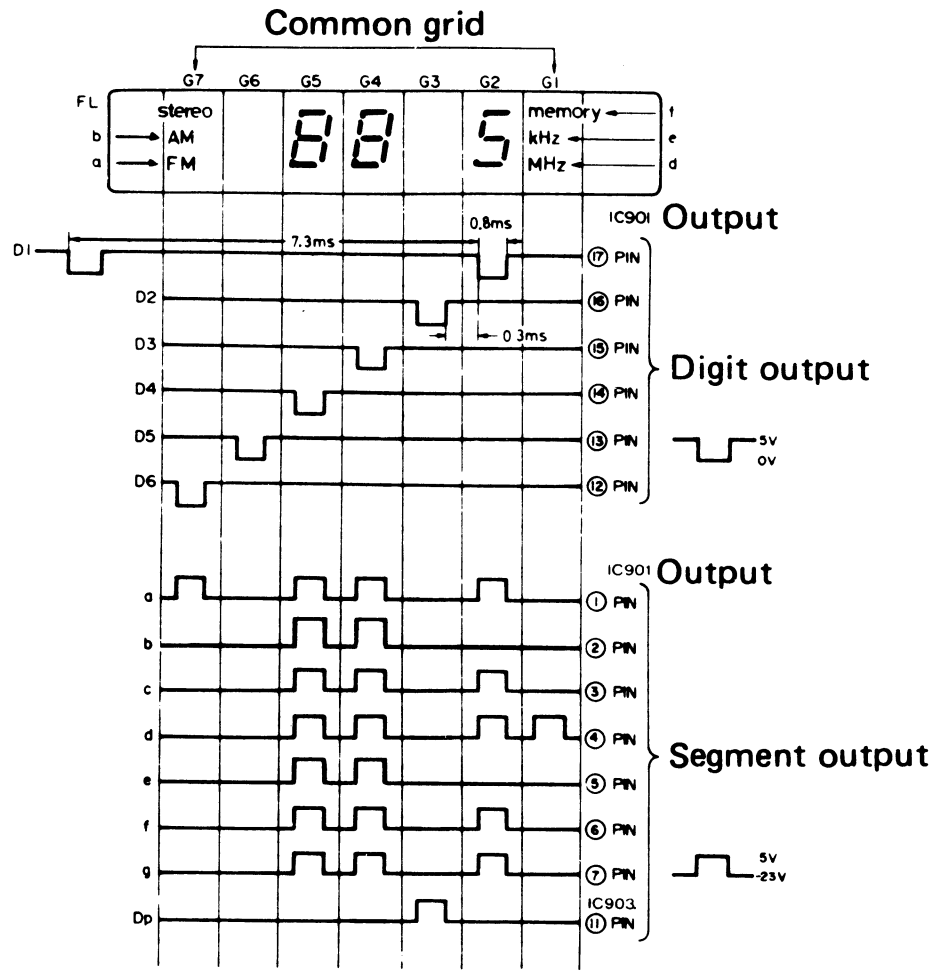


Fig. 13

Terminal guide of transistors, IC's and diodes

SVID1704C533		AN6552, SVIμPB553AC		2SC1675, 2SC1685, 2SA564, 2SC1815, 2SC945	
2SD882	MA150, OA90	SVDKV1236Z	MA27W-A	SVDSR1K2	SVDMZ □□□□

REPLACE

- Notes:
1. Part number
  2. Important sa
  3. Components
  4. Part other th
  5. Bracketed in

Ref. No.	
IC101	SVIU
IC102	SVIU
IC301	SVIU
IC302,501	AN65
IC901	SVID
IC902	SVIU
IC903	AN65
TRANSISTORS	
Q101	2SC
Q102,251,256,257	2SC
401~404,501~	2SC
505,507,508,703,	
906,907	
Q103,104,252~255,	2SA5
506,704,705,904	2SA5
Q701	2SC
Q702	2SD
Q901~903	2SC
DIODES	
D101~103,203,251	MA1
502~506,510,511	MA1
902~917	SVD
D201	SVD
D202	20A5
D401~404,407,408	LN4
D405,406	LN3
D501	MA2
D701~705	SVD
D706	SVD
D707	SVD
D708	SVD
D924	SVD
D925	SVD
COILS	
L101,254,302	SLQ
L202	SLA2
L203	SLA2
L251	SLA2
L253	SLA2
L301	SLM
TRANSFORMERS	
T101	SL14
T102	SL14
T201	SL12
T202	SL12
T701	SLT5
VARIABLE CAPACITORS	
CT201	SVC
CT251	SVC
FM FRONT END	
	SNV
CERAMIC FILTERS	
CF101	SVF

## ■ REPLACEMENT PARTS LIST

- Notes:**
- Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
  - Important safety notice:  
Components identified by  $\Delta$  mark have special characteristics important for safety.  
When replacing any of these components, use only manufacturer's specified parts.
  - $\textcircled{K}$  -marked parts are used for black only, while  $\textcircled{O}$  -marked parts are for silver type only.
  - Part other than  $\textcircled{K}$  -and  $\textcircled{O}$  -marked are used for both black and silver type.
  - Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

- The "S" mark is service standard parts and may differ from production parts.
- The parenthesized numbers in the column of description stand for the quantity per set.

Black type model No. : ST-S505L (K)

## Areas

- \* [EX] is available in Switzerland and Scandinavia.
- \* [EF] is available in France.
- \* [EB] is available in Belgium.

Ref. No.	Part No.	Description
<b>INTEGRATED CIRCUITS</b>		
IC101	SVIUPC1018C	FM IF & AM Converter
IC102	SVIUPC1167C2	FM IF Det.
IC301	SVIUPC1161C3	MPX
IC302,501	AN6552F	Pilot Cancel DC Amp., DC Amp.
IC901	SVID1704C533	Controller
IC902	SUIPB553AC	Pre-Scaler
IC903	AN6873N	FL Driver
<b>TRANSISTORS</b>		
Q101	2SC1675-L	IF Amp.
Q102,251,256,257	2SC1685-Q	Switching, Quartz
401~404,501~505,507,508,703,906,907		Lock,Muting
Q103,104,252~255,506,704,705,904	2SA564AQ	Switching, Muting
Q701	2SC1815-Y	Control
Q702	2SD793-P	Regulator
Q901~903	2SC945-Q	Regulator Loop Filter
<b>DIODES</b>		
D101~103,203,251	MA162A	Switching
502~506,510,511		
902~917		
D201	SVDKV1236Z	AM Variable Capacitance
D202	20A90	Detection
D401~404,407,408	LN41YCPHL	L.E.D(Narrow, Nomal, Quartz)
D405,406	LN31GCPHL	L.E.D(OK)
D501	MA27W-A	
D701~705	SVDSR1K2	Rectifier
D706	SVDMZ306C	6V,Zener
D707	SVDMZ314B	14V,Zener
D708	SVDMZ307A	7V,Zener
D924	SVDMZ305A	5V,Zener
D925	SVDMZ309A	9V,Zener
<b>COILS</b>		
L101,254,302	SLQX101-3M	Choke
L202	SLA2C7-P	AM Antenna
L203	SL02C31R-P	AM OSC
L251	SLA1C15R-P	LW Antenna
L253	SL01C17-P	LW OSC
L301	SLM1C57-Z	19kHzCancel
<b>TRANSFORMERS</b>		
T101	SLI4C541-Z	FM IFT
T102	SLI4C543-Z	FM IFT
T201	SLI2C127-M	AM IFT
T202	SLI2C413	AM IFT
T701	SLT5K135	Power Source
<b>VARIABLE CAPACITOR</b>		
CT201	SVCTZ03T110F	AM Antenna
CT251	SVCTZ03R200F	LW Antenna
<b>FM FRONT END</b>		
	SNVFE407E04	
<b>CERAMIC FILTERS</b>		
CF101	SVFE107MM-A	FM,10.7MHz(Red)
	SVFE107MM-D	FM,10.65MHz (Black)

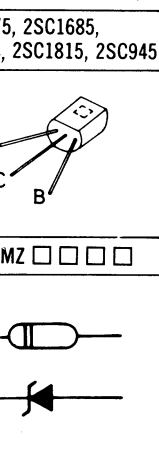
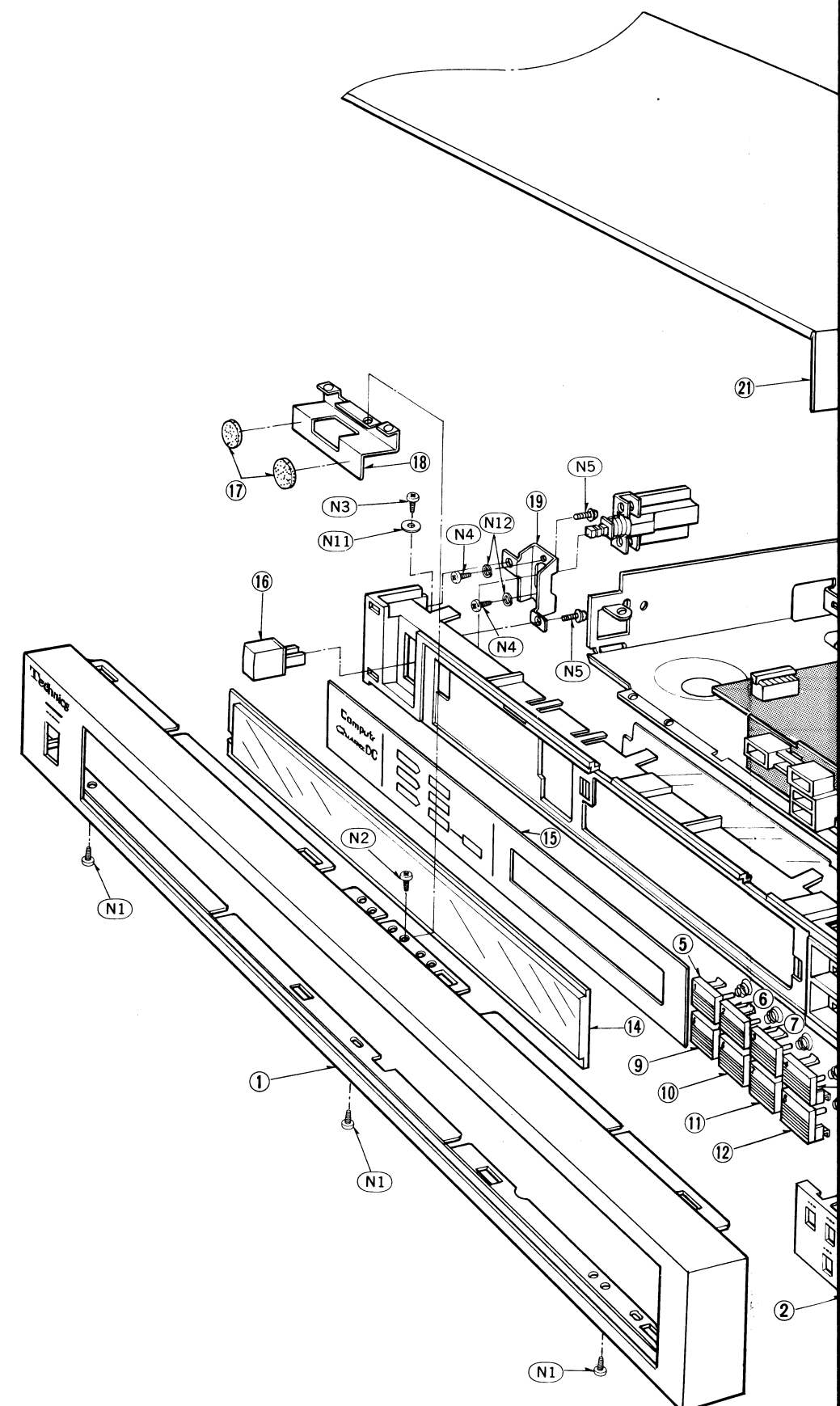
Ref. No.	Part No.	Description
<b>CERAMIC FILTERS</b>		
CF102,103	SVFE107MZ2-A	FM,10.7MHz(Red)
	SVFE107MZ2-D	FM,10.65MHz (Black)
CF104	SVFE107ML-A	FM,10.7MHz(Red)
	SVFE107ML-D	FM,10.65MHz (Black)
CF201	SVFSFP450HT	AM450kHz
	(Use pair ranks as same as CF101,CF102,CF103 and CF104)	
<b>CRYSTAL</b>		
X901	SVQ43U452-N	4.5MHz Counter OSC
<b>FLUORESCENT DISPLAY TUBE</b>		
FL	SAD7MT29ZA	Frequency
<b>VARIABLE RESISTORS</b>		
VR301	EVN75AA00B53	MPX VCO Adjust-ment,5k $\Omega$ (B)
VR302,501	EVN58AA00B54	19kHz Cancel Adjustment,SSL
		Adjustment,50k $\Omega$ (B)
VR303	EVN58AA00B14	38kHz Cancel Adjustment,10k $\Omega$ (B)
VR304	EVN58AA00B25	Separation Adjustment,200k $\Omega$ (B)
<b>COMPONENT COMBINATIONS</b>		
Z301,302	EXRP181K473C	180pF,47k $\Omega$
Z901	EXBP87104K	100k $\Omega$ (X7)
Z902	EXFP7331MW	330pF(X7)
<b>FUSE</b>		
F1	XBA2C05TR0	T500mA
<b>SWITCHES</b>		
S1~8,10,12~20	SSG13	Preset,FM Mode, FM IF Band Select, Tuning,Memory
		FM and AM Mode
S21	SSH183	Power Source
S23	SSS67	AM Allocation

Ref. No.	Part No.	Description
<b>CABINET and CHASSIS PARTS</b>		
1	$\textcircled{O}$ SGWTS505LE	Front Panel,Ass'y(Silver) (1)
1	$\textcircled{K}$ SGWTS505LKE	Front Panel,Ass'y(Black) (1)
2	$\textcircled{O}$ SGX7465-3	Panel,Button(Silver) (1)
2	$\textcircled{K}$ SGX7465-4	Panel,Button(Black) (1)
3	SBC561-3	Button,Front Sub Panel (1)
4	$\textcircled{O}$ SGX7455	Front Sub Panel(Silver) (1)
4	$\textcircled{K}$ SGX7455-1	Front Sub Panel(Black) (1)
5	SBC557-8	Button,Preset Switch (CH1) (1)
6	SBC557-9	Button,Preset Switch (CH2) (1)
7	SBC557-10	Button,Preset Switch (CH3) (1)
8	SBC557-11	Button,Preset Switch (CH4) (1)

Ref. No.	Part No.	Description & Pcs.
<b>CABINET and CHASSIS PARTS</b>		
9	SBC557-12	Button,Preset Switch (CH5) (1)
10	SBC557-13	Button,Preset Switch (CH6) (1)
11	SBC557-14	Button,Preset Switch (CH7) (1)
12	SBC557-15	Button,Preset Switch (CH8) (1)
13	SUS297	Spring,Button (8)
14	SGU331	Transparent Panel (1)
15	$\textcircled{O}$ SKD4592	Tinted Plate ( Silver ) (1)
15	$\textcircled{K}$ SKD4593	Tinted Plate ( Black ) (1)
16	SBC337-1	Button,Power Switch (1)
17	SKL245-2	Rubber (2)
18	SUW1891	Bracket,FL (1)
19	SUW1893-1	Bracket,Power Switch (1)
20	SDU167	Filter,FL (1)
21	$\textcircled{O}$ SKCTS505E	Cabinet (Silver) (1)
21	$\textcircled{K}$ SKCTS505KE	Cabinet (Black) (1)
22	SGP3110-1	Rear Sub Panel (1)
23	SHR127	Bushing,AC Cord (1)
24	$\Delta$ SJA88	AC Cord (1)
25[EX]	SGPTS505LE	Rear Panel,Ass'y (1)
25[EF,EB]	SGPTS505LB	Rear Panel,Ass'y (1)
25-1	[SKL245-2	Foot (4)
26	SJF8709N	Terminal Board (1)
<b>SCREWS</b>		
N1	$\textcircled{S}$ XTB3+8BFZ	Tapping, $\oplus 3 \times 8$ (3)
N2	$\textcircled{S}$ XTB3+8FFYR1	Tapping with Detent, $\oplus 3 \times 8$ (1)
N3	$\textcircled{S}$ XTN3+8BFN	Tapping, $\oplus 3 \times 8$ (2)
N4	$\textcircled{S}$ XSN3+6S	$\oplus 3 \times 6$ (2)
N5	$\textcircled{S}$ XTB3+8BFZ	Tapping, $\oplus 3 \times 8$ (2)
N6	$\textcircled{S}$ XTB3+8FFYR1	Tapping with Detent, $\oplus 3 \times 8$ (5)
N7	$\textcircled{S}$ XTB3+14BFN	Tapping, $\oplus 3 \times 14$ (1)
N8	$\textcircled{S}$ XTB3+10BFZ	Tapping, $\oplus 3 \times 10$ (2)
N9	$\textcircled{O}$ SNE2095-2	Tapping(Silver) (4)
N9	$\textcircled{K}$ SNE2095-1	Tapping(Black) (4)
N10	$\textcircled{S}$ XTB3+8BFZ	Tapping, $\oplus 3 \times 8$ (2)
<b>WASHERS</b>		
N11	$\textcircled{S}$ XWG3FN	Plain, $\phi 3$ (2)
N12	$\textcircled{S}$ XWA3B	Spring, $\phi 3$ (2)

Ref. No.	Part No.	Description & Pcs.
<b>ACCESSORIES</b>		
A1	SJP2129-5	Connection Cord (1)
A2	SSA267-1	Cord,Indoor Antenna (1)
A3	SSA611-1	Loop Antenna (1)
A4	SMA231	Holder,Loop Antenna (1)
A5	SMA233-1	Holder,Loop Antenna (1)
A6	XTN3+10AFZ	Screw,Loop Antenna Holder (2)
A7	SQF11491	Instruction Book (1)
<b>PACKING PARTS</b>		
P1	$\textcircled{O}$ SPP697	Polyethylene Bag(Silver)(1)
P1	$\textcircled{K}$ SPP647	Polyethylene Bag(Black)(1)
P2	SPS3493	Pad,Front Side (1)
P3	SPS3495	Pad,Rear Side (1)
P4	SPG4263	Carton Box (1)
P4[EF] only	SPG4265 - 1	Carton Box (1)
P5	$\textcircled{K}$ SGK1413	Label (Black only) (2)

## ■ EXPLODED VIEWS



EXPLODED VIEWS

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Description & Pcs.	
PARTS	
Button,Preset Switch (CH5)	(1)
Button,Preset Switch (CH6)	(1)
Button,Preset Switch (CH7)	(1)
Button,Preset Switch (CH8)	(1)
Spring,Button	(8)
Transparent Panel	(1)
Tinted Plate ( Silver )	(1)
Tinted Plate ( Black )	(1)
Button,Power Switch	(1)
Rubber	(2)
Bracket,FL	(1)
Bracket,Power Switch	(1)
Filter,FL	(1)
Cabinet (Silver)	(1)
Cabinet (Black)	(1)
Rear Sub Panel	(1)
Bushing,AC Cord	(1)
AC Cord	(1)
Rear Panel,Ass'y	(1)
Rear Panel,Ass'y	(1)
Foot	(4)
Terminal Board	(1)
Tapping,Φ3×8	(3)
Tapping with Detent, Φ3×8	(1)
Tapping,Φ3×8	(2)
Tapping,Φ3×6	(2)
Tapping,Φ3×8	(2)
Tapping with Detent, Φ3×8	(5)
Tapping,Φ3×14	(1)
Tapping,Φ3×10	(2)
Tapping(Silver)	(4)
Tapping(Black)	(4)
Tapping,Φ3×8	(2)
Plain, Φ 3	(2)
Spring, Φ 3	(2)

Ref. No.	Part No.	Description & Pcs.
ACCESSORIES		
A1	SJP2129-5	Connection Cord (1)
A2	SSA267-1	Cord,Indoor Antenna (1)
A3	SSA611-1	Loop Antenna (1)
A4	SMA231	Holder,Loop Antenna (1)
A5	SMA233-1	Holder,Loop Antenna (1)
A6	XTN3+10AFZ	Screw,Loop Antenna (2)
A7	SQF11491	Holder Instruction Book (1)
PACKING PARTS		
P1	○ SPP697	Polyethylene Bag(Silver)(1)
P1	⊗ SPP647	Polyethylene Bag(Black)(1)
P2	SPS3493	Pad,Front Side (1)
P3	SPS3495	Pad,Rear Side (1)
P4	SPG4263	Carton Box (1)
P4[EF] only	SPG4265 - 1	Carton Box (1)
P5	⊗ SGK1413	Label (Black only) (2)

