

SERVICE MANUALEnglish
Français

No. 104

**SPECIFICATIONS****Circuit****FM:** Dual gate MOS FET, RF single stage, 4 gang variable condenser, 4-stage differential IF amplifier wide band linear detector, PLL MPX**AM:** RF single stage, 2 gang variable condenser**IC:** 4 Transistors: 15 (1 FET) Diodes: 21 (1 LED)**Semiconductors****• FM SECTION****Frequency range**
Sensitivity

88–108 MHz

1.7 μ V (IHF), 3 μ V (S/N 50 dB Mono), 32 μ V (S/N 50 dB Stereo)**Image rejection**

More than 75 dB

IF rejection

More than 90 dB

Harmonic distortion**Mono** 0.15% (1 kHz), **Stereo** 0.25% (1 kHz)**Signal-to-noise ratio**

72 dB

Selectivity (IHF)

80 dB

Stereo separation

50 dB (1 kHz)

Capture ratio

1.0 dB

Antenna input impedance

300 ohms balanced type, 75 ohms unbalanced type

• AM SECTION**Frequency range**

530–1,605 kHz

Sensitivity (IHF)18 μ V**Image rejection**

more than 40 dB

IF rejection

more than 55 dB

Selectivity

36 dB

Signal-to-noise ratio

50 dB

• Output voltage/Output impedance

0.65V/less than 6 kohms (Fixed), 0.04–1.2V/less than 3 kohms (Variable)

• Power supply

AC 120V 60Hz, AC 220–240V 50Hz

• Power consumption

19 W

• Dimensions

435 (W) x 144 (H) x 394 (D) mm

• Weight

7.5 kg

• Accessory circuits

FM tuning meter, Signal meter, FM stereo indicator, FM muting/auto lock switch, Stereo-mono automatic change-over, FM/AM output level adjustment, MPX noise filter switch, FM 4-channel MPX output terminal, FM multipath output terminal, AM bar antenna

Specifications and designs may be changed without notice for improvement.

AM/FM STEREO TUNER

October 1976

CARACTERISTIQUES TECHNIQUES

Circuit	FM: MOS FET à double porte, RF à simple étage, 4 résistances variable jumelées, amplification IF à quatre étages différentiels, détecteur linéaire de bande passante, PLL MPX AM: RF syntonisé à simple étage, 2 résistances variable jumelées IC: 4 Transistors: 15 (1 FET) Diodes: 21 (1 LED)
Semi conducteur	
● Partie FM	
Bande de fréquence	88–108 MHz
Sensibilité	1,7 μ V (IHF), 3 μ V (S/B 50 dB Mono), 32 μ V (S/N 50 dB Stéréo)
Rejet image	plus de 75 dB
Rejet FM	plus de 90 dB
Distorsion harmonique	Mono 0,15% (1 kHz) Stéréo 0,25% (1 kHz)
Rapport signal/bruit	72 dB
Sélectivité (IHF)	80 dB
Séparation stéréo	50 dB (1 kHz)
Rapport de captage	1,0 dB
Impédance d'entrée de l'antenne	type compense de 300 ohms, type non compensé de 75 ohms
● Partie AM	
Bande de fréquence	530–1.605 kHz
Sensibilité (IHF)	18 μ V
Rejet image	plus de 40 dB
Rejet FM	plus de 55 dB
Sélectivité	36 dB
Rapport signal/bruit	50 dB
Voltage de sortie/Impédance de sortie	0,65 V/moins de 6 kohms (Fixes), 0,04 – 1,2 V/moins de 3 kohms (variables)
● Alimentation	CA 120V 60 Hz, CA 220 – 240V 50 Hz
● Consommation	19 W
● Dimensions	435 (L) x 144 (H) x 394 (P) mm
● Poids	7,5 kg
● Circuits Accessories	mètreur d'accord FM, mètreur Signal, indicateur FM stéréo, commutateur atténuateur FM/verouillage automatique, commutateur automatique stéréo/mono, réglage du niveau de sortie FM/AM, interrupteur du filtre de bruit MPX, borne de sortie MPX des 4 canaux FM, borne de sortie FM Multipath, antenne ferrite AM

Les caractéristiques techniques et la présentation peuvent être modifiées sans préavis pour des raisons d'améliorations.

FEATURES

1. The FM tuner intermediate frequency amplifier has excellent limiter characteristics because of the use of 4-stage differential amplification with ICs used throughout and a 3-element ceramic filter with excellent phase characteristics which also greatly improves selectivity. Quadrature detector using ICs extensively makes wider bandwidth and low distortion reception possible.
2. The newly developed PLL (Phase Locked Loop) IC which is the result of Hitachi's advanced technology is used in the FM detector thereby achieving high separation and low distortion combined with excellent reliability which is resistant to changes in temperature and the lapse of time.
3. An auto-lock tuning mechanism is employed which makes the location of the optimum tuning position easy in FM reception. This mechanism eliminates tuning errors and once tuned outside influences do not affect the tuning.
4. Stable reception possible with optimum separation and minimum distortion. The use of reed relays in the FM muting circuit eliminates inter-station noise which occurs in detuning, making listening to broadcasts more enjoyable.

CARACTERISTIQUES

1. Le récepteur FM à amplificateur de fréquence intermédiaire a d'excellentes caractéristiques grâce à l'utilisation d'une amplification différentielle à 4 étages avec circuits intégrés exclusivement et un filtre à céramique à trois éléments avec d'excellentes caractéristiques de phase qui améliore aussi grandement la sélectivité. La détection tétraphonique utilisant largement les circuits intégrés augmente la largeur de la bande passante et rend possible une réception à faible distorsion.
2. Le circuit intégré PLL (boucle à blocage de phase) récemment développé et qui est le résultat de la technologie avancée Hitachi, est utilisé dans le détecteur FM parvenant ainsi à une haute précision et à une faible distorsion en même temps qu'à une excellente fiabilité qui résiste aux changements de température ainsi qu'au vieillissement.
3. Un mécanisme auto blocage des stations est employé et il facilite la localisation de la position optimale des stations dans la réception FM. Ce mécanisme élimine les erreurs de sélection et empêche les influences extérieures d'affecter le réglage une fois qu'elle est opérée.
4. Réception stable possible avec une précision optimale et une distorsion minimale. L'utilisation de relais dans le circuit de réglage silencieux élimine les bruits de réglage entre les stations ainsi que ceux qui proviennent dans le changement des stations, rendant votre écoute des programmes plus agréable.

DISASSEMBLY, DEMONTAGE

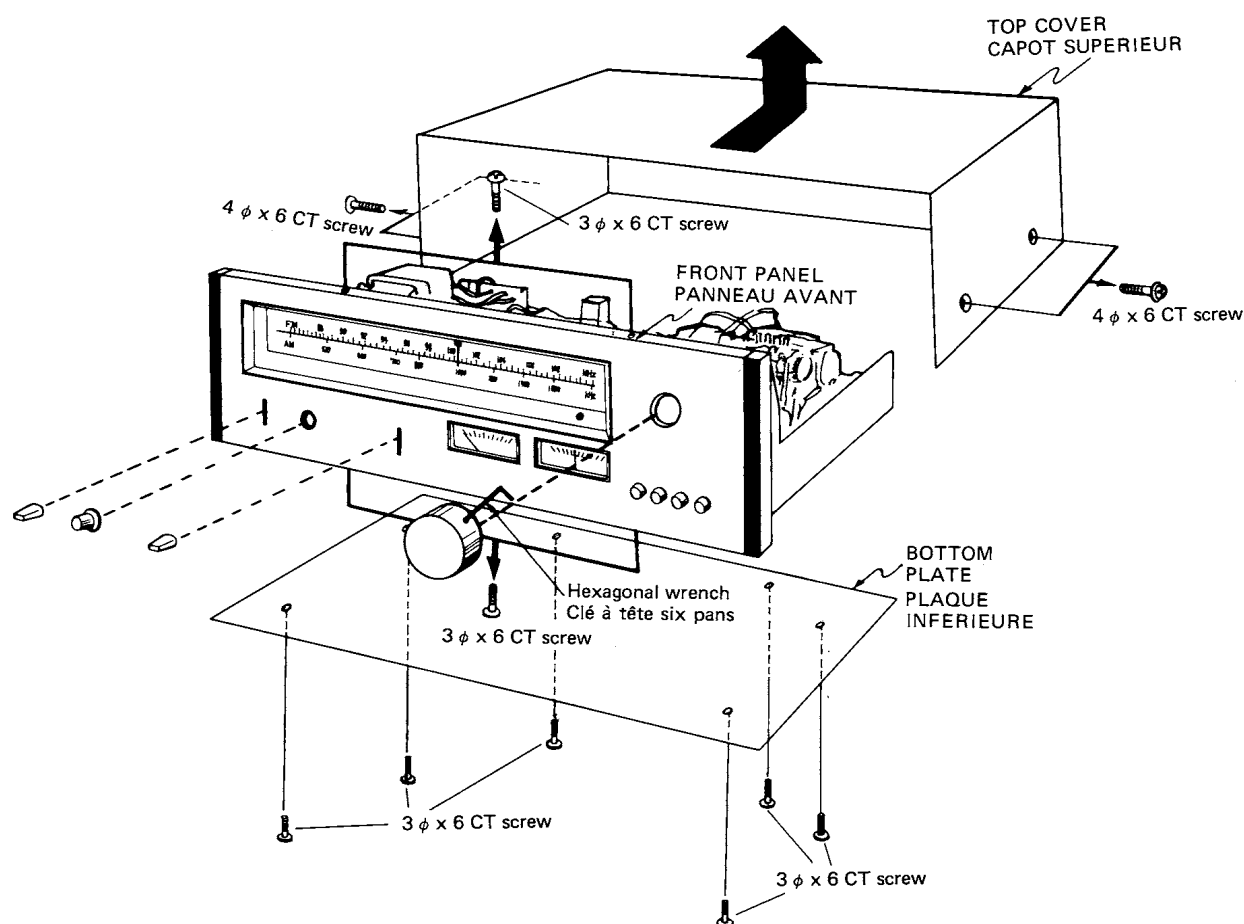


Fig. 1

REPLACEMENT

1. CONTROL PRINTED WIRING BOARD

- (1) Remove the meter lead wire from the Control printed wiring board.
- (2) Remove the six screws. (Fig. 2)

2. DIAL SCALE ILLUMINATION LAMP

- (1) Remove the Lamp printed wiring board. (Fig. 3)
- (2) Remove the break lamp after melting the solder of the lead wire. (Fig. 4)
- (3) A new lamp is provided for replacement. (Fig. 5)

3. FM CERAMIC FILTER

FM ceramic filter are classified by color—red, blue, orange depending on the different characteristics. Match the colors of MF201–203. (Fig. 6)

4. FET (FET101) and Transistor (Q101)

Ferrite cores are used for the second gate of FET101 and the collector of Q101. (Fig. 7)

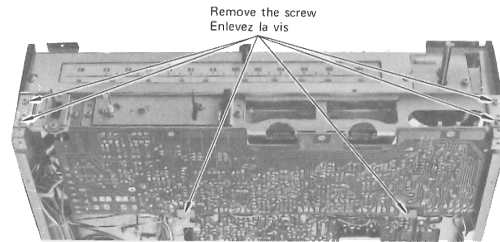


Fig. 2

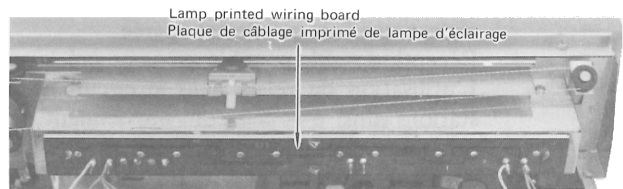


Fig. 3

REEMPLACEMENT

1. Plaque de câblage imprimée de commande

- (1) Désolidariser le fil d'indicateur de la plaque de câblage imprimée de commande.
- (2) Défaire les six vis de fixation. (Fig. 2)

2. Lampe d'éclairage de cadran d'accord

- (1) Désolidariser la plaque de câblage imprimé de lampe d'éclairage. (Fig. 3)
- (2) Retirer la lampe brisée après dessoudage du fil d'alimentation. (Fig. 4)
- (3) Une lampe neuve est fourni en vue d'un remplacement. (Fig. 5)

3. Filtre céramique FM

Le filtre céramique FM est classifié à l'aide de couleur: rouge, bleu, orange, en fonction de ses caractéristiques.

Accorder les couleurs de MF201–203. (Fig. 6)

4. FET (FET101) et transistor (Q101)

Les noyaux de ferrite sont employés pour à la seconde porte de FET101 et au niveau de l'électrode de captage de Q101. (Fig 7)

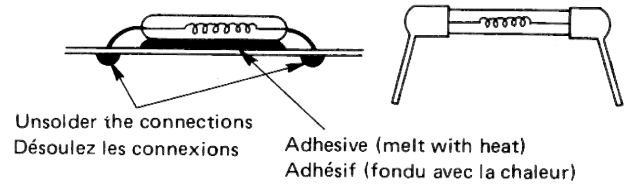


Fig. 4

Fig. 5

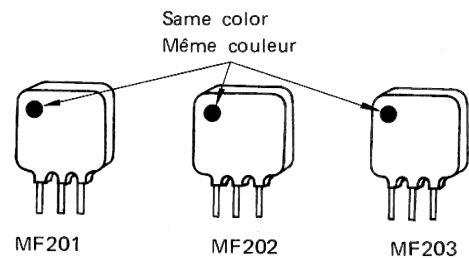


Fig. 6

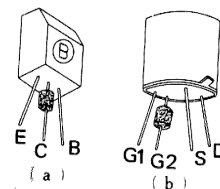


Fig. 7

GENERAL ALIGNMENT INSTRUCTION, INSTRUCTION GENERALE

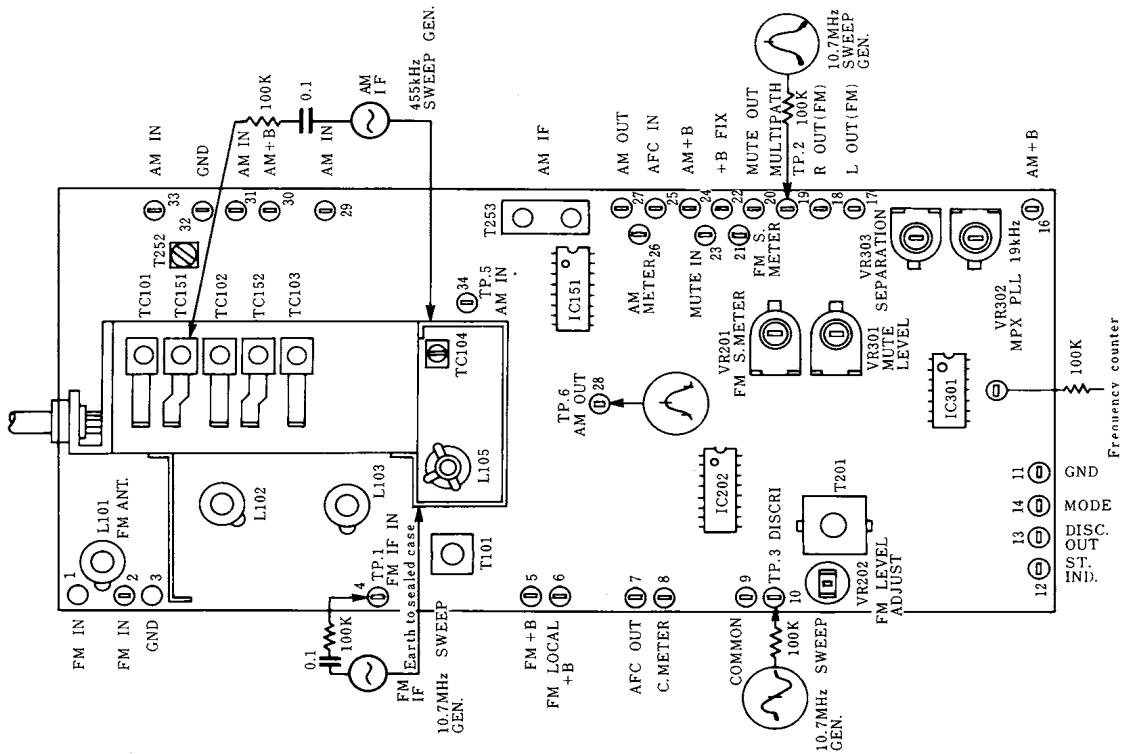


Fig. 8

FM TUNER ALIGNMENT

Test conditions

Set to the switch positions on the FT-520 as follows.

- FUNCTION FM, FM MUTE/AUTO LOCK
- VOLUME Minimum
- POWER ON

Steps	Item	Measuring Instrument	Input Terminal	Output Terminal	Frequency	Adjust	Wave Form
1	(1)	IF Amplifier	TP 1	TP 2		T101	CAUTION (1)
	(2)	"S" curve	TP 1	TP 3		T201	CAUTION (2)
2	(1)	Covering	Antenna terminal	REC OUT (L)	90MHz (Turn the dial pointer at 90MHz)	L105	Output Max.
					106MHz (Turn the dial pointer at 106MHz)	TC104	
	(3)						Repeat (1) & (2)

Steps	Item	Measuring Instrument	Input Terminal	Output Terminal	Frequency	Adjust	Wave form
3	Tracking	3.1 FM signal generator 90MHz 400Hz 100% modulated, 10dB at input AC Voltmeter	Antenna terminal	REC OUT (L)	90MHz	L101, L102 L103	Output Max.
		3.2 FM signal generator 106MHz 400Hz 100% modulated, 10dB at input AC Voltmeter				TC101, TC102 TC103	
4	Discriminate	FM signal generator 98MHz 400Hz 100% modulated, 10dB at input AC Voltmeter	Antenna terminal	REC OUT (L)	98MHz	T201 (lower)	Cut the input signal level of FM signal generator and set the pointer of tuning meter to the center mark.
5	Distortion	FM signal generator 98MHz 400Hz 100% modulated, 60dB at input Distortion meter	Antenna terminal	REC OUT (L)	98MHz	T201 (upper)	Adjust T201 so that distortion will become min. CAUTION (3)
6	Output	FM signal generator 98MHz 400Hz 30% modulated, 60dB at input AC Voltmeter	Antenna terminal	REC OUT (L)	98MHz	VR202	650mV ± 1dB
7	FM Muting	FM signal generator 98MHz 400Hz 100% modulated, 20dB at input AC Voltmeter	Antenna terminal	REC OUT (L)	98MHz	VR301	Adjust VR301 so that the output signal can occur then the input signal is 24 ± 6dB.
8	Signal Meter	Same as step 4	Antenna terminal	Signal Meter	98MHz	VR201	Adjust VR201 so that the pointer of signal meter will be 4-5.

CAUTION

- Short-circuit the OSC stage by earthing the live side of the variable capacitor in that stage. Adjust the core of T101 so that the gain will be max. In this case, reduce the level of the input signal of signal generator so that the waveform will be one shown in Fig. 9.
- Short-circuit the OSC stage as described in Caution 1. Adjust the primary core (lower) of T201 so that the output is like the S curve shown in Fig. 10 with A and B symmetrical with respect to C. Adjust the secondary core (upper) so that the straight line of the S curve can be achieved. At the time of adjustment in Caution 1 and 2, center of the marker will sometimes not correspond to that of the waveform because of the ceramic filters used.

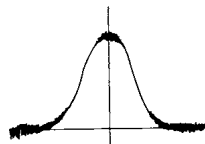


Fig. 9

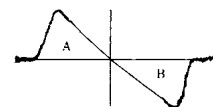


Fig. 10

- As the result of the adjustment step 5, the best point of adjustment from step 4 will be shifted a bit. Repeat the adjustment of step 4 and 5 until the deterioration becomes minimum and the pointer of the tuning meter is in its center.

FM MPX ALIGNMENT

Test conditions

Set to the switch positions on the FT-520 as follows.

- FUNCTION FM AUTO
- MODE STEREO
- VOLUME Minimum
- POWER ON

Steps	Item	Measuring Instrument	Input Terminal	Output Terminal	Frequency	Adjust	Wave Form
1	19kHz Free Running Frequency	FM signal generator 98MHz non-modulated 60dB at input AC Voltmeter Frequency counter	Antenna terminal	TP 4	98MHz	VR302	Adjust VR302 so that the counter will indicated 19kHz ± 30Hz.
2	(1) Separation	1. FM signal generator 98MHz, 60dB at input 2. Stereo signal generator Main signal 92% modulated Pilot signal 8% modulated AC Voltmeter	Antenna terminal	REC OUT (L)	98MHz	VR303	After making the signal of Rch and Pilot, adjust VR303 so that the output wave form of Lch becomes min.
	(2)						Optimize VR303 so that the leak level of the Lch signal is equal to that of the Rch signal.

AM TUNER ALIGNMENT

Test conditions

Set to the switch positions on the FT-520 as follows.

- FUNCTION AM
- VOLUME Minimum
- POWER ON

Steps	Item	Measuring Instrument	Input Terminal	Output Terminal	Frequency	Adjust	Wave Form
1	IF Amplifier	Sweep generator 455kHz	TC151	TP6		T253	Gain Max. CAUTION (4)
2	(1) Covering	AM signal generator 600kHz 400Hz 30% modulated, 50dB at input AC Voltmeter	Ferrite antenna	REC OUT	600kHz	T252	Gain Max. CAUTION (5)
					1400kHz	TC152	
(3)						Repeat (1) and (2)	
3	(1) Tracking	AM signal generator 600kHz 400Hz 30% modulated, 50dB at input AC Voltmeter	Ferrite antenna	REC OUT	600kHz	Ferrite antenna	Gain Max. CAUTION (5)
					1400kHz	TC151	
(3)						Repeat (1) and (2)	

4. In item 1, set the capacitance of the variable capacitor to minimum and adjust red and blue cores of T253 so that the waveform is as shown in Fig. 11. As T253 contains a 455kHz ceramic filter, sometimes the center of the marker will not correspond to that of the waveform.

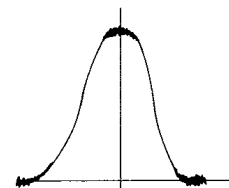


Fig. 11

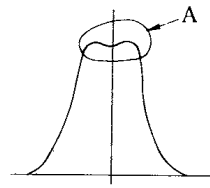


Fig. 12

In this case, neglect the marker. After adjusting as above, increase the output level of the sweep generator and adjust T253 again so that the top of the waveform A (indicated in Fig. 12) will be flat and wide.

5. In items 2 and 3, at the time of first adjustment, set input power at 74dB and adjust obtaining the minimum necessary input power (50dB).

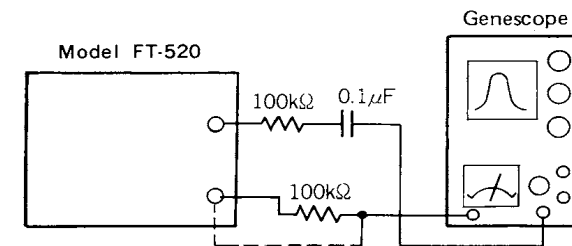


Fig. 13 FM IF Discriminator and AM IF alignments (AM and FM Step. 1)

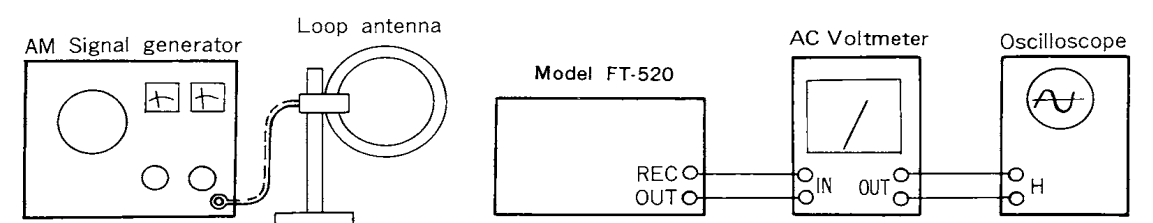


Fig. 14 AM frequency covering and tracking alignments (Step. 2 and 3)

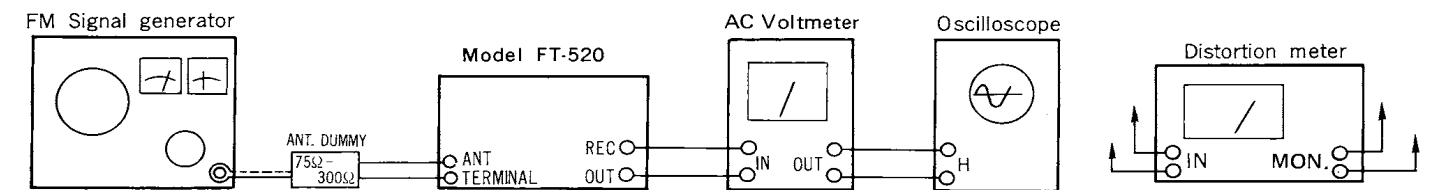


Fig. 15 FM frequency covering, tracking and other alignments (Step. 2 to 8)

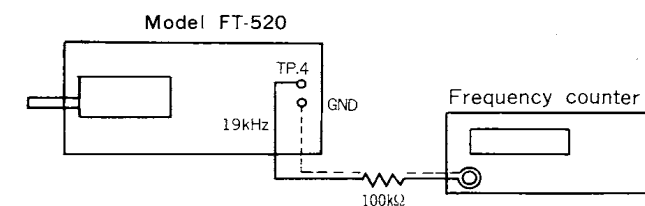


Fig. 16 FM MPX 19kHz adjustment (Step. 1)

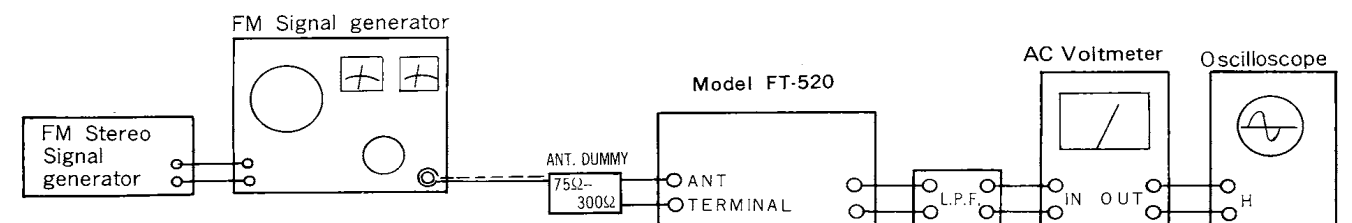


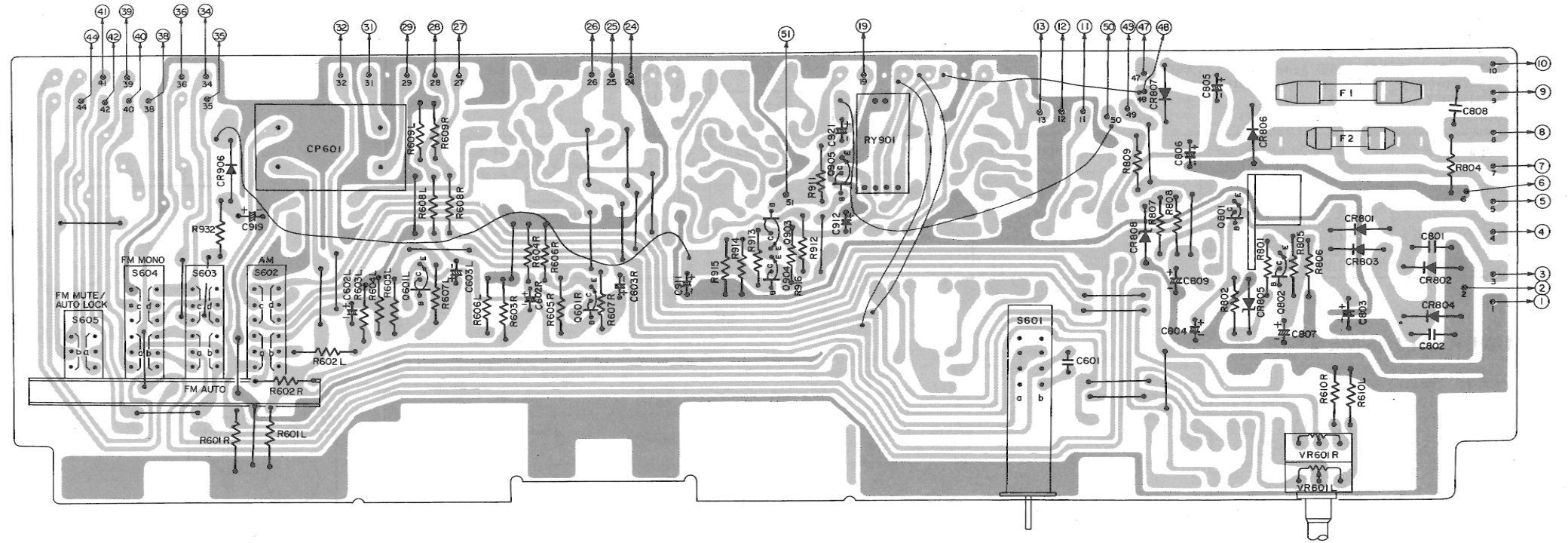
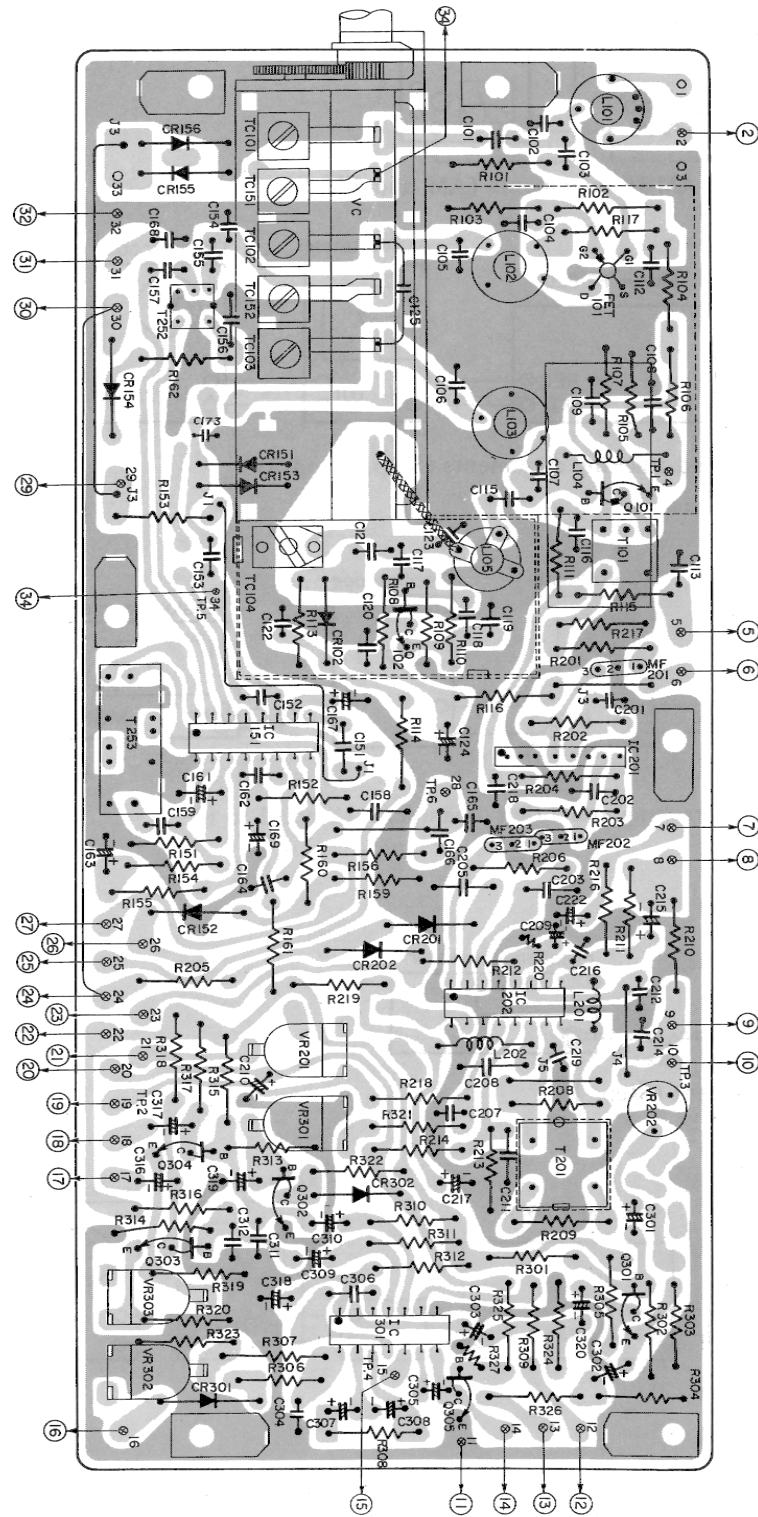
Fig. 17 FM MPX alignments (Step. 2)

PRINTED WIRING BOARD, PLAN DE BASE

TUNER PRINTED WIRING BOARD

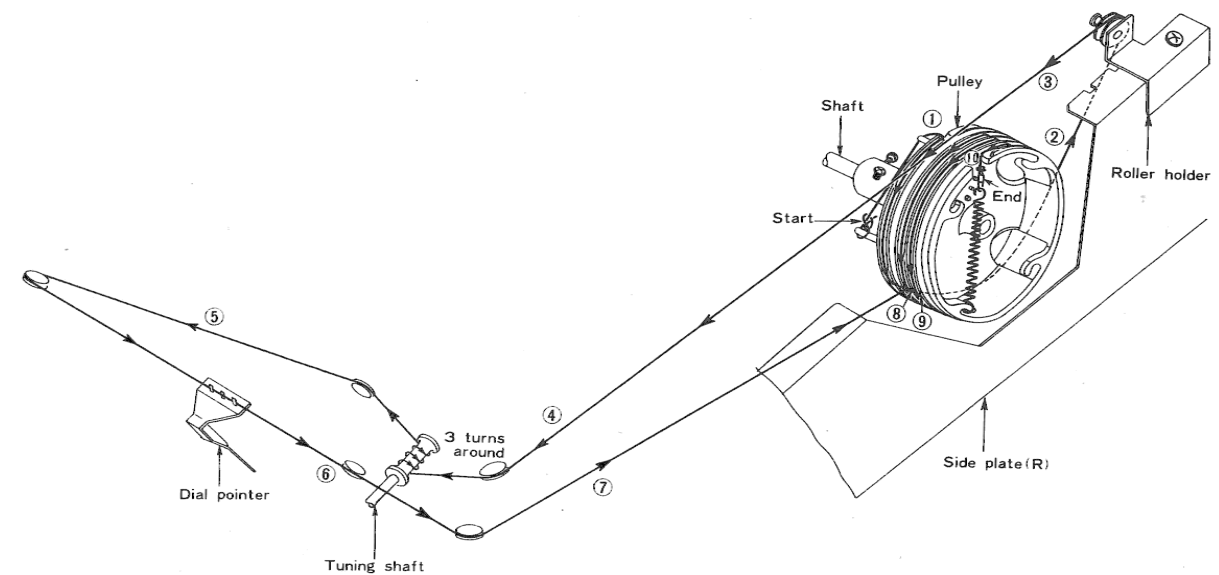
The terminal No. shows the stamp on the printed wiring board. This number matches the number in the circuit diagram.

CONTROL PRINTED WIRING BOARD



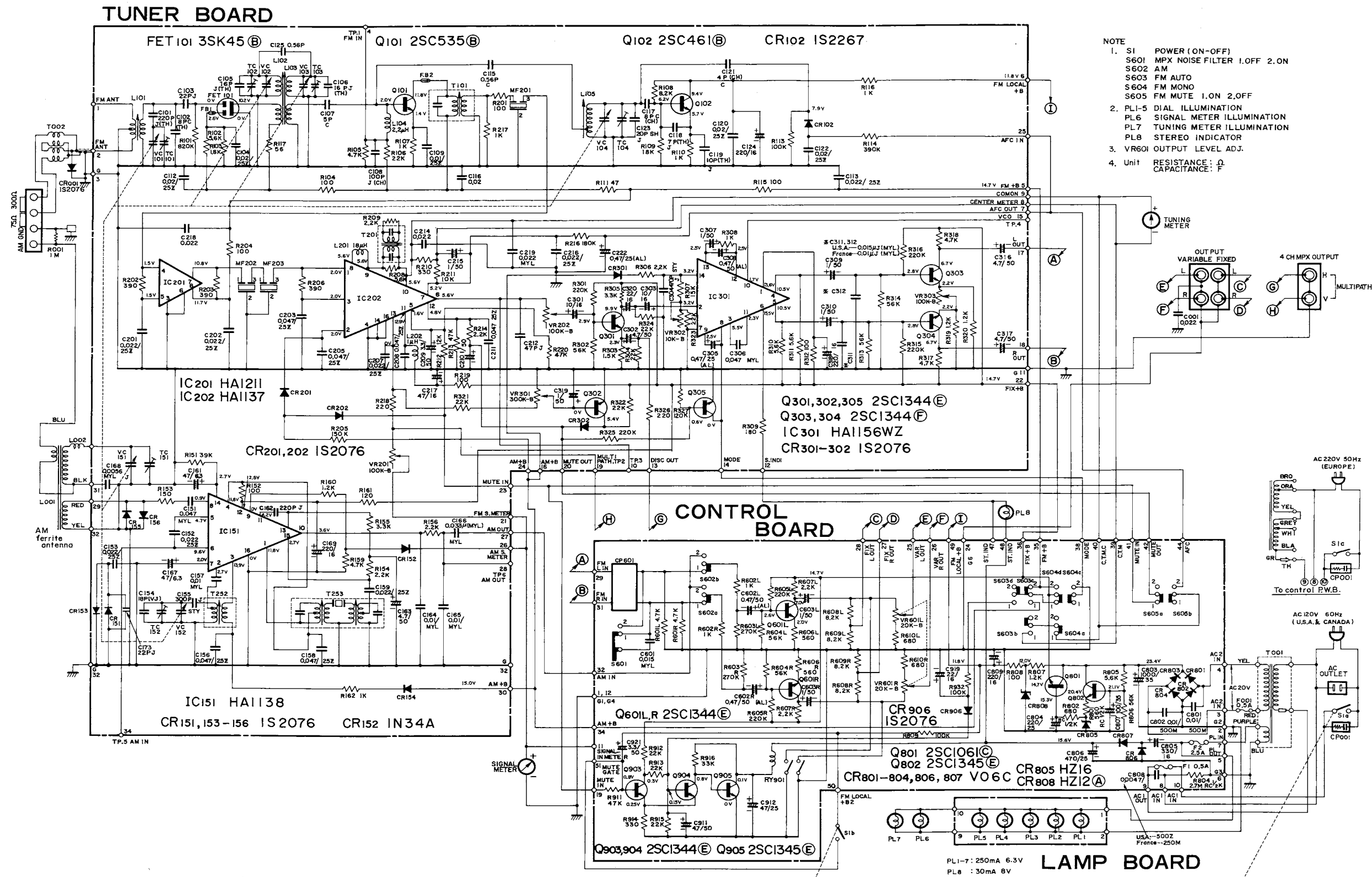
DIAL CORD SETTING

Note: The dial pulley shows the position that the variable condenser is turned to the counterclockwise direction.



CIRCUIT DIAGRAM, PLAN DE CIRCUIT

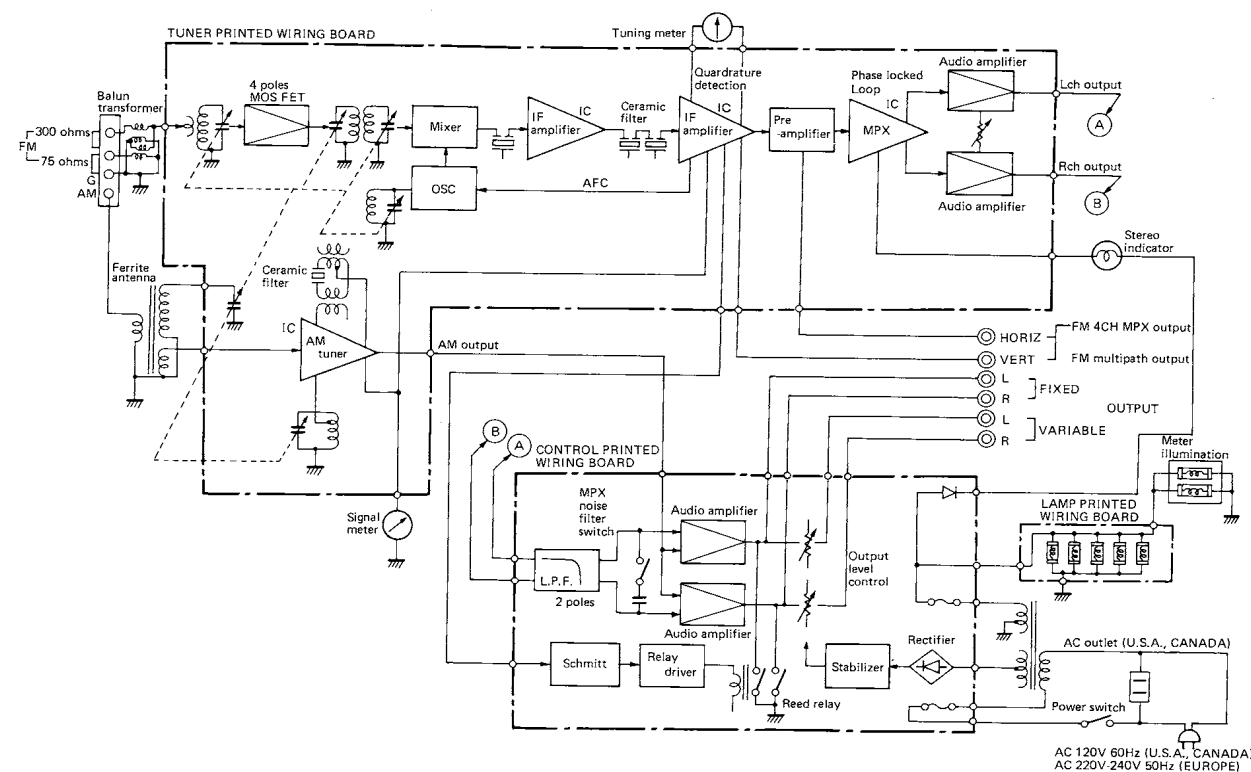
The circuit diagram is subject to change for improvement without notice.



- NOTE
1. S1 POWER (ON-OFF)
S601 MPX NOISE FILTER 1.OFF 2.ON
S602 AM
S603 FM AUTO
S604 FM MONO
S605 FM MUTE 1.ON 2.OFF
 2. PL1-5 DIAL ILLUMINATION
PL6 SIGNAL METER ILLUMINATION
PL7 TUNING METER ILLUMINATION
PL8 STEREO INDICATOR
 3. VR601 OUTPUT LEVEL ADJ.
 4. Unit RESISTANCE: Ω
CAPACITANCE: F

PL1-7: 250mA 6.3V
PL8: 30mA 8V

BLOCK DIAGRAM, BLOCK SCHEMA



AC 120V 60Hz (U.S.A., CANADA)
AC 220V-240V 50Hz (EUROPE)

DESCRIPTION OF THE NEW CIRCUIT

1. FM muting/auto lock

Both the AFC circuit and the muting circuit can be selected simultaneously by this switch. The S curve voltage for FM detection comes out between the pins (7) and (10) of HA1137. When S605 is ON, the muting circuit of HA1137 works and, at the same time, voltage is applied to 1S2267 (variable capacity diode). Accordingly, when the frequency of the local oscillator changes, the output voltage of the pin (7) of HA1137 changes, the capacity of 1S2267 changes, to control the change of the oscillation frequency, and maintains the oscillation frequency at a constant value always. When S605 is OFF, the pins (7) and (10) of HA1137 are short-circuited and the AFC does not work, also the muting circuit becomes OFF simultaneously. In addition, when S605 is ON, while there is no signal or it is below the mute level, it passes through the mute voltage control S605a and is added to the Schmitt circuit. The output side is earthed by the reed relay and the mute effect is further improved.

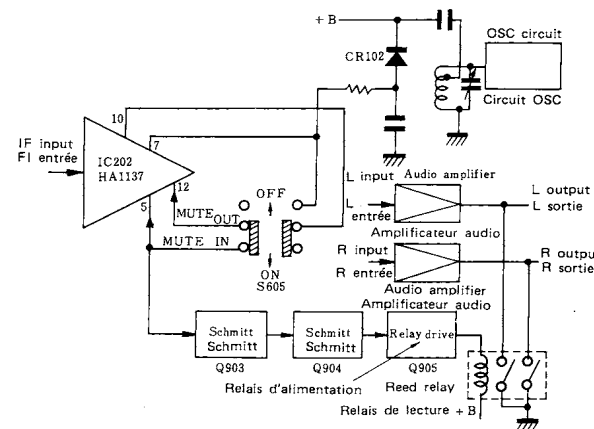
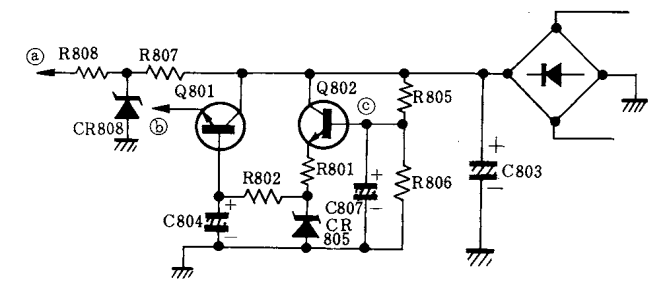


Fig. 18

2. Power supply circuit

Supposing the voltage at the point (a) is the voltage +B and the control voltage of the FM local oscillator circuit and the muting relay circuit (actually the lamp voltage, which is on the same part of the curve as point (a) is rectified and added to it), and the voltage at the point (b) is the voltage +B of the general signal system, the signal circuit is operated approx. 5 sec. after the power switch is turned ON to remove transient sounds due to static. When the power switch is turned ON, the voltage at the point (a) increases instantaneously, but the base voltage of Q802 becomes almost zero and it is cut off because C807 is charged, and the voltage does not appear in the emitter Q801. After that, by the discharge of C807 and R806, the voltage, which is divided by R805 and R806, is applied to the base of Q802, then Q802 turns ON and the constant voltage is applied to the base of Q801 turning it ON, thus a constant voltage is obtained from the emitter.



The voltage at (a) has already been fixed constant in the operating time when all the circuits operate.
La tension à (a) a été déjà établie comme fixe pour la durée de fonctionnement quand tous les circuits sont en fonction.

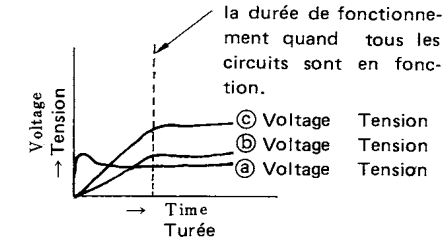


Fig. 19

DESCRIPTION DE NOUVEAU CIRCUIT

1. Réglage silencieux en FM/Verrouillage automatique

Ce dispositif contrôle la fréquence automatique AFC, la verrouillant par le circuit de réglage silencieux. La courbe de tension en S de détection FM apparaît entre les broches (7) et (10) de HA1137. Dès que S605 est en fonction "ON", le circuit de réglage silencieux de HA1137 est mis en fonction et au même instant, la tension appliquée à 1S2267 (diode à capacité variable). Par voie de conséquence, la fréquence de l'oscillateur local change, la tension de sortie de la broche (7) de HA1137 change, la capacité de 1S2267 change pour contrôler la fréquence d'oscillation et la maintenir constamment sur une valeur constante. Quand S605 est mis hors circuit "OFF", les broches (7) et (10) de HA1137 sont court-circuitées et l'AFC ne fonctionne pas tandis que le circuit de réglage silencieux est simultanément mis hors fonction "OFF". En outre, quand S605 est mis en fonction "ON" quand aucun signal n'est présent ou qu'il est inférieur au niveau de réglage silencieux, il passe par la régulation de tension de réglage silencieux S605a et est ajouté au circuit Schmitt. La sortie est mise à la terre par l'intermédiaire le relais à lames et l'effet de réglage silencieux est d'autant mieux amélioré.

2. Circuit d'alimentation

En supposant que la tension au point (a) est la tension +B et que la tension de régulation du circuit d'oscillateur local FM et le circuit relais de réglage silencieux (actuellement la tension de lampe qui fait partie de la courbe au point (a) est redressée et ajoutée à celle-ci), et que la tension au point (b) correspond à la tension +B du système de signal général, le circuit de signal est mis en fonction environ 5 sec. après la mise en fonction "ON" de l'interrupteur d'alimentation de façon à supprimer les sons transistors dus à un effet statique. Dès que l'interrupteur d'alimentation est mis en fonction "ON", la tension au point (a) augmente instantanément, mais la tension de base de Q802 descend pratiquement à zéro pour être coupée par la charge de C807 ce qui empêche la tension de parvenir à l'émetteur Q801. Ensuite, à la suite de la décharge de C807 et R806, la tension, divisée par R805 et R806, est appliquée à la base Q802 puis Q802 est mis en fonction "ON" tandis que la tension constante est appliquée à la base de Q801 qui la met en fonction "ON", ceci permet de fournir une tension constante à l'émetteur.

REPLACEMENT PARTS LIST, TABLEAU DES PIÈCE

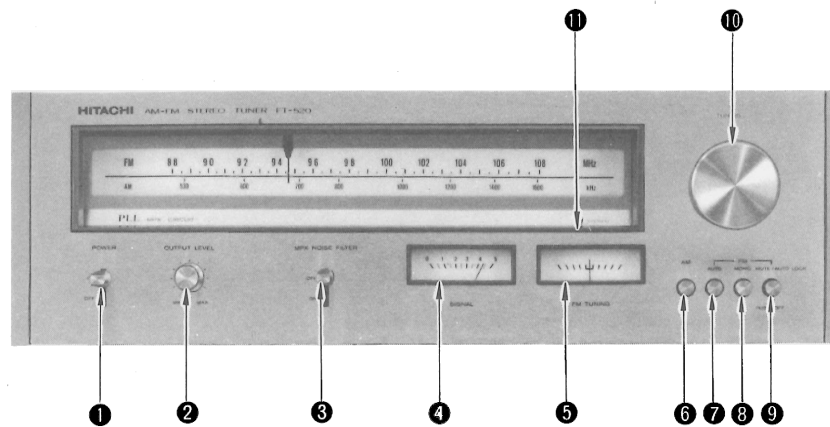
SYMBOL NO.	STOCK NO.	DESCRIPTION			SYMBOL NO.	STOCK NO.	DESCRIPTION		
CAPACITORS									
for TUNER PRINTED WIRING BOARD									
C101	0248362	Ceramic, discal	220pF $\pm 5\%$	50V	C208	0244175	Ceramic, discal	0.047 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V
C102	0248308	Ceramic, discal	8pF ± 0.25 pF	50V	C209	0252813	Electrolytic	3.3 μ F	50V
C103	0246448	Ceramic, discal	22pF $\pm 5\%$	50V	C210	0252811	Electrolytic	1 μ F	50V
C104	0245018	Ceramic, discal	0.02 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V	C211	0244175	Ceramic, discal	0.047 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V
C105	0248335	Ceramic, discal	16pF $\pm 5\%$	50V	C212	0248676	Ceramic, discal	47pF $\pm 5\%$	50V
C106	0248335	Ceramic, discal	16pF $\pm 5\%$	50V	C214	0245018	Ceramic, discal	0.02 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V
C107	0248635	Ceramic, discal	5pF ± 0.25 pF	50V	C215	0252811	Electrolytic	1 μ F	50V
C108	0246464	Ceramic, discal	100pF $\pm 5\%$	50V	C216	0245018	Ceramic, discal	0.02 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V
C109	0245017	Ceramic, discal	0.01 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V	C217	0252525	Electrolytic	47 μ F	16V
C112	0245018	Ceramic, discal	0.02 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V	C218	0245018	Ceramic, discal	0.02 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V
C113	0245018	Ceramic, discal	0.02 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V	C219	0275013	Mylar, film	0.022 μ F $\pm 10\%$	50V
C115	0231185	Ceramic, discal	0.56pF $\pm 5\%$	500V	C222	0252875	Electrolytic	0.47 μ F	50V
C116	0245018	Ceramic, discal	0.02 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V	C301	0252521	Electrolytic	10 μ F	16V
C117	0246418	Ceramic, discal	8pF ± 0.25 pF	50V	C302	0252815	Electrolytic	4.7 μ F	50V
C118	0248307	Ceramic, discal	7pF ± 0.25 pF	50V	C303	0252521	Electrolytic	10 μ F	16V
C119	0248310	Ceramic, discal	10pF ± 0.25 pF	50V	C304	0221522	Styrol	470pF $\pm 5\%$	50V
C120	0245018	Ceramic, discal	0.02 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V	C305	0252875	Electrolytic	0.47 μ F	50V
C121	0246414	Ceramic, discal	4pF ± 0.25 pF	50V	C306	0275015	Mylar, film	0.047 μ F $\pm 10\%$	50V
C122	0245018	Ceramic, discal	0.02 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V	C307	0252811	Electrolytic	1 μ F	50V
C123	0248177	Ceramic, discal	20pF $\pm 5\%$	50V	C308	0252875	Electrolytic	0.47 μ F	50V
C124	0252532	Electrolytic	220 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	16V	C309	0252811	Electrolytic	1 μ F	50V
C125	0231185	Ceramic, discal	0.56pF $\pm 5\%$	500V	C310	0252811	Electrolytic	1 μ F	50V
C151	0275015	Mylar, film	0.047 μ F $\pm 10\%$	50V	C311	1275212	Mylar, film	0.015 μ F $\pm 5\%$ (for U.S.A.)	50V
C152	0245018	Ceramic, discal	0.02 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V	C311	1275211	Mylar, film	0.01 μ F $\pm 5\%$ (for France)	50V
C153	0245018	Ceramic, discal	0.02 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V	C312	1275212	Mylar, film	0.015 μ F $\pm 5\%$ (for U.S.A.)	50V
C154	0248496	Ceramic, discal	18pF $\pm 5\%$	50V	C312	1275211	Mylar, film	0.01 μ F $\pm 5\%$ (for France)	50V
C155	0228322	Styrol	300pF $\pm 5\%$	50V	C316	0252815	Electrolytic	4.7 μ F	50V
C156	0244175	Ceramic, discal	0.047 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V	C317	0252815	Electrolytic	4.7 μ F	50V
C157	0275011	Mylar, film	0.01 μ F $\pm 10\%$	50V	C318	0252532	Electrolytic	220 μ F	16V
C158	0244175	Ceramic, discal	0.047 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V	C319	0252811	Electrolytic	1 μ F	50V
C159	0245018	Ceramic, discal	0.02 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V	C320	0252522	Electrolytic	22 μ F	16V
C161	0252225	Electrolytic	47 μ F	6.3V	for CONTROL PRINTED WIRING BOARD				
C162	0248692	Ceramic, discal	220pF $\pm 5\%$	50V	C601	0275012	Mylar, film	0.015 μ F $\pm 10\%$	50V
C163	0252815	Electrolytic	4.7 μ F	50V	C602(L,R)	0252875	Electrolytic	0.47 μ F	50V
C164	0275011	Mylar, film	0.01 μ F $\pm 10\%$	50V	C603(L,R)	0252811	Electrolytic	1 μ F	50V
C165	0275011	Mylar, film	0.01 μ F $\pm 10\%$	50V	C801	0245408	Ceramic, discal	0.01 μ F $\pm 20\%$	500V
C166	0275014	Mylar, film	0.033 μ F $\pm 10\%$	50V	C802	0245408	Ceramic, discal	0.01 μ F $\pm 20\%$	500V
C167	0252225	Electrolytic	47 μ F	6.3V	C803	0252741	Electrolytic	1000 μ F	35V
C168	1274235	Mylar, film	0.0056 μ F $\pm 5\%$	50V	C804	0252632	Electrolytic	220 μ F	25V
C169	0252532	Electrolytic	220 μ F	16V	C805	0252533	Electrolytic	330 μ F	16V
C173	0248668	Ceramic, discal	22pF $\pm 5\%$	50V	C806	0252635	Electrolytic	470 μ F	25V
C201	0245018	Ceramic, discal	0.02 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V	C807	0252731	Electrolytic	100 μ F	35V
C202	0245018	Ceramic, discal	0.02 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V	C808	0243873	Ceramic, discal	0.0047 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$ (for U.S.A.)	500V
C203	0244175	Ceramic, discal	0.047 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V	C808	0243875	Ceramic, discal	0.0047 μ F $\pm 20\%$ (for France)	250V
C205	0244175	Ceramic, discal	0.047 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V	C809	0252532	Electrolytic	220 μ F	16V
C207	0245018	Ceramic, discal	0.02 μ F $\begin{smallmatrix} +80\% \\ -20\% \end{smallmatrix}$	25V	C911	0252815	Electrolytic	4.7 μ F	50V
					C912	0252625	Electrolytic	47 μ F	25V
					C919	0252522	Electrolytic	22 μ F	16V

SYMBOL NO.	STOCK NO.	DESCRIPTION			SYMBOL NO.	STOCK NO.	DESCRIPTION		
C921	0252813	Electrolytic	3.3μF	50V	R301	0114289	Carbon film	220kΩ ±5%	SRD¼P
for REAR PLATE ASSEMBLY					R302	0114219	Carbon film	56kΩ ±5%	SRD¼P
C001	0245018	Ceramic, discal	0.02μF $\pm_{-20}^{+80}\%$	25V	R303	0114165	Carbon film	1.5kΩ ±5%	SRD¼P
RESISTORS					R304	0114209	Carbon film	22kΩ ±5%	SRD¼P
for TUNER PRINTED WIRING BOARD					R305	0114173	Carbon film	3.3kΩ ±5%	SRD¼P
R101	0114303	Carbon film	820kΩ ±5%	SRD¼P	R306	0114169	Carbon film	2.2kΩ ±5%	SRD¼P
R102	0114179	Carbon film	5.6kΩ ±5%	SRD¼P	R307	0114205	Carbon film	15kΩ ±5%	SRD¼P
R103	0114167	Carbon film	1.8kΩ ±5%	SRD¼P	R308	0114161	Carbon film	1kΩ ±5%	SRD¼P
R104	0114131	Carbon film	100Ω ±5%	SRD¼P	R309	0114137	Carbon film	180Ω ±5%	SRD¼P
R105	0114177	Carbon film	4.7kΩ ±5%	SRD¼P	R310	0114179	Carbon film	5.6kΩ ±5%	SRD¼P
R106	0114209	Carbon film	22kΩ ±5%	SRD¼P	R311	0114179	Carbon film	5.6kΩ ±5%	SRD¼P
R107	0114161	Carbon film	1kΩ ±5%	SRD¼P	R312	0114131	Carbon film	100Ω ±5%	SRD¼P
R108	0114183	Carbon film	8.2kΩ ±5%	SRD¼P	R313	0114219	Carbon film	56kΩ ±5%	SRD¼P
R109	0114207	Carbon film	18kΩ ±5%	SRD¼P	R314	0114219	Carbon film	56kΩ ±5%	SRD¼P
R110	0114161	Carbon film	1kΩ ±5%	SRD¼P	R315	0114289	Carbon film	220kΩ ±5%	SRD¼P
R111	0114057	Carbon film	47Ω ±5%	SRD¼P	R316	0114289	Carbon film	220kΩ ±5%	SRD¼P
R113	0114281	Carbon film	100kΩ ±5%	SRD¼P	R317	0114177	Carbon film	4.7kΩ ±5%	SRD¼P
R114	0114295	Carbon film	390kΩ ±5%	SRD¼P	R318	0114177	Carbon film	4.7kΩ ±5%	SRD¼P
R115	0114131	Carbon film	100Ω ±5%	SRD¼P	R319	0114163	Carbon film	1.2kΩ ±5%	SRD¼P
R116	0114161	Carbon film	1kΩ ±5%	SRD¼P	R320	0114163	Carbon film	1.2kΩ ±5%	SRD¼P
R117	0114059	Carbon film	56Ω ±5%	SRD¼P	R321	0114209	Carbon film	22kΩ ±5%	SRD¼P
R151	0114215	Carbon film	39kΩ ±5%	SRD¼P	R322	0114209	Carbon film	22kΩ ±5%	SRD¼P
R152	0114131	Carbon film	100Ω ±5%	SRD¼P	R323	0114209	Carbon film	22kΩ ±5%	SRD¼P
R153	0114135	Carbon film	150Ω ±5%	SRD¼P	R324	0114209	Carbon film	22kΩ ±5%	SRD¼P
R154	0114169	Carbon film	2.2kΩ ±5%	SRD¼P	R325	0114289	Carbon film	220kΩ ±5%	SRD¼P
R155	0114173	Carbon film	3.3kΩ ±5%	SRD¼P	R326	0114139	Carbon film	220Ω ±5%	SRD¼P
R156	0114169	Carbon film	2.2kΩ ±5%	SRD¼P	R327	0138203	Carbon film	120kΩ ±5%	SRD¼P
R159	0114177	Carbon film	4.7kΩ ±5%	SRD¼P	for CONTROL PRINTED WIRING BOARD				
R160	0114163	Carbon film	1.2kΩ ±5%	SRD¼P	R601(L,R)	0114177	Carbon film	4.7kΩ ±5%	SRD¼P
R161	0114133	Carbon film	120Ω ±5%	SRD¼P	R602(L,R)	0114161	Carbon film	1kΩ ±5%	SRD¼P
R162	0114161	Carbon film	1kΩ ±5%	SRD¼P	R603(L,R)	0114291	Carbon film	270kΩ ±5%	SRD¼P
R201	0114131	Carbon film	100Ω ±5%	SRD¼P	R604(L,R)	0114219	Carbon film	56kΩ ±5%	SRD¼P
R202	0114145	Carbon film	390Ω ±5%	SRD¼P	R605(L,R)	0114289	Carbon film	220kΩ ±5%	SRD¼P
R203	0114145	Carbon film	390Ω ±5%	SRD¼P	R606(L,R)	0114149	Carbon film	560Ω ±5%	SRD¼P
R204	0114131	Carbon film	100Ω ±5%	SRD¼P	R607(L,R)	0114169	Carbon film	2.2kΩ ±5%	SRD¼P
R205	0114285	Carbon film	150kΩ ±5%	SRD¼P	R608(L,R)	0114183	Carbon film	8.2kΩ ±5%	SRD¼P
R206	0114145	Carbon film	390Ω ±5%	SRD¼P	R609(L,R)	0114183	Carbon film	8.2kΩ ±5%	SRD¼P
R208	0114179	Carbon film	5.6kΩ ±5%	SRD¼P	R610(L,R)	0114151	Carbon film	680Ω ±5%	SRD¼P
R209	0114169	Carbon film	2.2kΩ ±5%	SRD¼P	R801	0134370	Composition	560Ω ±10%	RC½GF
R210	0114143	Carbon film	330Ω ±5%	SRD¼P	R802	0134371	Composition	680Ω ±10%	RC½GF
R211	0114201	Carbon film	10kΩ ±5%	SRD¼P	R804	0139005	Composition	2.7MΩ ±10%	RC½GF
R212	0114203	Carbon film	12kΩ ±5%	SRD¼P	R805	0114179	Carbon film	5.6kΩ ±5%	SRD¼P
R213	0114217	Carbon film	47kΩ ±5%	SRD¼P	R806	0114219	Carbon film	56kΩ ±5%	SRD¼P
R214	0114169	Carbon film	2.2kΩ ±5%	SRD¼P	R807	0114163	Carbon film	1.2kΩ ±5%	SRD¼P
R216	0114287	Carbon film	180kΩ ±5%	SRD¼P	R808	0114131	Carbon film	100Ω ±5%	SRD¼P
R217	0114161	Carbon film	1kΩ ±5%	SRD¼P	R809	0114281	Carbon film	100kΩ ±5%	SRD¼P
R218	0114139	Carbon film	220Ω ±5%	SRD¼P	R911	0114217	Carbon film	47kΩ ±5%	SRD¼P
R219	0114131	Carbon film	100Ω ±5%	SRD¼P	R912	0114209	Carbon film	22kΩ ±5%	SRD¼P
R220	0138177	Carbon film	47kΩ ±5%	SRD¼P	R913	0114209	Carbon film	22kΩ ±5%	SRD¼P
					R914	0114143	Carbon film	330Ω ±5%	SRD¼P
					R915	0114209	Carbon film	22kΩ ±5%	SRD¼P
					R916	0114213	Carbon film	33kΩ ±5%	SRD¼P
					R932	0114281	Carbon film	100kΩ ±5%	SRD¼P

SYMBOL NO.	STOCK NO.	DESCRIPTION			SYMBOL NO.	STOCK NO.	DESCRIPTION		
for REAR PLATE ASSEMBLY									
R001	0139007	Composition	1000k Ω \pm 10%	RC $\frac{1}{2}$ GF	CR803	2327041	VO6C		
					CR804	2327041	VO6C		
					CR805	2337182	HZ-16		
					CR806	2327041	VO6C		
					CR807	2327041	VO6C		
					CR808	2337101	HZ-12 (A)		
FET, IC's & TRANSISTORS									
for TUNER PRINTED WIRING BOARD									
FET101	2327432	3SK45 (B)			CR906	2337011	1S2076		
IC151	2367201	HA1138			for REAR PLATE ASSEMBLY				
IC201	2367191	HA1211			CR001	2337011	1S2076		
IC202	2367122	HA1137			VARIABLE RESISTORS				
IC301	2367173	HA1156WZ			for TUNER PRINTED WIRING BOARD				
Q101	0573510	2SC535 (B)			VR201	0151226	100k Ω - B		
Q102	0573507	2SC461 (B)			VR202	0151254	100k Ω - B		
Q301	2327443	2SC1344 (E)			VR301	0151284	300k Ω - B		
Q302	2327443	2SC1344 (E)			VR302	0151224	10k Ω - B		
Q303	2327444	2SC1344 (F)			VR303	0151226	100k Ω - B		
Q304	2327444	2SC1344 (F)			for CONTROL PRINTED WIRING BOARD				
Q305	2327443	2SC1344 (E)			VR601(L,R)	0151862	20k Ω - B		
for CONTROL PRINTED WIRING BOARD									
Q601(L,R)	2327443	2SC1344 (E)			COILS & TRANSFORMERS				
Q801	2327153	2SC1061 (C)			for TUNER PRINTED WIRING BOARD				
Q802	2327363	2SC1345 (E)			L101	2134651	FM antenna coil		
Q903	2327443	2SC1344 (E)			L102	2134657	FM RF1 coil		
Q904	2327443	2SC1344 (E)			L103	2134658	FM RF2 coil		
Q905	2327363	2SC1345 (E)			L104	2227201	Choke coil (2.2 μ H)		
DIODES									
for TUNER PRINTED WIRING BOARD									
CR102	2337141	1S2267			L105	2134471	FM OSC coil		
CR151	2337011	1S2076			L201	2227119	Choke coil (18 μ H)		
CR152	0575002	1N34A			L202	2227081	Choke coil (1 μ H)		
CR153	2337011	1S2076			T101	2154293	FM IF transformer		
CR154	2337011	1S2076			T201	2154271	FM IF transformer		
CR155	2337011	1S2076			T252	2134445	AM OSC coil		
CR156	2337011	1S2076			T253	2154181	AM IF transformer		
CR201	2337011	1S2076			MF201	2134541	Ceramic filter		
CR202	2337011	1S2076			MF202	2134541	Ceramic filter		
CR301	2337011	1S2076			MF203	2134541	Ceramic filter		
CR302	2337011	1S2076			for REAR PLATE ASSEMBLY				
for CONTROL PRINTED WIRING BOARD									
CR801	2327041	VO6C			L001	2134692	Ferrite Antenna		
CR802	2327041	VO6C			L002	2227081	Choke coil (1 μ H)		
					T002	2120871	Balun transformer		

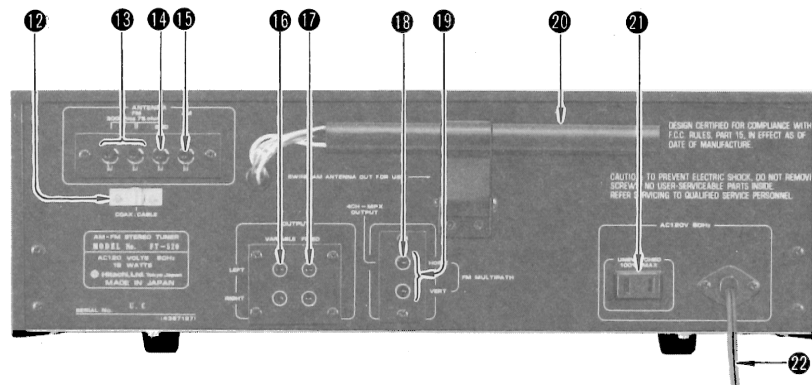
SYMBOL NO.	STOCK NO.	DESCRIPTION	SYMBOL NO.	STOCK NO.	DESCRIPTION
for CHASSIS ASSEMBLY					
T001	2218071	Power transformer		2767201	Lamp-lamp (6.3V, 0.25A)
MISCELLANEOUS				2720022	Holder-fuse holder
	2505289	Tuner printed wiring board assembly		3917522	Washer-8 φ washer
	2505297	Control printed wiring board assembly		4683401	Rubber bushing (for lamp hold)
	2505271	Lamp printed wiring board assembly		4567411	Screw-3 φ x 6 CT bind screw
VC101-104	0281181	Variable capacitor		4567413	Screw-3 φ x 10 CT bind screw
VC151,152	0283123	Trimmer capacitor (10pF)	for REAR PLATE ASSEMBLY		
TC104	2647061	Reed relay		2748441	AC power cord
RY901	0269017	Spark killer (for U.S.A.)		0043793	Bushing (for AC power cord) } (for U.S.A.)
CP001	0269015	Spark killer (for France)		2748511	AC power cord
CP601	2134492	Leak filter		3913001	Bushing (for AC power cord) } (for Europe)
F 1	2727015	Fuse 0.5A		3913006	Bushing (for ferrite antenna)
F 2	2727013	Fuse 2.5A		2657281	Socket-AC socket (for U.S.A.)
F 001	2720056	Wired in fuse (0.5A)		3920381	Cover-AC socket cover (for Europe)
S 1 a,b	2637693	Switch-power switch		2687612	Jack-2P US pin jack
S 601	2627091	Switch-lever switch		2687622	Jack-4P US pin jack
S 602-5	2637681	Switch-push switch		2687421	4P screw terminal board
	2727161	Lamp holder		2687361	2P terminal board
	2577193	Meter-signal meter		4567432	Screw-3 φ x 8 CT bind screw
	2577192	Meter-tuning meter		4568812	Screw-3 φ x 8 CT screw
	4567451	Screw-3 φ x 6 CT bind screw (silver)		4567453	Screw-3 φ x 10 CT bind screw
	4567411	Screw-3 φ x 6 CT bind screw (yellow)	for ACCESSORIES		
	4567431	Screw-3 φ x 6 CT bind screw (black)		2748393	FM antenna
	4567414	Screw-3 φ x 12 CT bind screw		2748542	Patch cord
	4567422	Screw-4 φ x 8 CT bind screw			
	4790096	Washer-3.2 φ washer			
	3920802	Pulley			
	2687311	6 P terminal board			
for FINAL ASSEMBLY					
	3243594	Escutcheon assembly			
	3282801	Knob-push knob (AM sw. others)			
	3283251	Knob (Tuning)			
	3282661	Knob (Output level)			
	3282981	Knob-lever knob (Power, MPX noise filter)			
	4743425	Ring (Output level)			
	4388182	Cover assembly			
	3916411	Leg			
	4567411	Screw-3 φ x 6 CT bind screw			
	4567413	Screw-3 φ x 10 CT bind screw			
	4567441	Screw-4 φ x 6 CT bind screw			
	4374051	Washer-11.5 φ washer			
for DIAL MECHANISM ASSEMBLY					
	3386762	Dial pointer			
	3199442	Dial scale			
	4387074	Dial panel			
	3913554	Spot indicator			
	0666704	Wire clip			
	3338841	Spring			
	4567411	Screw-3 φ x 6 CT bind screw			
for MECHANICAL PLATE ASSEMBLY					
	4570123	Tuning shaft assembly			
	2767233	Lamp-lamp (8V, 30mA)			

FRONT AND REAR PANEL, PANNEAUX AVANT ET ARRIERE



- ① Power switch
- ② FM/AM output level control
- ③ MPX noise filter switch
- ④ Signal meter
- ⑤ Tuning meter
- ⑥ AM switch
- ⑦ FM auto switch
- ⑧ FM mono switch
- ⑨ FM muting/auto-lock switch
- ⑩ Tuning control
- ⑪ FM stereo indicator

- ① Interrupteur d'alimentation
- ② Réglage du niveau de sortie FM/AM
- ③ Interrupteur du filtre de bruit MPX
- ④ Indicateur de signal
- ⑤ Cadran de mesure de l'accord
- ⑥ Interrupteur AM
- ⑦ Interrupteur FM automatique
- ⑧ Interrupteur FM mono
- ⑨ Interrupteur d'atténuation FM/ auto blocage des stations
- ⑩ Contrôle de l'accord
- ⑪ Indicateur stéréo FM



- ⑫ Coaxial cable clamp
- ⑬ FM antenna terminal
- ⑭ Earth terminal
- ⑮ AM antenna terminal
- ⑯ Output terminal (variable)
- ⑰ Output terminal (fixed)
- ⑱ FM 4 CH MPX output terminal
- ⑲ FM multipath output terminal
- ⑳ AM bar antenna
- ㉑ AC outlet (for U.S.A. & Canada set only)
- ㉒ Power cord

- ⑫ Pince de fixation du câble coaxial
- ⑬ Borne d'antenne FM
- ⑭ Borne de terre
- ⑮ Borne d'antenne AM
- ⑯ Borne de sortie (variable)
- ⑰ Borne de sortie (fixe)
- ⑱ Borne FM MPX à quatre canaux
- ⑲ Borne du circuit de réjection
- ⑳ Antenne AM
- ㉑ Prise auxiliaire (uniquement 120V)
- ㉒ Cordon d'alimentation



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