HITACHI

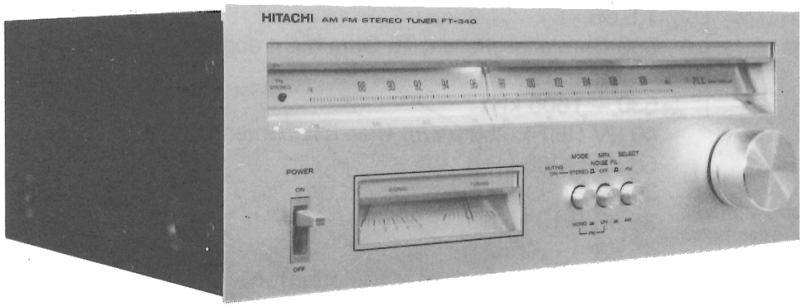
FT-340

SERVICE MANUAL

English
Deutsch
Français

No. 116

(Additional print for U.S.A.)



SPECIFICATIONS

Circuitry	AM/FM 2-band stereo tuner
Semi-conductors	2 ICs, 9 transistors (1 FET), 16 diodes
FM section	
Frequency range	88 – 108 MHz
Usable sensitivity	2.0 μV (IHF), 1.9 μV (S/N 30 dB, 30% modulation)
Image rejection	50 dB
IF rejection	90 dB
Distortion	Monaural 0.15% (400 Hz), Stereo 0.4% (400 Hz)
Signal-to-noise ratio	75 dB
Selectivity	65 dB (±400 kHz)
Stereo separation	40 dB (1 kHz)
Capture ratio	1.5 dB
Antenna input impedance	300 ohms balanced type, 75 ohms unbalanced type
AM section	
Frequency range	530 – 1,605 kHz
Usable sensitivity	40 μV (IHF), 250 μV/m (bar antenna)
Image rejection	56 dB (1000 kHz)
IF rejection	38 dB
Selectivity	35 dB (±10 kHz)
Signal-to-noise ratio	45 dB
Output voltage	300 mV (400 Hz, 30% modulation)
Power requirements	AC 120 V 60 Hz or ~100V–120V/200V–240V 50/60 Hz
Power consumption	9 W
Dimensions	390 (W) x 143 (H) x 369 (D) mm (including AM bar antenna swung down)
Weight	11.1 lbs. (5.5 kg)

Specifications and designs may be changed without notice for improvement.

AM/FM STEREO TUNER

June 1977

TECHNISCHE DATEN

Schaltung	Stereo-Tuner mit 2 Wellenbereichen (MW, UKW)
Bestückung	2 integrierte Schaltkreise, 9 Transistoren (1 Feldeffekttransistor), 16 Dioden
UKW-Teil	
Frequenzbereich	88 – 108 MHz
Nutzempfindlichkeit	2,0 µV (IHF), 1,9 µV (Geräuschspannungsabstand 30 dB, 30% Modulation)
Spiegelselektion	50 dB
ZF-Unterdrückung	90 dB
Klirrfaktor	Monaural 0,15% (400 Hz), Stereo 0,4% (400 Hz)
Geräuschspannungsabstand	75 dB
Trennschärfe	65 dB (±400 kHz)
Kanaltrennung	40 dB (1 kHz)
Gleichwellenselektion	1,5 dB
Antennen-Eingangsimpedanz	300 Ohm abgeglichen, 75 Ohm nicht abgeglichen
MW-Teil	
Frequenzbereich	530 – 1605 kHz
Nutzempfindlichkeit	40 µV (IHF), 250 µV/m (Ferritstabantenne)
Spiegelselektion	56 dB (1000 kHz)
ZF-Unterdrückung	38 dB
Trennschärfe	35 dB (±10 kHz)
Geräuschspannungsabstand	45 dB
Ausgangsspannung	300 mV (400 Hz, 30% Modulation)
Netzspannung	120 V ~, 60 Hz oder ~ 100V–120V/200V–240V 50/60 Hz
Leistungsaufnahme	9 W
Abmessungen	390 (B) x 143 (H) x 369 (T) mm (einschließlich ausgeschwenkter MW-Ferritstabantenne)
Gewicht	5,5 kg

Änderungen der Konstruktion und technischen Daten im Sinne von Verbesserungen jederzeit vorbehalten.

CARACTERISTIQUES TECHNIQUES

Montage	Tuner stéréo à 2 gammes d'ondes AM/FM
Semi-conducteurs	2 CI, 9 transistors (1 FET), 16 diodes
Section FM	
Gamme de fréquences	88 – 108 MHz
Sensibilité utile	2,0 µV (IHF), 1,9 µV (S/B 30 dB, modulation 30%)
Rejet image	50 dB
Rejet FI	90 dB
Distorsion	Monaurale 0,15% (400 Hz), Stéréo 0,4% (400 Hz)
Rapport signal/bruit	75 dB
Sélectivité	65 dB (±400 kHz)
Séparation stéréo	40 dB (1 kHz)
Taux de captage	1,5 dB
Impédance d'entrée d'antenne	300 ohms type compensé, 75 ohms type non-compensé
Section AM	
Gamme de fréquences	530 – 1605 kHz
Sensibilité utile	40 µV (IHF), 250 µV/m (antenne à tige)
Rejet image	56 dB (1000 kHz)
Rejet FI	38 dB
Sélectivité	35 dB (±10 kHz)
Rapport signal/bruit	45 dB
Tension de sortie	300 mV (400 Hz, modulation 30%)
Alimentation	CA 120 V 60 Hz ou ~ 100V–120V/200V–240V 50/60 Hz
Consommation électrique	9 W
Dimensions	390 (L) x 143 (H) x 369 (P) mm (antenne à tige déployée comprise)
Poids	5,5 kg (11,1 lbs.)

Par suite d'améliorations éventuelles les caractéristiques techniques indiquées ci-dessus peuvent être modifiées sans préavis.

DISASSEMBLY AND REPLACEMENT · ZERLEGUNG UND AUSTAUSCH · DEMONTAGE ET REMONTAGE

- Removing the top cover, front panel & bottom plate.
- Ausbau der oberen Abdeckung, der Fronttafel und der Bodenplatte
- Deposer le couvercle supérieur, le panneau frontal et la plaque inférieure

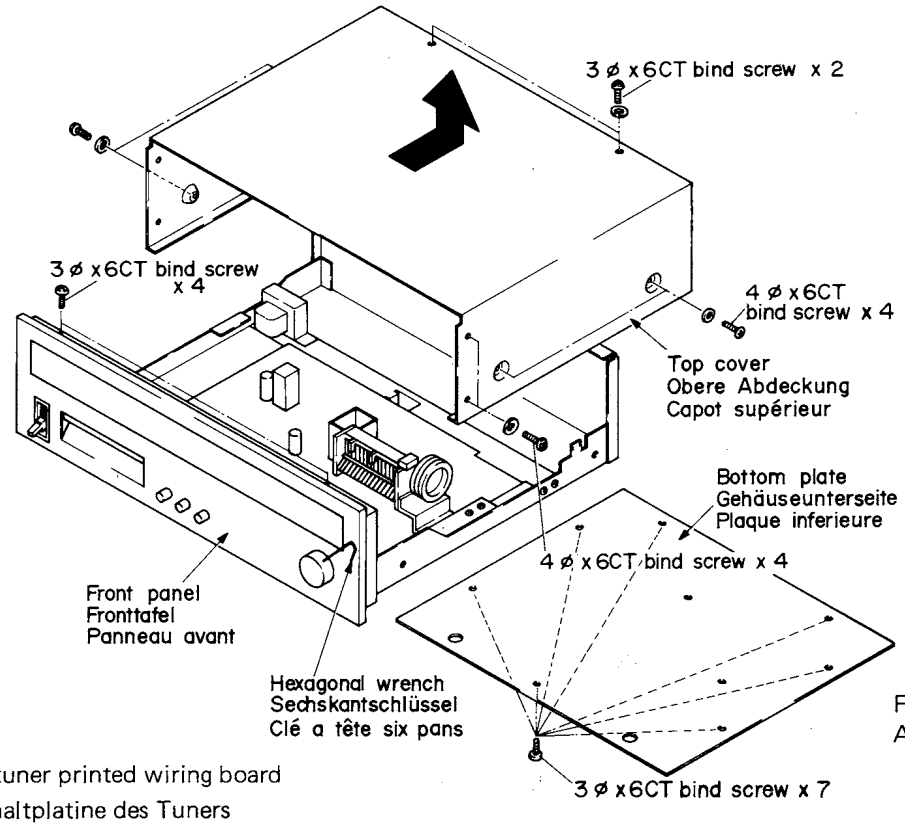


Fig. 1
Abb. 1

- Removing the tuner printed wiring board
- Ausbau der Schaltplatine des Tuners
- Démontage de la plaquette à circuits imprimés du turer

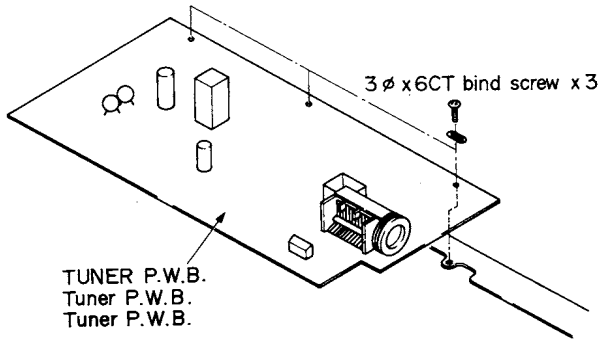


Fig. 2
Abb. 2

Remarks for replacing the FM ceramic filters
The FT-340 uses two FM ceramic filters (MF201 and MF202) which are color-coded red, blue or orange to indicate the characteristics. To obtain the specified performance, those of the same color should be used.

Hinweise zum Austausch der UKW-Keramikfilter
Modell FT-340 ist mit zwei UKW-Keramikfiltern (MF201 und MF202) ausgerüstet, die mit den Farbcodierungen rot, blau oder orange, je anch ihren Eigenschaften versehen sind. Um die vorgeschriebene Leistung zu erhalten, immer die Filter mit den gleichen Farbcodierungen verwenden.

Remarques concernant le remplacement des filtres céramiques de modulation de fréquence
Le FT-340 emploie deux filtres céramiques de modulation de fréquence (MF201 et MF202) qui possèdent un code de couleur correspondant à leurs caractéristiques: rouge, bleu ou orange. Les filtres de même couleur doivent être employés pour être sûr d'obtenir les performances spécifiées.

GENERAL ALIGNMENT INSTRUCTION · ALLGEMEINE AUSRICHTANLEITUNG · INSTRUCTION GENERALE

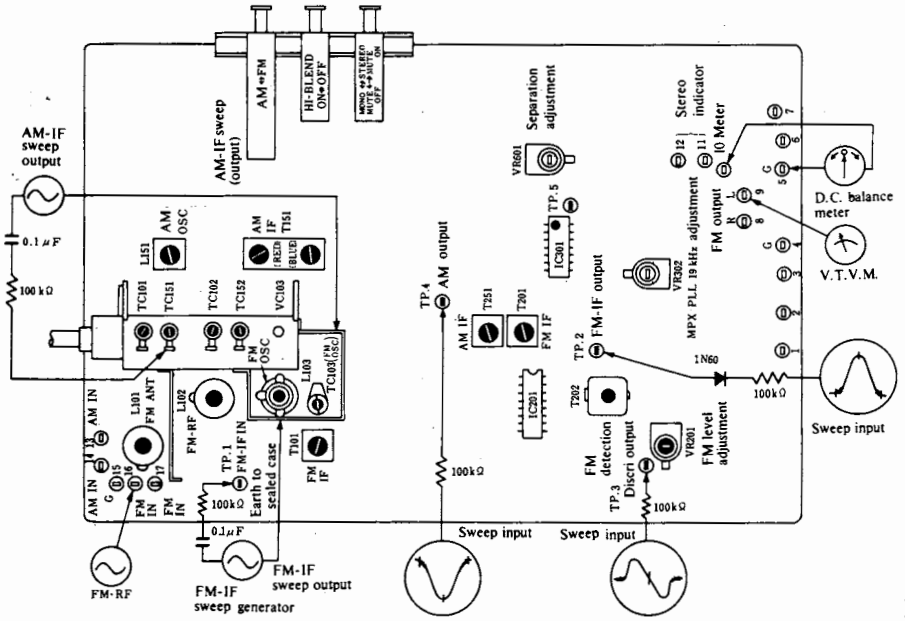


Fig. 3

FM TUNER ALIGNMENT

Steps		Item	Measuring Instrument	Input terminal	Output terminal	Frequency	Adjust	Wave form
1	(1)	IF Amplifier	Sweep generator (10.7MHz)	TP. 1	TP. 2		T101, T201	CAUTION (1), (3)
	(2)						T201	CAUTION (2)
	(3)						T101	CAUTION (4)
	(4)	"S" curve			TP. 3		T202 (lower) T202 (upper)	CAUTION (5)
2	(1)	Covering	FM signal generator (87.5 MHz, 400Hz, 100% modulated 10 dB at input) V.T.V.M.	Antenna terminal	OUTPUT (L)	87.5 MHz	L103	Gain Max.
					f min	Germany 87.5 MHz		
	(2)		FM signal generator (108MHz, 400Hz, 100% modulated 10 dB at input) V.T.V.M.			108 MHz	TC103	
					f max	Germany 108 MHz		
	(3)							Repeat (1) & (2)
3	(1)	Tracking	FM signal generator (90MHz, 400Hz, 100% modulated 10 dB at input) V.T.V.M.	Antenna terminal	OUTPUT (L)	90MHz	L101, L102	Gain Max.
	(2)		FM signal generator (106MHz, 400Hz, 100% modulated 10 dB at input) V.T.V.M.			106MHz	TC101 TC102	
	(3)							Repeat (1) & (2)
4		Discriminator	D.C balance meter	Antenna terminal (open)	TP. 3 (D.C balance meter)	detuning	T202 (upper)	CAUTION (6)
5		Distortion	FM signal generator (98MHz, 400Hz, 100% modulated 60 dB at input) Distortion meter	Antenna terminal	OUTPUT (L)	98MHz CAUTION (7)	T202 (lower)	Adjust distortion min. with T202
6		Output	FM signal generator (98MHz, 400Hz, 100% modulated 60 dB at input) V.T.V.M.	Antenna terminal	OUTPUT (L)	98MHz	VR201	Adjust output 1V

HITACHI FT-340

CAUTION

(1) Input low level signals (such that noises are mixed together as is shown in Fig. 4) from the sweep generator. Setting the gain to maximum with T101 and T201, adjust the waveform until it appears like that shown in Fig. 4. The ground side of the sweep generator output dummy should be connected to the local oscillator shielded plate.
(2) Inputting high level signals from the sweep generator, adjust the waveform with T201 until it becomes like that shown in Fig. 5.
(3) When connecting the sweep generator (input side) with TP.2, insert a 1N60 diode between them. (See Fig. 6.)
(4) Switching the sweep generator to low level, adjust the waveform again with T101 so that it becomes like that shown in Fig. 4.
(5) Adjusting the secondary core (upper) of T202, obtain an S- curve as shown in Fig. 7. Then adjust the primary core (lower) of T202 to make the amplitude of the S-curve maximum with points A and B symmetrical with respect to point C and the slope as linear as possible.
(6) Connect a DC balance meter with TP.3 through a 100k ohms resistor. Adjust the secondary core (upper) of T202 so that the DC balance meter indicates OV.
(7) Connecting the DC balance meter to TP.3 through a 100k ohms resistor, tune the FT-340. to 98MHz with the tuning knob so that the DC balance meter indicates OV.

Fig. 4

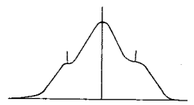


Fig. 5

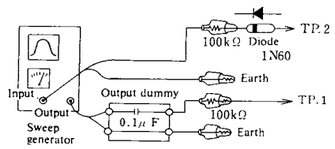


Fig. 6

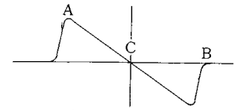


Fig. 7

AM TUNER ALIGNMENT

Steps		Item	Measuring Instrument	Input terminal	Output terminal	Frequency	Adjust	Wave form
1		IF Amplifier	Sweep generator 455kHz	TC 151	TP. 4		T151 T251	Gain Max. CAUTION (8) (9)
2	(1)	Covering	AM signal generator (145 kHz, 400Hz, 30% modulated 74 dB/m at input) V.T.V.M.	Ferrite antenna	OUTPUT (L)	left end	L151	Gain Max. CAUTION (10)
	(2)		AM signal generator (355 kHz, 400 Hz, 30% modulated 74dB/m at input) V.T.V.M.			right end	TC152	
	(3)							Repeat (1) & (2)
3	(1)	Tracking	AM signal generator (175kHz, 400Hz, 30% modulated weak input) V.T.V.M.	Ferrite antenna	OUTPUT (L)	175kHz	Ferrite antenna	Gain Max. CAUTION (10)
	(2)		AM signal generator (300kHz, 400Hz, 30% modulated weak input) V.T.V.M.			300kHz	TC151	
	(3)							Repeat (1) & (2)

(8) Connect the ground side of the sweep generator output dummy to the local oscillator shielded plate. Adjust the variable capacitor so that it has minimum capacitance.
(9) Adjusting T151 core, make a waveform as in Fig. 8 Because of the ceramic filters used, the markers may be out of position. If this happens, neglect the markers.
(10) Set the input level to 74dB in coarse adjustment. Reduce the input level to minimum (50dB) as adjustment proceeds.

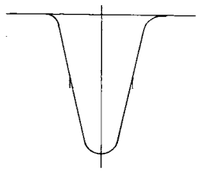


Fig. 8.

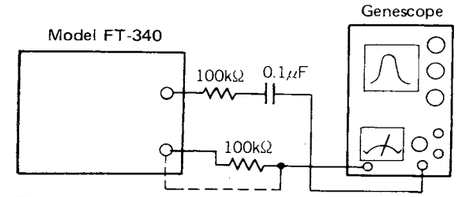


Fig. 9 FM IF Discriminator and AM IF alignments (AM and FM Step. 1)

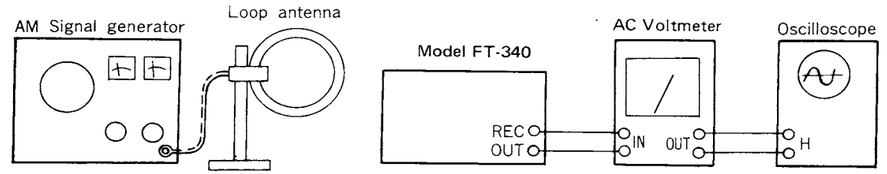


Fig. 10 AM frequency covering and tracking alignments (Step. 2 and 3)

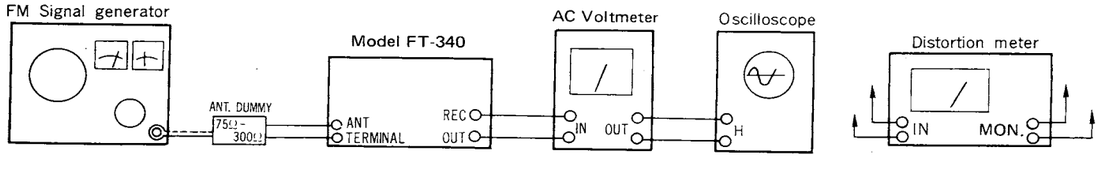


Fig. 11 FM frequency covering, tracking and other alignments (Step. 2 to 8)

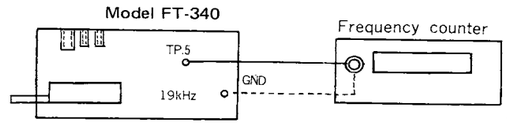


Fig. 12 FM MPX 19kHz adjustment (Step. 1)

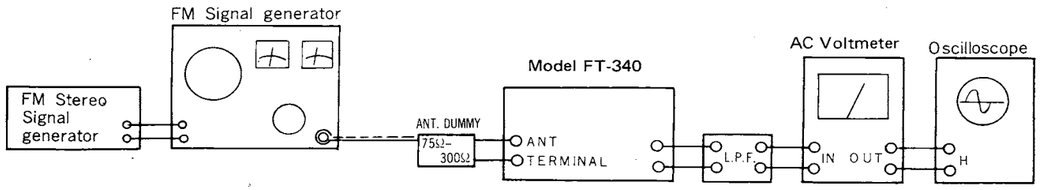
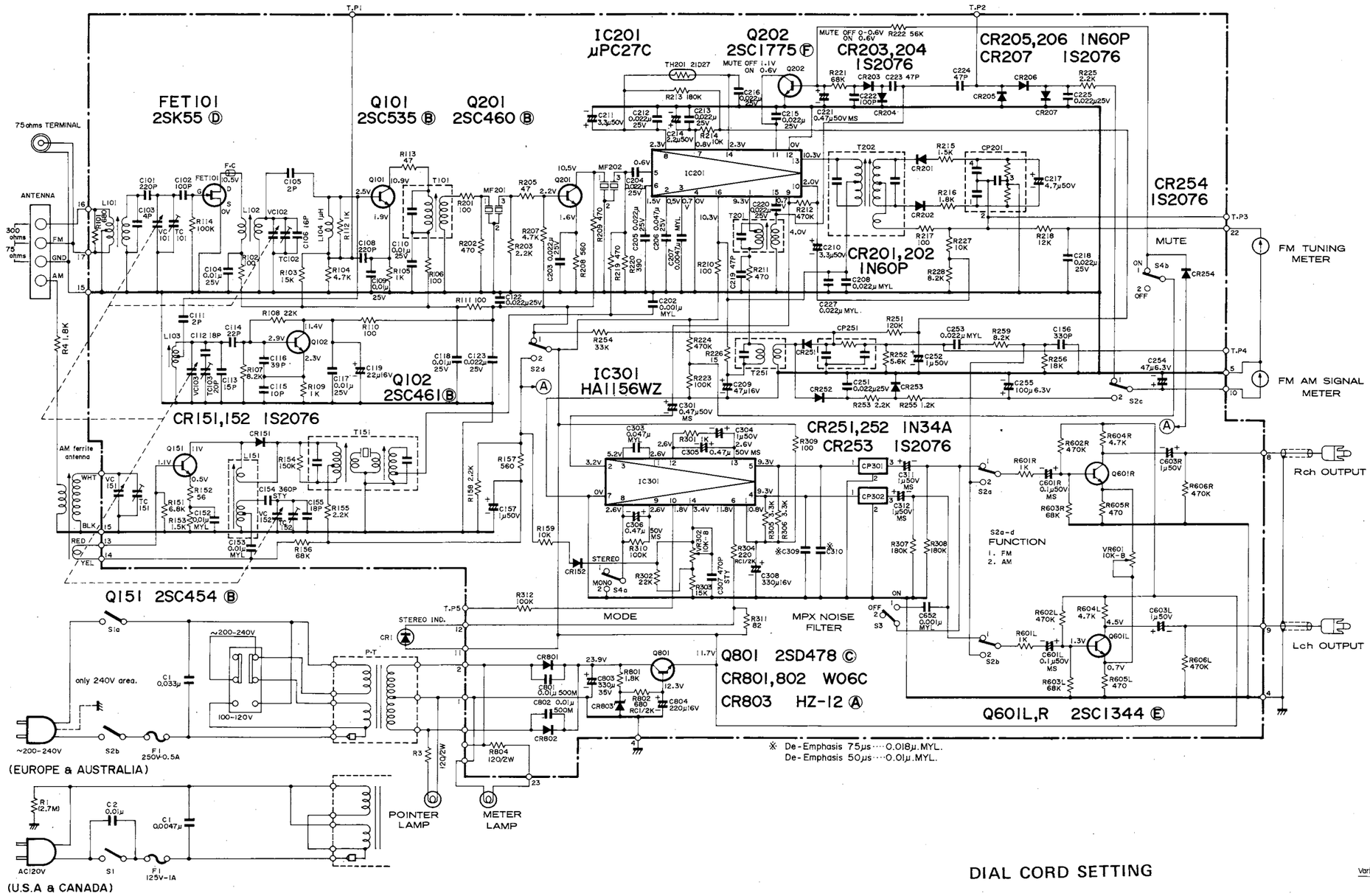
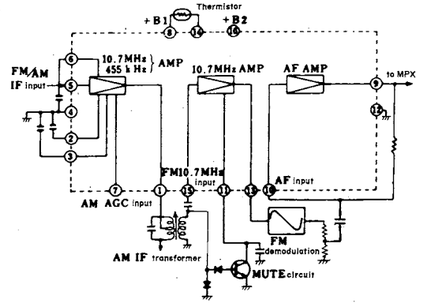


Fig. 13 FM MPX alignments (Step. 2)

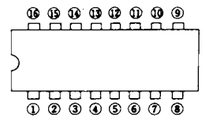
CIRCUIT DIAGRAM · SCHALTPLAN · PLAN DE CIRCUIT

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

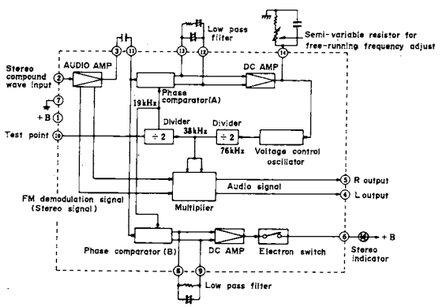




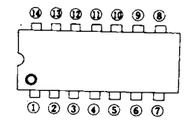
μPC27C BLOCK DIAGRAM



μPC 27C

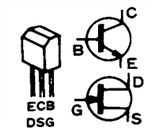
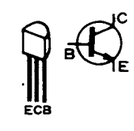
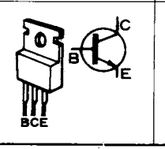
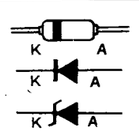
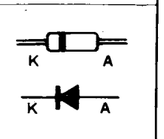


HA 1156WZ BLOCK DIAGRAM



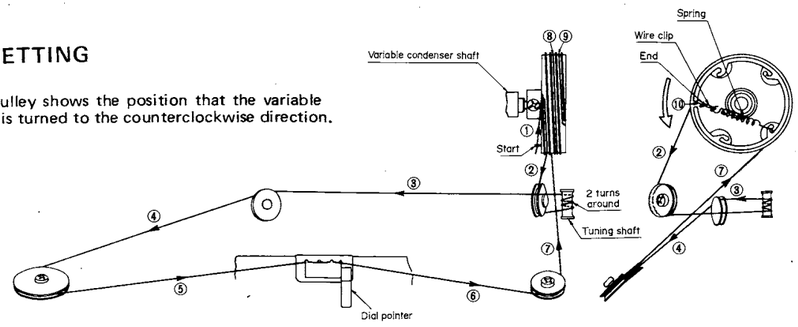
HA 1156WZ

How to discriminate transistor, FET and diode pin

2SC535 2SC460 2SC461 2SC1344 2SC454 2SK55	2SC1775	2SD478	1S2076 HZ-12 W06C	1N60 1N34A
				

DIAL CORD SETTING

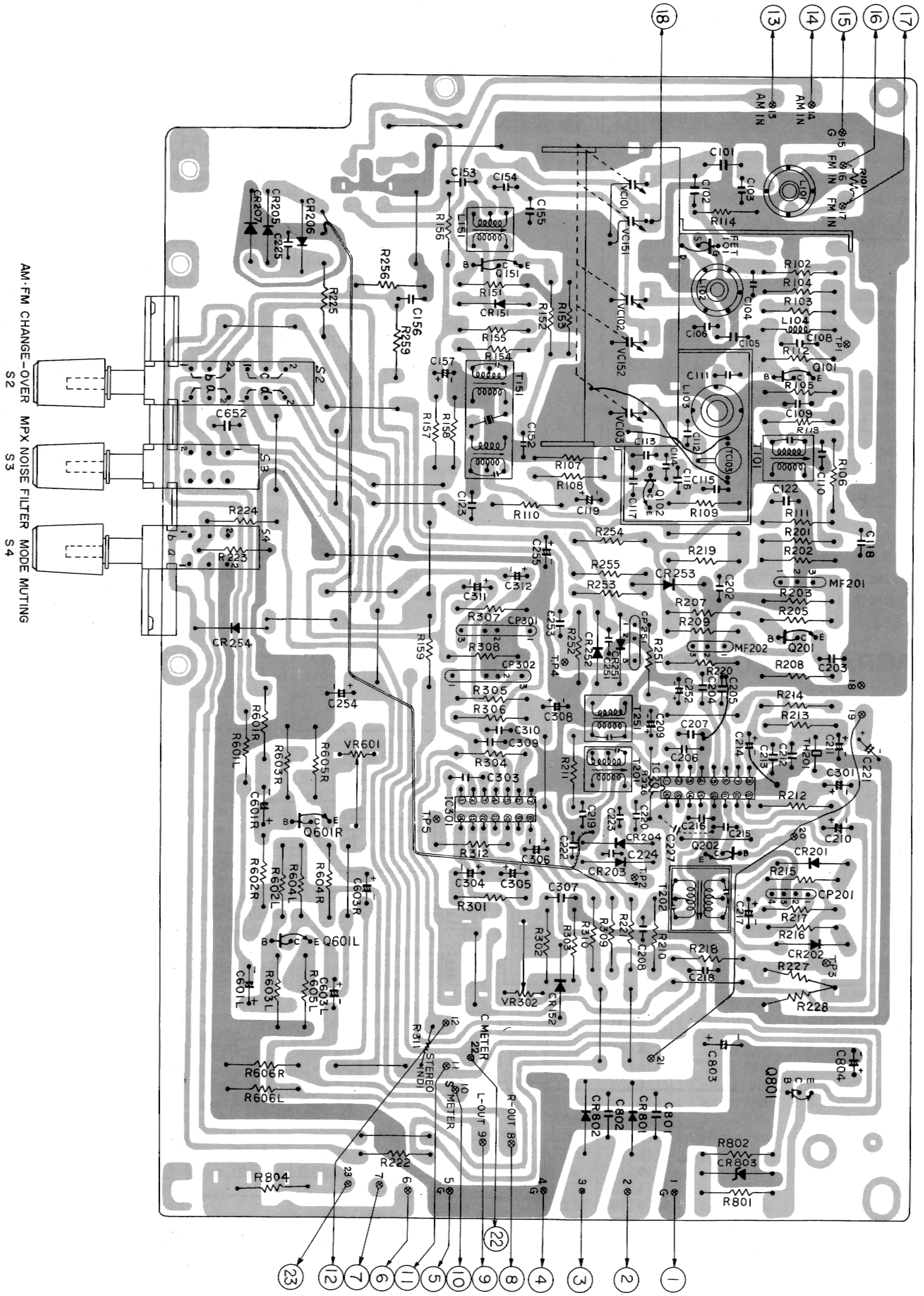
Note : The dial pulley shows the position that the variable condenser is turned to the counterclockwise direction.



PRINTED WIRING BOARD · PRINTPLATTEN · 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.



FEATURES

1. A newly developed PLL (phase locked loop) IC which is the result of Hitachi's advanced technology is used in the FM multiplex circuit. The PLL is a very special kind of feedback circuit; higher separation and lower distortion are obtained compared with the conventional LC tuning system and the PLL has higher reliability against aging.
2. Since a high performance FET is used in the input stage of the FM tuner, noise and interference are decreased.
3. A ceramic filter with sharp characteristics and a high performance IC are used in the FM tuner intermediate frequency amplifier to further improve the selectivity characteristics, capture ratio and distortion characteristics.
4. A Mode/Muting switch which combines the mode changeover and muting functions is used.
5. Since a MPX noise filter circuit is employed, high frequency noise can be cut during the reception of FM stereo broadcasts.
6. A triple tune ceramic filter is used in the AM section to improve selectivity.
7. The carrier which causes beats to occur and degrades sound quality during tape recording, is decreased sharply by using an active low-pass filter which protects the audio frequency characteristics from deterioration.
8. Convenient antenna terminals are fitted for the connection of a 300 ohm feeder line or 75 ohm coaxial cable.
9. Two easy-to-read meters are used for frequency and signal/tuning indication. A dial mechanism employing a large-sized fly-wheel with a high moment of inertia for easy operation is incorporated.

MERKMALE

1. Ein neuentwickelter integrierter Schaltkreis mit phasenstarrer Schleife (PLL) – ein Ergebnis der fortschrittlichen Hitachi-Technologie – wird in der UKW-Multiplexschaltung verwendet. Bei der phasenstarren Schleife handelt es sich um einen Rückkopplungskreis in ganz besonderer Ausführung; im Vergleich zur herkömmlichen LC-Abstimmung wird eine bessere Trennung und geringere Verzerrung erzielt, außerdem ist die phasenstarre Schleife (PLL) alterungsbeständiger.
2. Durch Verwendung eines Hochleistungs-Feldeffekttransistors in der Eingangsstufe des UKW-Tuners werden Störgeräusche und Interferenz reduziert.
3. Im ZF-Verstärker des UKW-Tuners werden ein hochselektives Keramikfilter und eine hochleistungsfähige integrierte Schaltung verwendet, um die Trennschärfe und Gleichwellenselektion zu verbessern und den Klirrfaktor zu verringern.
4. Ein Betriebsart-/Stillabstimmschalter, der die Betriebsartumschalt- und Stillabstimmfunktionen in sich vereinigt, wird verwendet.
5. Durch Verwendung einer Multiplex-Rauschfilterschaltung kann hochfrequentes Störgeräusch beim Empfang von UKW-Stereo-Sendungen unterdrückt werden.
6. Im MW-Teil wird ein Dreifachabstimm-Keramikfilter verwendet, um die Trennschärfe zu verbessern.
7. Der HF-Träger, welcher durch Interferenzerzeugung die Klangqualität bei Bandaufnahmen beeinträchtigt, wird mit Hilfe eines aktiven Tiefpaßfilters stark abgeschwächt, ohne eine Verschlechterung der Tonfrequenzeigenschaften hervorzurufen.
8. Praktische Antennenanschlußklemmen sind für den Anschluß einer 300-Ohm-Speiseleitung oder eines 75-Ohm-Koaxialkabels vorhanden.
9. Zwei gut lesbare Anzeigeinstrumente werden für die Feldstärke- und Abstimmanzeige verwendet. Ein Skalenmechanismus, für den ein großdimensioniertes Schwungrad mit hohem Trägheitsmoment verwendet wird, sorgt für ausgezeichneten Bedienungskomfort.

CARACTERISTIQUES

1. Un CI PLL nouvellement créé (verrouilleur de phase), résultat de la haute technologie Hitachi, est monté dans le circuit multiplex FM. Le PLL est un circuit de réaction très particulier; on obtient une séparation supérieure et une distorsion moindre grâce à ce circuit en comparaison au système d'accord LC conventionnel tandis que le PLL possède des caractéristiques de résistance élevée contre le vieillissement.
2. Etant donné qu'un FET à haute performance est utilisé dans l'étage d'entrée du tuner FM, les bruits et les interférences sont largement diminués.
3. Un filtre céramique aux caractéristiques élevées et un CI à haute performance sont utilisés dans l'amplificateur de fréquence intermédiaire du tuner FM pour améliorer les caractéristiques de sélectivité, le taux de captage et les caractéristiques de distorsion.
4. Commutateur de mode/sourdine, combinant les fonctions de commutation de mode et de réglage silencieux.
5. Un circuit de filtrage du bruit MPX est utilisé et permet de supprimer les parasites de hautes fréquences au cours de la réception des émissions FM diffusées en stéréo.
6. Un triple filtre céramique d'accord est utilisé dans la section AM pour améliorer la sélectivité.
7. L'onde porteuse provoque des battements et altère la qualité sonore à l'occasion d'enregistrement sur bande magnétique; elle est améliorée en utilisant un filtre passe-bas efficace qui permet de protéger contre toute détérioration les caractéristiques des fréquences audibles.
8. Bornes d'antenne pratiques installées pour le raccordement d'une antenne feeder de 300 ohms ou d'un câble coaxial de 75 ohms.
9. Les deux indicateurs faciles à lire servent à afficher la fréquence et le signal/syntonisation. Pour la facilité de l'utilisation, on a incorporé un mécanisme de cadran à volant surdimensionné à haut moment d'inertie.

DESCRIPTION OF THE NEW CIRCUIT

Phase locked loop (PLL)

The FT-340 uses a PLL MPX circuit in the FM MPX demodulation circuit. This circuit is superior to the MPX circuits of common LC tuning circuits in that temperature and humidity changes do not cause deterioration of performance. It compensates the change of phase (or frequency) immediately it happens, making it possible to obtain a high channel separation. The PLL is a closed loop, involving a servomechanism comparing the phases of two signals, which keeps the phase relation stationary. It consists of the four basic blocks shown in Fig. 14.

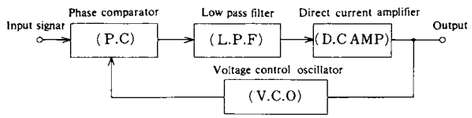


Fig. 14

When the input signal comes in, the phase comparator (P.C.) compares the phase of input signal with that of the voltage control oscillator (V.C.O.) and produces an output signal which is proportional to the phase difference between the two signals. Passing the output signal through a low-pass filter (L.P.F.), the direct current component is taken out, which will be amplified with the direct current amplifier (D.C. AMP.) and sent to the voltage control oscillator. The voltage control oscillator is an oscillator the oscillation frequency of which is controlled by the direct current signal. It will oscillate at its natural frequency if there is no input signal. If there is an input, the output frequency will drift by an amount proportional to the input voltage from its natural frequency, so that the phase difference (frequency difference) between the original input signal and the output of the voltage control oscillator is cancelled. The PLL with such a closed circuit follows the input signal so that the phase (frequency) difference between the two signals is always kept zero. This means that the DC amplifier produces DC voltages such that there is no phase (frequency) difference between the two signals. If the input frequency shifts around the natural frequency, DC voltages proportional to the differences between the natural and input frequencies can be taken out. Thus the S-shaped curve can be obtained. For this reason the PLL can be used for FM demodulation as in the FT-340.

BESCHREIBUNG DES NEUEN SCHALTKREISES

PLL-Schaltung (Phase Locked Loop)

Modell FT-340 ist mit einer PLL-Stereo-Schaltung im UKW-Stereo-Decoder ausgerüstet. Diese Schaltungstechnik ist herkömmlichen LC-Abstimmkreisen weit überlegen, da keinerlei Leistungsverminderung bei auftretenden Temperatur- und Feuchtigkeitsschwankungen verursacht werden. Phasenverschiebungen (oder Frequenzänderungen) werden augenblicklich festgestellt und korrigiert, wodurch eine hohe Übersprechdämpfung gewährleistet wird. Die PLL-Schaltung ist eine Servo-Schleife, die die Phasengänge von zwei Signalen ständig vergleicht und immer im gleichen Verhältnis erhält. Dieser Schaltkreis besteht aus den in Abb. 14 gezeigten Grundblöcken.

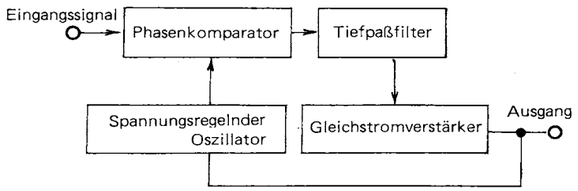


Abb. 14

Der Phasenkomparator vergleicht die Phase des einkommenden Eingangssignals mit dem vomspannungsregelnden Oszillator erzeugten Bezugssignal und erzeugt ein Ausgangssignal, daß dem Phasenunterschied zwischen den beiden Signalen entspricht. Dieses Ausgangssignal wird durch ein Tiefpaßfilter einem Gleichstromverstärker zugeführt, in dem etwaige Gleichstromkomponenten ausgesiebt wird, wonach die Verstärkung erfolgt; das so verstärkte Signal wird an den spannungsregelnden Oszillator weitergeleitet. Die Frequenz des Oszillators wird durch das Gleichstromsignal geregelt. Wenn kein Eingangssignal angelegt wird, schwingt dieser Oszillator mit seiner Nennfrequenz. Bei einem angelegten Eingangssignal ändert sich die Frequenz genau um jenen Betrag, der den Phasenunterschied zwischen dem eigentlichen Eingangssignal und dem Ausgangssignal des Oszillators aufhebt. Die PLL-Schaltung ist daher eine geschlossene Servo-Schleife, die den Unterschied zwischen der Phase (der Frequenz) der beiden Signale immer auf Null hält. Dies bedeutet, daß der Gleichstromverstärker eine Gleichspannung erzeugt, die keinerlei Phasenunterschiede (Frequenzunterschiede) zwischen den beiden Signalen zuläßt. Wenn die Eingangsfrequenz von der Eigenfrequenz des Oszillators abweicht, wird eine dieser Abweichung proportionale Gleichspannung angelegt. Dadurch kann eine s-förmige Kurve erhalten werden. Aus diesem Grund wird die PLL-Schaltung im UKW-Stereo-Decoder von Modell FT-340 eingesetzt.

HITACHI FT-340

RENSEIGNEMENTS CONCERNANT LE NOUVEAU CIRCUIT

Circuit en phase (PLL)

Le FT-340 emploie un circuit en phase PLL MPX dans le circuit de démodulation FM MPX. Ce circuit est supérieur aux circuits MPX habituellement employés dans les circuits de syntonisation LC car les changements de température et d'humidité ne provoquent aucune détèrioration des performances. Il compense le changement de phase (ou de fréquence) immédiatement après son apparation et assure ainsi une haute séparation de canal. Le circuit en phase PLL est un circuit bouclé incorporant un servomécanisme comparant les phasees de deux signaux permettant de maintenir le raport de phase à un état stationnaire. Il se compose de quatre blocs principaux comme le montre la Fig. 14.

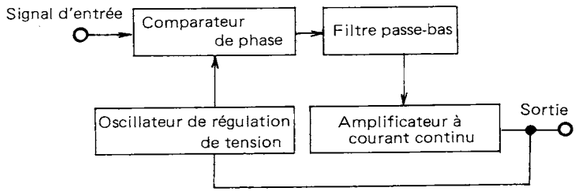
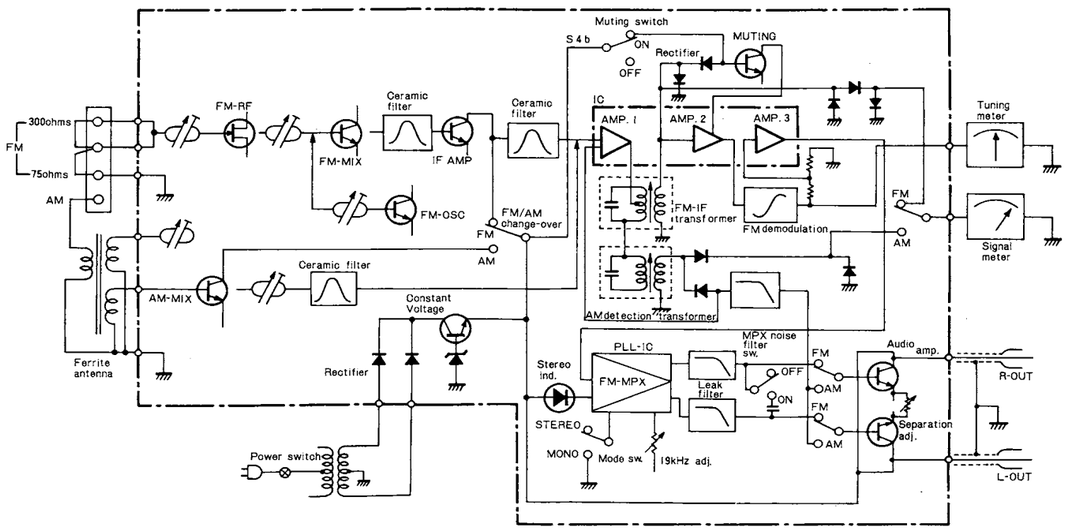


Fig. 14

Quand le signal d'entrée est appliqué au circuit, le comparateur de phase (P.C.) compare la phase du signal d'entrée avec celle de l'oscillateur de régulation de tension (V.C.O.) et produit un signal de sortie qui est proportionnel au déphasage entre les deux signaux. En faisant circuler le signal de sortie par un filtre passe-bas (L.P.F.) le composant à courant continu est extrait pour être amplifié par l'amplificateur à courant continu (D.C.AMP.) et être soumis à l'oscillateur de régulation de tension (V.C.O.). Ce dernier représente un oscillateur dont la fréquence d'oscillation est contrôlée par le signal à courant continu.

Il oscillera à sa fréquence propre quand aucun signal d'entrée n'est appliqué. Quand une entrée apparaît, la fréquence de sortie dérive d'une valeur proportionnelle à la tension d'entrée à partir de sa fréquence propre, c'est à dire que le déphasage (différence de fréquence) entre le signal d'entrée d'origine et la sortie de l'oscillateur de régulation de tension est annulé. Le circuit en phase (PLL) possédant un tel circuit bouclé surveille le signal d'entrée de telle sorte que le déphasage (la différence de fréquence) entre les deux signaux soit toujours maintenue à zéro. Cela signifie que l'amplificateur à courant continu produit des tensions à courant continu de telle sorte qu'aucun déphasage (aucune différence de fréquence) n'existe entre les deux signaux. Si la fréquence d'entrée dérive à proximité de la fréquence propre, les tensions à courant continu qui sont proportionelles aux différences entre les fréquences propres et les fréquences d'entrée peuvent être obtenues. C'est la raison pour laquelle un circuit en phase (PLL) peut être employé pour la démodulation de la modulation de fréquence dans le FT-340.

BLOCK DIAGRAM · BLOCKSCHEMA · SCHEMA



REPLACEMENT PARTS LIST · ERSATZTEILLISTE · TABLEAU DES PIECE

CAPACITORS

for TUNER PRINTED WIRING BOARD

SYMBOL NO.	STOCK NO.	DESCRIPTION		
C101	0248362	Ceramic, discal	220pF ±5%	50V
C102	0248724	Ceramic, discal	100pF ±10%	50V
C103	0248304	Ceramic, discal	4pF ±0.25pF	50V
C104	0245017	Ceramic, discal	0.01μF +80 −20 %	25V
C105	0248632	Ceramic, discal	2pF ±0.25pF	50V
C106	0248335	Ceramic, discal	16pF ±5%	50V
C108	0248362	Ceramic, discal	220pF ±5%	50V
C109	0245017	Ceramic, discal	0.01μF +80 −20 %	25V
C110	0245017	Ceramic, discal	0.01μF +80 −20 %	25V
C111	0248632	Ceramic, discal	2pF ±0.25pF	50V
C112	0246446	Ceramic, discal	18pF ±5%	50V
C113	0248034	Ceramic, discal	15pF ±5%	50V
C114	0246448	Ceramic, discal	22pF ±5%	50V
C115	0248310	Ceramic, discal	10pF ±0.25%	50V
C116	0248344	Ceramic, discal	39pF ±5%	50V
C117	0245017	Ceramic, discal	0.01μF +80 −20 %	25V
C118	0245017	Ceramic, discal	0.01μF +80 −20 %	25V
C119	0252522	Electrolytic	22μF	16V
C122	0245018	Ceramic, discal	0.022μF +80 −20 %	25V
C123	0245018	Ceramic, discal	0.022μF +80 −20 %	25V
C152	0275011	Mylar, film	0.01μF ±10%	50V
C153	0275011	Mylar, film	0.01μF ±10%	50V
C154	0228324	Styrol	360pF ±5%	50V
C155	0248496	Ceramic, discal	18pF ±5%	50V
C156	0248736	Ceramic, discal	330pF ±10%	50V
C157	0252811	Electrolytic	1μF	50V
C202	0274011	Mylar, film	1000pF ±10%	50V
C203	0245018	Ceramic, discal	0.022μF +80 −20 %	25V
C204	0245018	Ceramic, discal	0.022μF +80 −20 %	25V
C205	0245018	Ceramic, discal	0.022μF +80 −20 %	25V
C206	0244175	Ceramic, discal	0.047μF +80 −20 %	25V
C207	0274315	Mylar, film	4700pF ±10%	50V
C208	0275013	Mylar, film	0.022μF ±10%	50V
C209	0252525	Electrolytic	47μF	16V
C210	0252813	Electrolytic	3.3μF	50V
C211	0252813	Electrolytic	3.3μF	50V
C212	0245018	Ceramic, discal	0.022μF +80 −20 %	25V
C213	0245018	Ceramic, discal	0.022μF +80 −20 %	25V
C214	0252878	Electrolytic	2.2μF	50V
C215	0245018	Ceramic, discal	0.022μF +80 −20 %	25V
C216	0245018	Ceramic, discal	0.022μF +80 −20 %	25V
C217	0252815	Electrolytic	4.7μF	50V
C218	0245018	Ceramic, discal	0.022μF +80 −20 %	25V
C219	0248676	Ceramic, discal	47pF ±5%	50V
C220	0245018	Ceramic, discal	0.022μF +80 −20 %	25V
C221	0252875	Electrolytic	0.47μF	50V
C222	0248724	Ceramic, discal	100pF ±10%	50V
C223	0248676	Ceramic, discal	47pF ±5%	50V
C224	0248676	Ceramic, discal	47pF ±5%	50V
C225	0245018	Ceramic, discal	0.022μF +80 −20 %	25V
C227	0275013	Mylar, film	0.022μF ±10%	50V
C251	0245018	Ceramic, discal	0.022μF +80 −20 %	25V
C252	0252811	Electrolytic	1μF	50V
C253	0275013	Mylar, film	0.022μF ±10%	50V
C254	0252225	Electrolytic	47μF	6.3V
C255	0252231	Electrolytic	100μF	6.3V
C301	0252875	Electrolytic	0.47μF	50V
C303	0275015	Mylar, film	0.047μF ±10%	50V
C304	0252811	Electrolytic	1μF	50V
C305	0252875	Electrolytic	0.47μF	50V
C306	0252875	Electrolytic	0.47μF	50V
C307	0221522	Styrol	470pF ±5%	50V
C308	0252533	Electrolytic	330μF	16V
C309	0275011	Mylar, film	0.01μF ±10% (for Europe)	50V
C309	0275032	Mylar, film	0.018μF ±10% (for Canada & U.S.A.)	50V
C310	0275011	Mylar, film	0.01μF ±10% (for Europe)	50V
C310	0275032	Mylar, film	0.018μF ±10% (for Canada & U.S.A.)	50V
C311	0252877	Electrolytic	1μF	50V
C312	0252877	Electrolytic	1μF	50V
C601L,R	0252871	Electrolytic	0.1μF	50V
C603L,R	0252811	Electrolytic	1μF	50V
C652	0274011	Mylar, film	1000pF ±10%	50V
C801	0245408	Ceramic, discal	0.01μF ±20%	500V
C802	0245408	Ceramic, discal	0.01μF ±20%	500V
C803	0252733	Electrolytic	330μF	35V
C804	0252733	Electrolytic	330μF	35V

for CHASSIS ASSEMBLY

C1	0261204	Ceramic, discal	0.033μF ±20% (except for Canada & U.S.A.)	250V
C1	0243885	Ceramic, discal	4700pF +80 −20 % (for Canada & U.S.A.)	500V
C2	0243887	Spark killer	0.01μF ±20% (for Canada & U.S.A.)	125V

RESISTORS

for TUNER PRINTED WIRING BOARD

R101	0114151	Carbon film	680Ω ±5%	SRD¼P
R102	0114131	Carbon film	100Ω ±5%	SRD¼P
R103	0114205	Carbon film	15kΩ ±5%	SRD¼P
R104	0114177	Carbon film	4.7kΩ ±5%	SRD¼P
R105	0114161	Carbon film	1kΩ ±5%	SRD¼P
R106	0114131	Carbon film	100Ω±5%	SRD¼P
R107	0114183	Carbon film	8.2kΩ ±5%	SRD¼P
R108	0114209	Carbon film	22kΩ ±5%	SRD¼P
R109	0114161	Carbon film	1kΩ ±5%	SRD¼P
R110	0114131	Carbon film	100Ω ±5%	SRD¼P
R111	0114131	Carbon film	100Ω ±5%	SRD¼P
R112	0114161	Carbon film	1kΩ ±5%	SRD¼P
R113	0114057	Carbon film	47Ω ±5%	SRD¼P
R114	0114281	Carbon film	100kΩ ±5%	SRD¼P

SYMBOL NO.	STOCK NO.	DESCRIPTION		
R151	0114181	Carbon film	6.8kΩ ±5%	SRD¼P
R152	0114059	Carbon film	56Ω ±5%	SRD¼P
R153	0114165	Carbon film	1.5kΩ ±5%	SRD¼P
R154	0114285	Carbon film	150kΩ ±5%	SRD¼P
R155	0114169	Carbon film	2.2kΩ ±5%	SRD¼P
R156	0114221	Carbon film	68kΩ ±5%	SRD¼P
R157	0114149	Carbon film	560Ω ±5%	SRD¼P
R158	0114169	Carbon film	2.2kΩ ±5%	SRD¼P
R159	0114201	Carbon film	10kΩ ±5%	SRD¼P
R201	0114131	Carbon film	100Ω ±5%	SRD¼P
R202	0114147	Carbon film	470Ω ±5%	SRD¼P
R203	0114169	Carbon film	2.2kΩ ±5%	SRD¼P
R205	0114057	Carbon film	47Ω ±5%	SRD¼P
R207	0114177	Carbon film	4.7kΩ ±5%	SRD¼P
R208	0114149	Carbon film	560Ω ±5%	SRD¼P
R209	0114147	Carbon film	470Ω ±5%	SRD¼P
R210	0114131	Carbon film	100Ω ±5%	SRD¼P
R211	0114147	Carbon film	470Ω ±5%	SRD¼P
R212	0114297	Carbon film	470kΩ ±5%	SRD¼P
R213	0114287	Carbon film	180kΩ ±5%	SRD¼P
R214	0114201	Carbon film	10kΩ ±5%	SRD¼P
R215	0114165	Carbon film	1.5kΩ ±5%	SRD¼P
R216	0114167	Carbon film	1.8kΩ ±5%	SRD¼P
R217	0114131	Carbon film	100Ω ±5%	SRD¼P
R218	0114203	Carbon film	12kΩ ±5%	SRD¼P
R219	0114147	Carbon film	470Ω ±5%	SRD¼P
R220	0114145	Carbon film	390Ω ±5%	SRD¼P
R221	0114221	Carbon film	68kΩ ±5%	SRD¼P
R222	0114219	Carbon film	56kΩ ±5%	SRD¼P
R223	0114281	Carbon film	100kΩ ±5%	SRD¼P
R224	0114297	Carbon film	470kΩ ±5%	SRD¼P
R225	0114169	Carbon film	2.2kΩ ±5%	SRD¼P
R226	0114045	Carbon film	15Ω ±5%	SRD¼P
R227	0114201	Carbon film	10kΩ ±5%	SRD¼P
R228	0114183	Carbon film	8.2kΩ ±5%	SRD¼P
R251	0114283	Carbon film	120kΩ ±5%	SRD¼P
R252	0114179	Carbon film	5.6kΩ ±5%	SRD¼P
R253	0114169	Carbon film	2.2kΩ ±5%	SRD¼P
R254	0114213	Carbon film	33kΩ ±5%	SRD¼P
R255	0114163	Carbon film	1.2kΩ ±5%	SRD¼P
R256	0114207	Carbon film	18kΩ ±5%	SRD¼P
R259	0114183	Carbon film	8.2kΩ ±5%	SRD¼P
R301	0114161	Carbon film	1kΩ ±5%	SRD¼P
R302	0114209	Carbon film	22kΩ ±5%	SRD¼P
R303	0114205	Carbon film	15kΩ ±5%	SRD¼P
R304	0134365	Carbon film	220Ω ±10%	RC½GF
R305	0114173	Carbon film	3.3kΩ ±5%	SRD¼P
R306	0114173	Carbon film	3.3kΩ ±5%	SRD¼P
R307	0114287	Carbon film	180kΩ ±5%	SRD¼P
R308	0114287	Carbon film	180kΩ ±5%	SRD¼P
R309	0114131	Carbon film	100Ω ±5%	SRD¼P
R310	0114281	Carbon film	100kΩ ±5%	SRD¼P
R311	0138063	Carbon film	82Ω ±5%	SRD¼P
R312	0114281	Carbon film	100kΩ ±5%	SRD¼P

SYMBOL NO.	STOCK NO.	DESCRIPTION		
R601L,R	0114161	Carbon film	1kΩ ±5%	SRD¼P
R602L,R	0114297	Carbon film	470kΩ ±5%	SRD¼P
R603L,R	0114221	Carbon film	68kΩ ±5%	SRD¼P
R604L,R	0114177	Carbon film	4.7kΩ ±5%	SRD¼P
R605L,R	0114147	Carbon film	470Ω ±5%	SRD¼P
R606L,R	0114297	Carbon film	470kΩ ±5%	SRD¼P
R801	0134376	Carbon film	1.8kΩ ±10%	RC½GF
R802	0134371	Carbon film	680Ω ±10%	RC½GF
R804	0119522	Metal, oxide	120Ω ±10%	RD2PA

for CHASSIS ASSEMBLY

R1	0139005	Carbon film	2.7MΩ ±10% (for Canada & U.S.A.)	RC½GF
R3	0119522	Metal, oxide	120Ω ±10%	RD2PA
R4	0114167	Carbon film	1.8kΩ ±5%	SRD¼P

ICs, FET & TRANSISTORS

for TUNER PRINTED WIRING BOARD

IC201	2367161	μPC27C
IC301	2367173	HA1156WZ
FET101	2327683	2SK 55Ⓓ
Q101	0573510	2SC535 Ⓑ
Q102	0573507	2SC461 Ⓑ
Q151	0573491	2SC454 Ⓑ
Q201	0573486	2SC460 Ⓑ
Q202	2327914	2SC1775 Ⓕ
Q601L,R	2327443	2SC1344 Ⓔ
Q801	2327802	2SD478 Ⓒ

DIODES

for TUNER PRINTED WIRING BOARD

CR151	2337011	1S2076
CR152	2337011	1S2076
CR201	0575019	1N60P
CR202	0575019	1N60P
CR203	2337011	1S2076
CR204	2337011	1S2076
CR205	0575019	1N60P
CR206	0575019	1N60P
CR207	2337011	1S2076

SYMBOL NO.	STOCK NO.	DESCRIPTION
CR251	0575002	1N34A
CR252	0575002	1N34A
CR253	2337011	1S2076
CR254	2337011	1S2076
CR801	2337083	W06C
CR802	2337083	W06C
CR803	2337101	HZ-12Ⓐ

VARIABLE RESISTORS

for TUNER PRINTED WIRING BOARD

VR302	0151224	10kΩ – (B)
VR601	0151224	10kΩ – (B)

COILS & TRANSFORMERS

for TUNER PRINTED WIRING BOARD

L101	2134741	FM antenna coil
L102	2134743	FM RF coil
L103	2134471	FM OSC coil
L104	2227081	Choke coil (1μH)
L151	2134431	AM OSC coil
T101	2154291	FM IF transformer
T151	2154311	AM IF transformer
T201	2154294	FM IF transformer
T202	2154202	FM discriminator transformer
T251	2154122	AM IF transformer

MISCELLANEOUS

ELECTROLYTIC PARTS

	3922212	Tuner printed wiring board assembly
TH201	2347091	Thermister 21D27
MF201	2134541	FM ceramic filter
MF202	2134541	FM ceramic filter
CP201	0186121	CR multiple component
CP251	0186131	CR multiple component
CP301	0186011	Carrier leak filter
CP302	0186011	Carrier leak filter
TC101, 102,151, 152 VC101-103,151, 152	0281169	FM AM variable capacitor
TC103	0283122	Trimmer capacitor (20pF)
	2637921	Miniature push switch
	2777011	Ferrite core
	2687311	6P terminal board U.S.A.)
F1	2727083	Fuse-wired in fuse (125V/1A) (for Canada &
F1	2727197	Fuse-fuse (250V/0.5A T) (except for Canada &
	2727181	Holder-fuse holder U.S.A.)
	2218471	Power transformer
	2577281	Level meter
	2767411	Lamp

SYMBOL NO.	STOCK NO.	DESCRIPTION

MECHANICAL PARTS

	3920802	Pulley
	2687311	6P terminal board
	4567421	4φ x 6 CT bind screw (yellow)
	4567411	3φ x 6 CT bind screw (yellow)
	4567431	3φ x 6 CT bind screw (black)
	4567451	3φ x 6 CT bind screw (silver)
	4790096	Fiber washer

for DIAL MECHANISM ASSEMBLY

	4400371	Dial pointer
	3199951	Dial scale
	4567411	3φ x 6 CT bind screw (yellow)
	0666704	Wire clip
	3337201	Spring

for MECHANICAL PLATE ASSEMBLY

	4562415	Roller shaft
	4571933	Flywheel assembly
	4567411	3φ x 6 CT bind screw (yellow)
S1	2637794	Power switch (except for Canada & U.S.A.)
S1	2637793	Power switch (for Canada & U.S.A.)
	2337238	Light emitting diode assembly (stereo indicator)

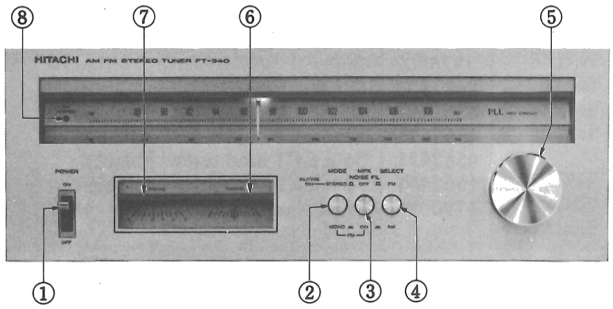
for REAR PLATE ASSEMBLY

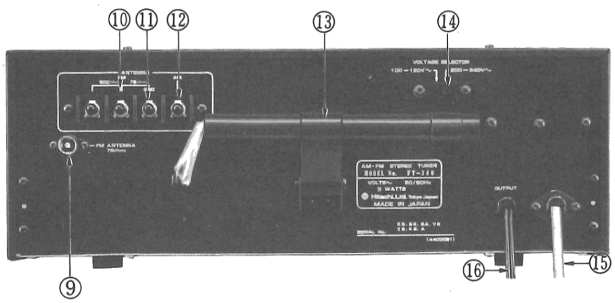
	4567449	4φ x 30 CT bind screw
	3913001	Bushing (for AC power cord) (for Sweden, Europe & Switzerland)
	3715183	Bushing (for AC power cord) (for U.K.)
	0043793	Bushing (for AC power cord) (for Canada & U.S.A.)
	3913006	Bushing (for ferrite antenna lead)
	2687831	5P terminal board
	4567431	3φ x 6 CT bind screw
	8811244	3φ washer
	8821234	3φ nut
	2687762	4P screw terminal
	2757271	Ferrite antenna
	2657361	Coaxial socket (except for Canada & U.S.A.)
	2787221	Belt (for AC power cord) } (for Australia)
	2747301	AC power cord } (for Australia)
	2748621	AC power cord (for U.K.)
	2747771	AC power cord (for Switzerland)
	2748551	AC power cord (for Sweden)
	2748441	AC power cord (for Canada & U.S.A.)
	2748511	AC power cord (for Europe)
	2748615	Output cord
	2627041	Switch-slide switch (Voltage selector)

for FINAL ASSEMBLY

	3244542	Escutcheon assembly
	3284203	Tuning knob
	3284362	Knob-lever knob (Power)
	3284173	Knob-push knob (Mode, MPX noise filter, Select)
	4396392	Cover
	4374051	4.3φ washer (for cover fixing)
	4567441	4φ x 6 CT bind screw (black)
	3916411	Leg
	4567413	3φ x 10 CT bind screw
	4567411	3φ x 6 CT bind screw (yellow)
	4567421	4φ x 6 CT bind screw (yellow)

FRONT AND REAR PANEL · VORDERE UND HINTERE BEDIENUNGSTAFEL · PANNEAUX AVANT ET ARRIERE





① POWER switch
② MODE/MUTING switch
③ MPX NOISE FILTER switch
④ FM/AM change-over switch (SELECT)
⑤ Tuning knob
⑥ TUNING meter
⑦ SIGNAL meter
⑧ FM STEREO indicator
⑨ FM ANTENNA socket (75 ohms) (except U.S.A. & Canada set)
⑩ FM ANTENNA terminal (300 ohms & 75 ohms)
⑪ Ground terminal (GND)
⑫ AM ANTENNA terminal
⑬ AM bar antenna
⑭ VOLTAGE SELECTOR (except U.S.A. & Canada set)
⑮ Power supply cord
⑯ Output cord

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① Netzschalter(POWER)
② Betriebsart-/Stillabstimmschalter (MODE/MUTING)
③ Multiplex-Rauschfilterschalter (MPX NOISE FILTER)
④ Wellenbereichschalter (SELECT)
⑤ Abstimmknopf
⑥ Abstimminstrument (TUNING)
⑦ Feldstärkeinstrument (SIGNAL)
⑧ UKW-Stereo-Anzeige (FM STEREO)
⑨ UKW-Antennenbuchse (75 Ohm) (FM ANTENNA) (außer für das USA- und Kanada-Modell)
⑩ UKW-Antennenanschluß (300 und 75 Ohm) (FM ANTENNA)
⑪ Erdungsklemme (GND)
⑫ MW-Antennenklemme (AM ANTENNA)
⑬ MW-Ferritstabantenne
⑭ Netzspannungswähler (VOLTAGE SELECTOR) (außer für das USA- und Kanada-Modell)
⑮ Netzkabel
⑯ Ausgangskabel

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① Interrupteur secteur (POWER)
② Commutateur de mode/soudine (MODE/MUTING)
③ Commutateur du filtre de bruit MPX (MPX NOISE FILTER)
④ Commutateur d'inversion FM/AM (SELECT)
⑤ Bouton d'accord
⑥ Indicateur de syntonisation (TUNING)
⑦ Indicateur de l'intensité du SIGNAL
⑧ Indicateur FM STEREO
⑨ Prise d'antenne FM (75 ohms) (FM ANTENNA) (sauf appareil aux USA et au Canada)
⑩ Borne d'antenne FM (300 ohms et 75 ohms) (FM ANTENNA)
⑪ Prise de terre (GND)
⑫ Borne d'antenne AM (AM ANTENNA)
⑬ Antenne à tige AM
⑭ Sélecteur de tension (VOLTAGE SELECTOR) (sauf appareil aux USA et au Canada)
⑮ Cordon d'alimentation électrique
⑯ Cordon de sortie

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