

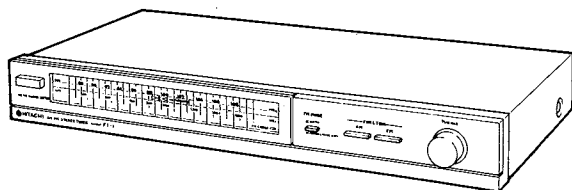
HITACHI

SERVICE MANUAL

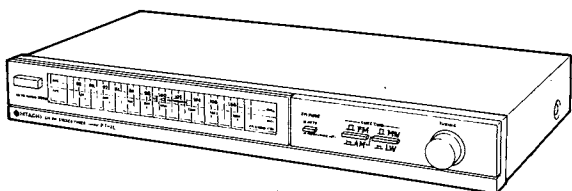
TY

No. 370 EGF

FT-1
FT-1L



FT-1



FT-1L

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SAFETY PRECAUTIONS

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety related characteristics, always use genuine Hitachi's replacement parts. Especially critical parts in the power circuit block should not be replaced with other makers. Critical parts are marked with Δ in the circuit diagram and printed wiring board.
2. Before returning a repaired unit to the customer, the service technician must thoroughly test the unit to ascertain that it is completely safe to operate without danger of electrical shock.

SPECIFICATIONS

Circuitry	AM/FM 2-band Stereo tuner (FT-1) MW/LW/FM 3-band stereo tuner (FT-1L)	•AM SECTION (FT-1)	
•FM SECTION		Frequency range	530 - 1,605 kHz
Frequency range	88 - 108 MHz	Sensitivity	36 μ V (DIN) ... S/N 26 dB 18 μ V (IHF) 250 μ V/m (IHF Loop antenna)
Usable Sensitivity	11.2 dBf (IHF), 1.0 μ V (75 ohms DIN)	Image interference ratio	40 dB
Image interference ratio	50 dB (98 MHz)	Selectivity	40 dB
Total harmonic distortion	MONO : 0.3 % (1 kHz) STEREO : 0.4 % (1 kHz)	Signal-to-noise ratio	48 dB
Signal-to-noise ratio	Mono : 75 dB (IHF) 65 dB (IEC, unweighted, Q-peak) 60 dB (IEC, weighted, Q-peak) STEREO : 70 dB (IHF) 60 dB (IEC, unweighted, Q-peak) 55 dB (IEC, weighted, Q-peak)	Output voltage	165 mV (400 Hz, 30 % modulation)
Frequency response	50 Hz - 12 kHz (50 μ s \pm 2 dB) 50 Hz - 15 kHz (50 μ s \pm 6.0 dB) (for W. Germany & Italy) 50 Hz - 12 kHz (75 μ s \pm 2 dB) (for U.S.A. & Canada)	•AM (MW) SECTION (FT-1L)	
Selectivity	50 dB	Frequency range	530 - 1,605 kHz
Stereo separation	40 dB (1 kHz) (except for W. Germany & Italy)	Sensitivity	36 μ V (DIN) ... S/N 26 dB
Capture ratio	1.0 dB	Image interference ratio	40 dB
Output voltage	550 mV (1 kHz)	Selectivity	40 dB
		Signal-to-noise ratio	48 dB
		Output voltage	165 mV (400 Hz, 30 % modulation)
		•AM (LW) SECTION (FT-1L)	
		Frequency range	150 - 350 kHz
		Sensitivity	200 μ V (DIN) ... S/N 26 dB
		•GENERAL	
		Power requirements	DC Power supply from the amplifier (HA-1 or HA-2)
		Dimensions	435 (W) \times 60 (H) \times 236 (D) mm
		Weight	2.4 kg (5.3 lbs.)

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE TO CHANGE FOR IMPROVEMENT.

AM/FM STEREO TUNER

May 1983

TOYOKAWA WORKS

SICHERHEITSMASSNAHMEN

Bei Wartungsarbeiten sind die folgend Sicherheitsmaßnahmen zu beachten:

- Da verschiedene Teile dieses Gerätes Sicherheitsfunktionen aufweisen, nur Original-Hitachi-Ersatzteile verwenden. Kritische Teile im Netzteil sollten nicht durch ähnliche Teile anderer Hersteller ersetzt werden. Alle kritischen Teile sind im Schaltplan und im Diagramm der Schaltplatinen mit dem Symbol Δ gekennzeichnet.
- Vor der Auslieferung eines reparierten Gerätes an den Kunden muß der Wartungstechniker das Gerät einer gründlichen Prüfung unterziehen, um sicherzustellen, daß sicherer Betrieb ohne die Gefahr von elektrischen Schlägen gewährleistet ist.

TECHNISCHE DATEN

Type	Zwei-Wellenbereichs-Stereotuner MW/UKW (FT-1) Drei-Wellenbereichs-Stereotuner MW/LW/UKW (FT-1L)	Gleichwellenselektion	1,0 dB
• UKW-Teil		Ausgangsspannung	500 mV (1 kHz, 40 kHz Hub)
Empfangsbereich	88 MHz bis 108 MHz	• MW-Teil (FT-1)	
Nutzbare Empfindlichkeit	11,2 dBf (IHF), 1,0 μ V (75 Ohm DIN)	Empfangsbereich	530 kHz – 1605 kHz
Spiegelfrequenzdämpfung	50 dB (98 MHz)	Empfindlichkeit	36 μ V (DIN) ...S/N 26 dB 18 μ V (IHF) 250 μ V/m (IHF Zimmer antenne)
Klirrfaktor	MONO : 0,3 % (1 kHz) STEREO : 0,4 % (1 kHz)	Spiegelfrequenzdämpfung	40 dB
Rauschabstand	MONO : 75 dB (IHF) 65 dB (Fremdspannung sabstand) 60 dB (Geräuschspannung sabstand) STEREO : 70 dB (IHF) 60 dB (Fremdspannung sabstand) 55 dB (Geräuschspannung sabstand)	Trennschärfe	40 dB (\pm 9 kHz)
Übertragungsbereich	50 Hz bis 12 kHz (50 μ s \pm 2,0 dB) 50 Hz bis 15 kHz (50 μ s \pm 1,0 dB) (für die Bundesrepublik Deutschland) 50 kHz bis 12 kHz (75 μ s \pm 2 dB) (für USA und Kanada)	Signal-Geräuschabstand	48 dB
Trennschärfe	50 dB	Ausgangsspannung	165 mV (400 Hz, 30 % Modulation)
Übersprechdämpfung	40 dB (1 kHz) (außer die Bundesrepublik Deutschland)	• MW-Teil (FT-1L)	
		Empfangsbereich	530 kHz – 1605 kHz
		Empfindlichkeit	36 μ V (DIN) ...S/N 26 dB
		Spiegelfrequenzdämpfung	40 dB
		Trennschärfe	40 dB (\pm 9 kHz)
		Signal-Geräuschabstand	48 dB
		Ausgangsspannung	165 mV (400 Hz, 30 % Modulation)
		• LW-Teil (FT-1L)	
		Empfangsbereich	150 – 350 kHz
		Empfindlichkeit	200 μ V (DIN) ...S/N 26 dB
		• Allgemeine Daten	
		Stromversorgung	Gleichstromversorgung vom Verstärker (HA-1 oder HA-2)
		Abmessungen	435 (B) \times 60 (H) \times 236 (T) mm
		Gewicht	2,4 kg (5,3 lbs.)

PRÉCAUTIONS DE SÉCURITÉ

Les précautions suivantes doivent être observées chaque fois qu'une réparation doit être faite.

- Etant donné que de nombreux composants de l'appareil possèdent des caractéristiques relatives à la sécurité, utiliser uniquement des pièces de rechange d'origine Hitachi pour effectuer un remplacement. Ceci se rapporte notamment aux pièces critiques du bloc d'alimentation qui ne doivent en aucun cas être remplacées par celles d'autres fabricants. Les pièces critiques sont accompagnés du symbole Δ dans le schéma de montage et sur le schéma de plaque de câblage.
- Avant de retourner l'appareil réparé au client, le technicien doit procéder à un essai complet pour s'assurer qu'il ne présente aucun danger de chocs électriques.

CARACTÉRISTIQUES TECHNIQUES

Circuit	Tuner stéréo 2 gammes AM/FM (FT-1) Tuner stéréo 3 gammes PO/GO/FM (FT-1L)	• SECTION PO (FT-1)	
• SECTION FM		Plage de fréquence	530 – 1605 kHz
Plage de fréquence	88 – 108 MHz	Sensibilité	36 μ V (DIN) ...S/N 26 dB 18 μ V (IHF) 250 μ V/m (IHF antenna-cadre)
Sensibilité utilisable	11,2 dBf (IHF), 1,0 μ V (75 ohms DIN)	Taux d'interférence image	40 dB
Taux d'interférence image	50 dB (98 MHz)	Sélectivité	40 dB (\pm 9 kHz)
Distorsion harmonique totale	MONO : 0,3 % (1 kHz) STEREO : 0,4 % (1 kHz)	Rapport signal/bruit	48 dB
Rapport signal/bruit	MONO : 75 dB (IHF) 65 dB (IEC, non pondéré, crête Q) 60 dB (IEC, pondéré, crête Q) STEREO : 70 dB (IHF) 60 dB (IEC, non pondéré, crête Q) 55 dB (IEC, pondéré, crête Q)	Tension de sortie	165 mV (400 Hz, 30 % modulation)
Réponse de fréquence	50 Hz – 12 kHz (50 μ s \pm 2,0 dB) 50 Hz – 15 kHz (50 μ s \pm 1,0 dB) (pour l'Allemagne de l'Ouest) 50 kHz – 12 kHz (75 μ s \pm 2 dB) (pour les Etats-Unis et le Canada)	• SECTION PO (FT-1L)	
Sélectivité	50 dB	Plage de fréquence	530 – 1605 kHz
Séparation stéréo	40 dB (1 kHz) (sauf pour l'Allemagne de l'Ouest)	Sensibilité	36 μ V (DIN) ...S/N 26 dB
Taux de capture	1,0 dB	Taux d'interférence image	40 dB
Tension de sortie	500 mV (1 kHz, 40 kHz déviation)	Sélectivité	40 dB (\pm 9 kHz)
		Rapport signal/bruit	48 dB
		Tension de sortie	165 mV (400 Hz, 30 % modulation)
		• SECTION GO (FT-1L)	
		Plage de fréquence	150 – 350 kHz
		Sensibilité	200 μ V (DIN) ...S/N 26 dB
		• DONNÉES GÉNÉRALES	
		Alimentation électrique	Alimentation continue depuis l'amplificateur (HA-1 ou HA-2)
		Dimensions	435 (L) \times 60 (H) \times 236 (P) mm
		Poids	2,4 kg (5,3 lbs.)

DIAL CORD SETTING · SKALENSEILEINSTELLUNG · EQUIPEMENT DE CADRAN

Specification :

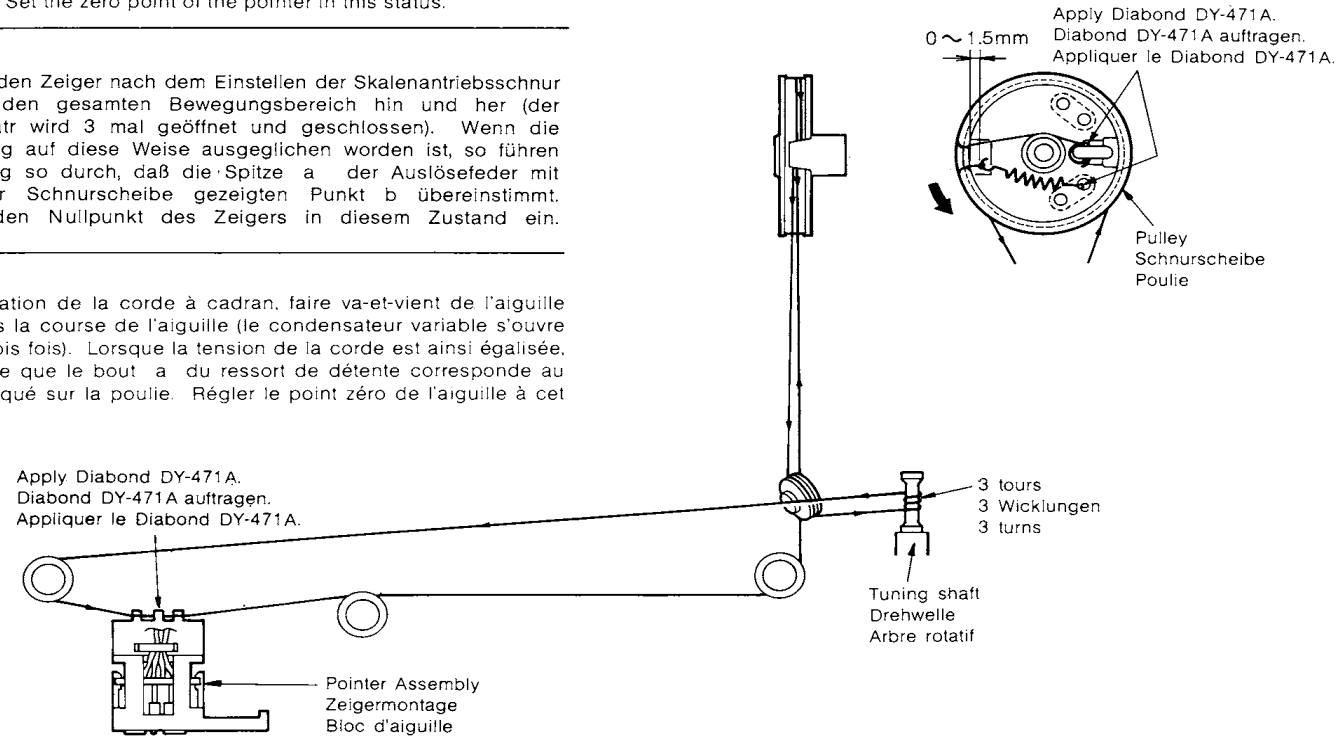
After setting the dial cord, make the pointer go and return three times within the pointer stroke (the variable capacitor opens and closes three times). When the cord tension is thus equalized, make adjustment so that the tip a of the trigger spring matches with the point b shown on the pulley. Set the zero point of the pointer in this status.

Spezifikation :

Bewegen Sie den Zeiger nach dem Einstellen der Skalenantriebsschnur 3 mal über den gesamten Bewegungsbereich hin und her (der Drehkondensator wird 3 mal geöffnet und geschlossen). Wenn die Schnurspannung auf diese Weise ausgeglichen worden ist, so führen Sie Einstellung so durch, daß die Spitze a der Auslösefeder mit dem auf der Schnurscheibe gezeigten Punkt b übereinstimmt. Stellen Sie den Nullpunkt des Zeigers in diesem Zustand ein.

Spécifications :

Après l'installation de la corde à cadran, faire va-et-vient de l'aiguille trois fois dans la course de l'aiguille (le condensateur variable s'ouvre et se ferme trois fois). Lorsque la tension de la corde est ainsi égalisée, régler de sorte que le bout a du ressort de détente corresponde au point b indiqué sur la poulie. Régler le point zéro de l'aiguille à cet état.



GENERAL ALIGNMENT INSTRUCTION · ALLGEMEINE AUSRICHTANLEITUNG · INSTRUCTIONS GENERALES

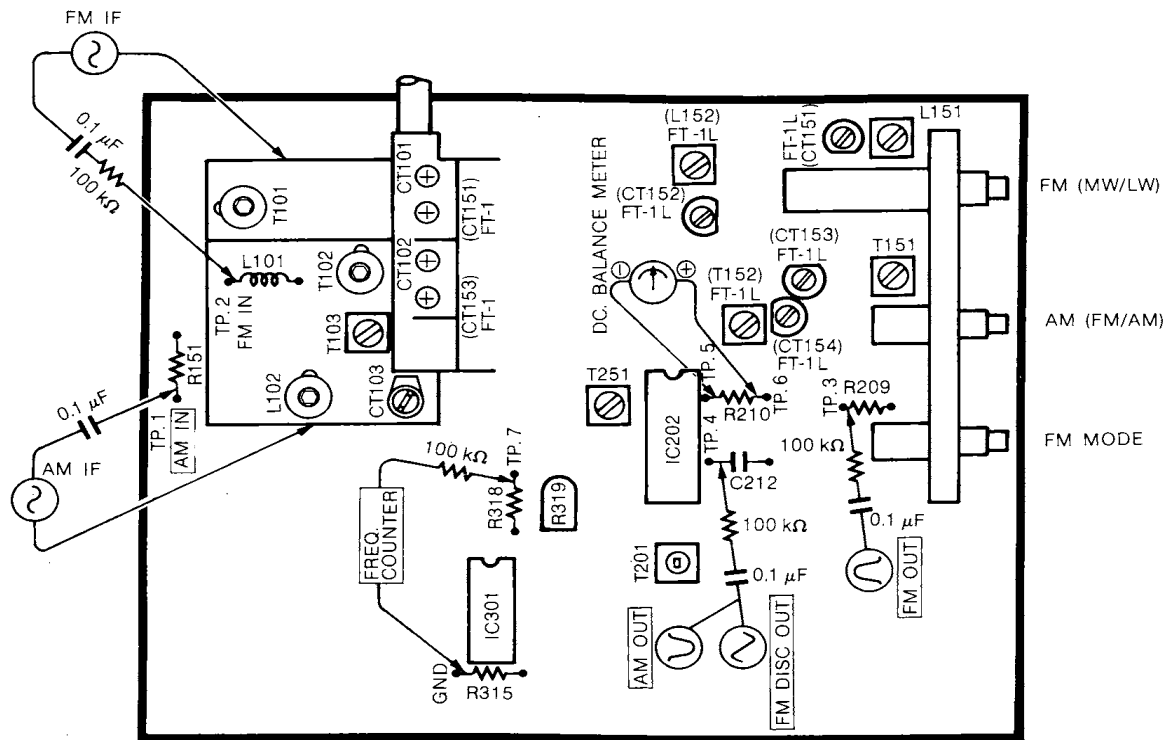


Fig. 1
Abb. 1

FM TUNER ALIGNMENT · ABGLEICH DES UKW-TUNERS · REGLAGE DE TUNER FM

⊗ Sweep Generator
Wobbelgenerator
Générateur de balayage

⊘ Signal Generator
Oszillator
Générateur de signaux

⊘ Oscilloscope
Oszilloskop
Oscilloscope

⊘ VTVM
Vakuumröhrevoltmeter
Voltmètre électronique

⊘ Frequency Counter
Frequenzzähler
Fréquencemètre

⊘ Dist.
Distortion Meter
Verzerrungsmesser
Indicateur de distorsion

Condition Function : FM
FM Muting : OFF
Modulation : 1000 Hz, 53.3%
(Unless otherwise notified)

Bedingung Funktion : FM (UKW)
FM (UKW) Muting : OFF
Modulation : 1000 Hz, 53,3 %
(Falls nicht anders angegeben)

Condition Function : FM
Sourdine FM : OFF
Modulation : 1000 Hz, 53,3 %
(Sauf indication contraire)

Sequence Reihenfolge Séquence	Connection Anschluß Connexion		Setting Einstellung Montage		Adjust for Einstellen für Réglage pour	
	Input Eingang Entrée	Output Ausgang Sortie	Tuning Abstimmung Indicateur d'accord	Signal	Adjust Einstellen Réglage	Indication Anzeige Indication
1	IF Amp. ZF-Verstärker. Amplificateur de fréquence intermédiaire	TP.3 0.1 μ 100 k	⊗	10.7 MHz	T103	Caution 1 Vorsicht 1 Attention 1
2	"S" curve S-Kurve Courbe S	TP.2 0.1 μ 100 k	⊗	10.7 MHz	T201	Straight line Gerade Linie Ligne droite Caution 2 Vorsicht 2 Attention 2
3	Covering Abgleich Poursuite	ANT. Terminal (75 ohms) Antennen-Anschluß Borne d'antenne		f min. 87.4 MHz	L102	V max.
				f max. 108.35MHz	CT103	
4	Tracking Vorstufe Alignement	ANT.		90 MHz 106 MHz	T101, T102 CT101, CT102	V max.
5	Discri. Det. Discri. (MUTE ON)	ANT. Terminal (75 ohms) Antennen-Anschluß Borne d'antenne	Dist. Verzerrung Distorsion 	98 MHz	98 MHz	T201 Caution 3 Vorsicht 3 Attention 3
6	76 kHz	ANT. Terminal (75 ohms) Antennen-Anschluß Borne d'antenne ANT. 60 dB input 60 dB Eingang Entrée 60 dB Non-modulated Nicht moduliert Non modulé		98 MHz	98 MHz	R319 Fre. 76 kHz±120 Hz Frequenz 76 kHz±120 Hz Fréquence 76 kHz±120 Hz

CAUTION

- Short-circuit the OSC stage by earthing the live side of the variable capacitor in that stage. Adjust the core of T103 so that the gain will be max. In this case, reduce the level of the input signal of signal generator so that the wave from will be the same as the one shown in the figure.
- Short-circuit the OSC stage as described in Caution 1. Adjust the core of T201 so that the output is like the S curve shown in illustration of this table with A and B symmetrical with respect to C.
- Connect the DC balance meter to TP.5 and TP.6, and set to 0 V ±30 mV with no-signal.

VORSICHT

- Die Oszillator-Stufe kurzschließen, indem die spannungsführende Seite des Regelkondensators dieser Stufe an Masse gelegt wird. Den Kern von T103 so einstellen, daß maximaler Gewinn erzielt wird. In diesem Fall ist der Eingangssignalpegel des Signalgenerators zu reduzieren, damit die in der Abbildung gezeigte Wellenform erhalten wird.
- Die in Punkt 1 beschriebene Oszillator-Stufe kurzschließen. Den Kern von T201 einstellen, daß ein der in der Tabelle gezeigten S-Kurve ähnlicher Ausgang erhalten wird, wobei A und B gegenüber C symmetrisch sein müssen.
- Ein Gleichstrom-Balancemeter an TP.5 und TP.6 anschließen und ohne Signal auf 0V ±30 mV abgleichen.

ATTENTION

- Court-circuiter l'étage OSC en raccordant le pôle sous tension à l'aide d'un condensateur variable au sein de l'étage. Ajuster le noyau de T103 de telle sorte que le gain soit optimum. Dans ce cas, réduire le niveau du signal d'entrée du générateur de signaux de telle sorte que la forme d'onde soit identique à celle indiquée sur l'illustration.
- Court-circuiter l'étage OSC comme décrit dans le paragraphe Précaution 1. Ajuster le noyau de T201 de telle sorte que la section droite de la courbe en S indiquée sur l'illustration de la table A et B soit symétrique par rapport à C.
- Raccorder un indicateur d'équilibrage à courant continu aux bornes TP.5 et TP.6 et ajuster à 0 V ±30 mV sans signal injecté.

**AM TUNER ALIGNMENT · ABGLEICH DES AM-TUNERS ·
REGLAGE DE TUNER AM**

Condition Function : AM Modulation : 400 Hz, 30 % Bedingung Funktion : AM Modulation : 400 Hz, 30 % Condition Fonction : AM Modulation : 400 Hz, 30 %

Sequence Reihenfolge Séquence	Connection Anschluß Connexion		Setting Einstellung Montage		Adjust for Einstellen für Réglage pour		FT-1L
	Input Eingang Entrée	Output Ausgang Sortie	Tuning Abstimmung Indicateur d'accord	Signal	Adjust Einstellen Réglage	Indication Anzeige Indication	
1 IF Amp. ZF Verstärker Amplificateur de fréquence intermédiaire	OUT TP.1 0.1 μ	TP.4 0.1 μ 100 k IN		450 kHz	T251	 Caution 1 Vorsicht 1 Attention 1	MW MW PO
2 Covering Abgleich Poursuite		OUTPUT FT-1L		515 kHz	T151	V max Caution 2 Vorsicht 2 Attention 2	MW MW PO
				1650 kHz	CT153		Repeat 2 (MW) Wiederholung 2 (MW) Répétition 2 (PO)
				145 kHz	T152	V max Caution 2 Vorsicht 2 Attention 2	LW LW GO
				355 kHz	(CT154)		
							Repeat 2 (LW) Wiederholung 2 (LW) Répétition 2 (GO)

3 Tracking Vorstufe Alignment		OUTPUT FT-1L	600 kHz	600 kHz	L151	V max Caution 2 Vorsicht 2 Attention 2	MW MW PO
			1400 kHz	1400 kHz	CT151		Repeat 3 (MW) Wiederholung 3 (MW) Répétition 3 (PO)
			175 kHz	175 kHz	L152	V max Caution 2 Vorsicht 2 Attention 2	LW LW GO
			300 kHz	300 kHz	(CT152)		Repeat 3 (LW) Wiederholung 3 (LW) Répétition 3 (GO)

CAUTION

- In step 1, set the capacitance of the variable capacitor to minimum and adjust red and blue cores of T251 so that the wave form is as shown in Fig. 2. As T251 contains a 450 kHz ceramic filter, sometimes the center of the marker will not correspond to that of the wave form.
- Set the input level to 74 dB in coarse adjustment. Reduce the input level to minimum (55 dB) as adjustment proceeds.

VORSICHT

- In Schritt 1 ist die Kapazität des Regelkondensators auf ein Minimum einzustellen; die roten und blauen Kerne von T251 so einjustieren, daß die in Abb. 2 gezeigte Wellenform erhalten wird. Da T251 auch ein 450-kHz-Keramikfilter enthält, kann es vorkommen, das manchmal die Mitte der Anzeige nicht mit der Wellenamplitude übereinstimmt.
- Eine Grobeinstellung auf einen Eingangspegel von 74 dB vornehmen. Im Verlauf der Einstellungen den Eingangspegel auf ein Minimum (55 dB) absenken.

ATTENTION

- Dans le point 1, régler la capacitance du condensateur variable sur la position minimum et ajuster les noyaux rouge et bleu de T251 pour que la forme d'onde soit identique a celle indiquée sur l'illustration (Fig. 2). Etant donné que T251 contient un filtre céramique de 450 kHz, il peut arriver que le centre de l'indicateur ne corresponde pas à la forme d'onde.
- Ajuster le niveau d'entrée sur 74 dB en procédant à un réglage approximatif. Réduire le niveau d'entrée à son minimum (55 dB) au fur et à mesure que le réglage est fait.

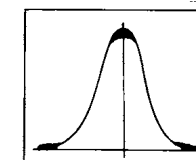


Fig. 2
Abb. 2

Fig. 3 FM IF Discriminator and AM IF alignments (AM and FM Step. 1)
Abb. 3 UKW-ZF-Diskriminator und AM-ZF-Abgleich (AM: Schritt 1, UKW: Schritt 1)
Fig. 3 Réglages de discriminateur FM IF et AM IF (Operations IFM et IAM)

Oscilloscope
Oszilloskop
Oscilloscope

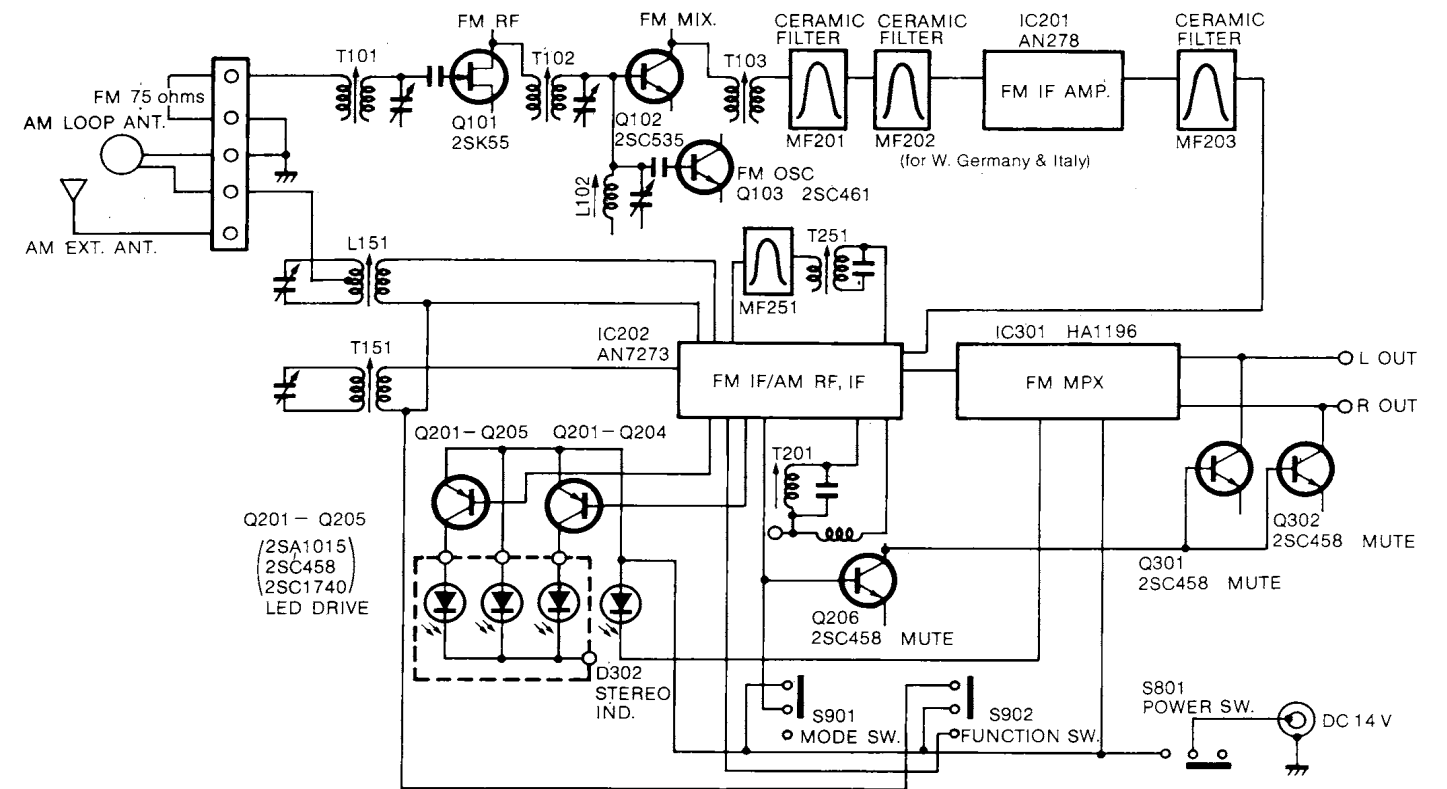
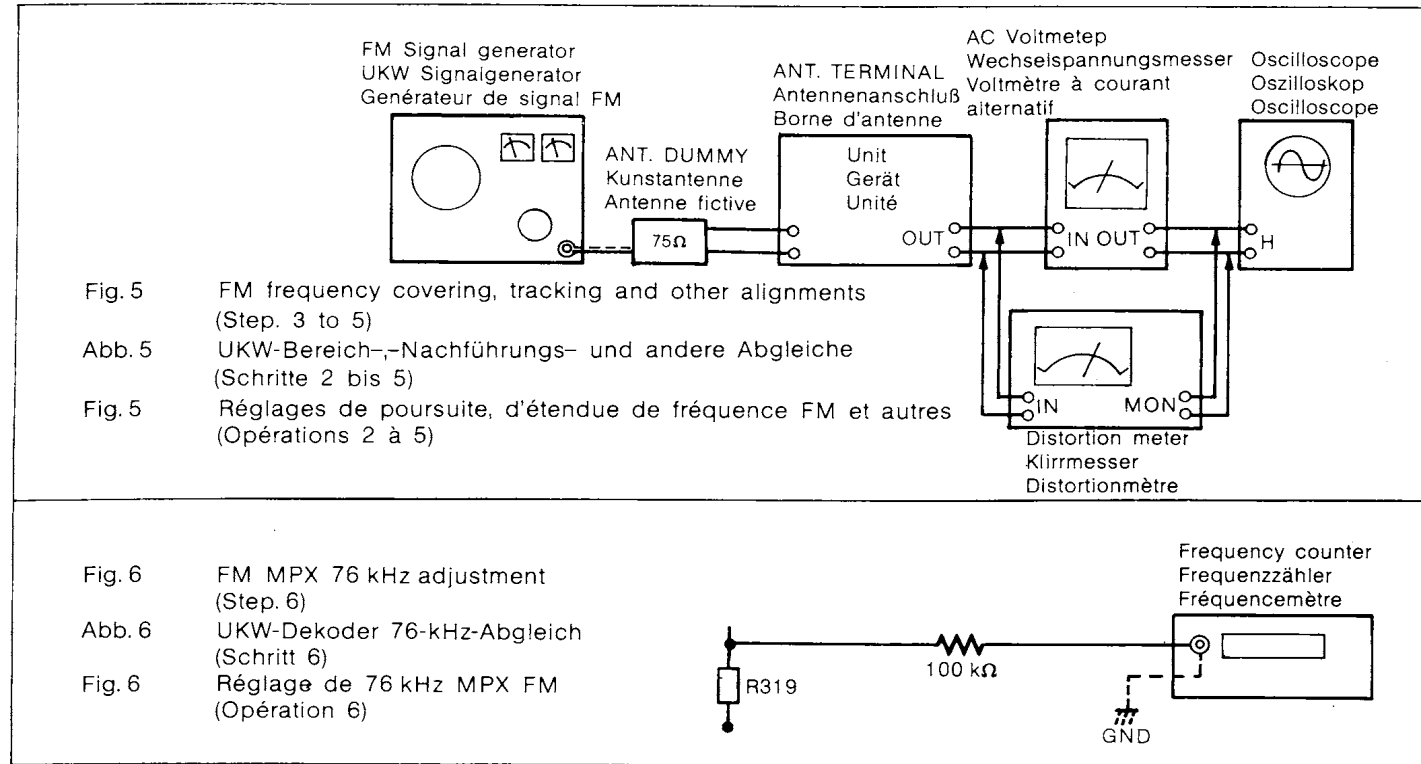
AM Signal generator
AM Signalgenerator
Générateur de signal AM

AC Voltmeter
Wechselspannungsmesser
Voltmètre à courant alternatif

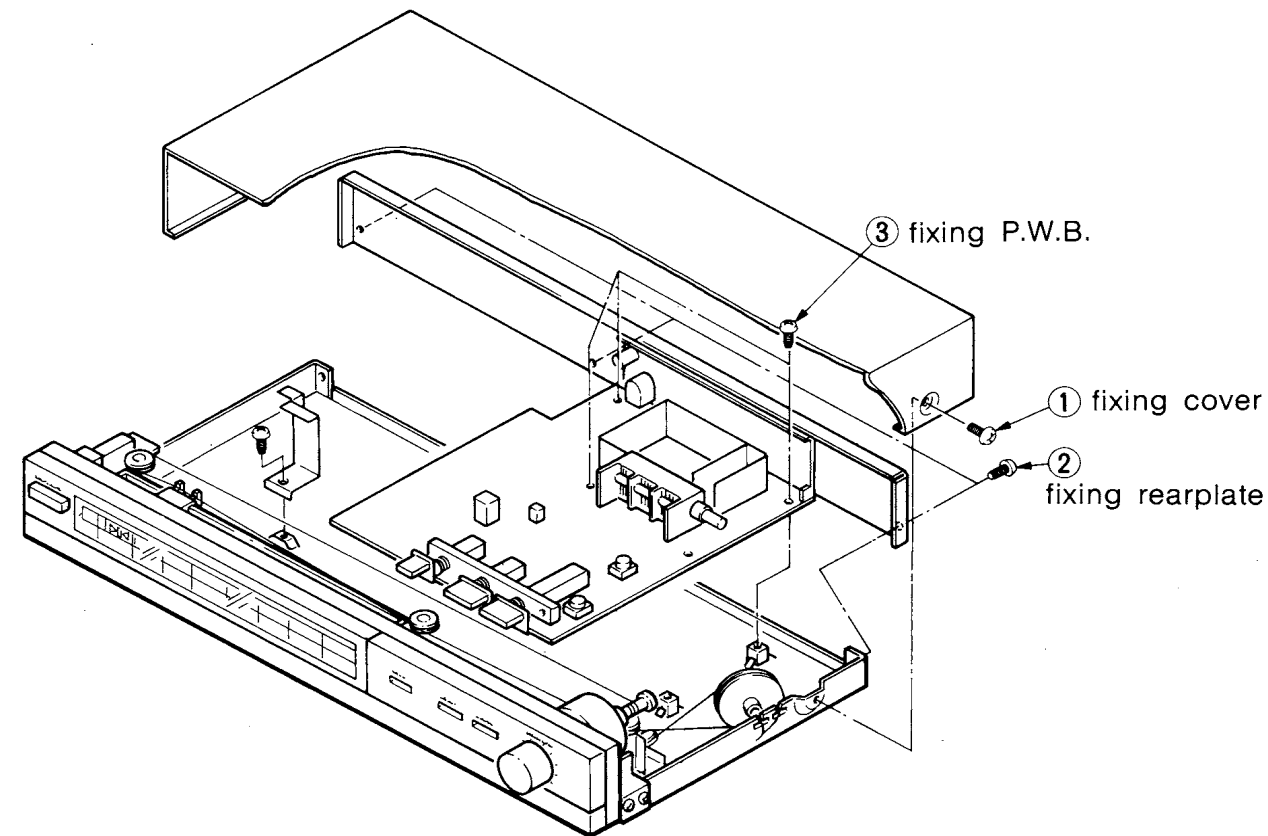
Oscilloscope
Oszilloskop
Oscilloscope

Fig. 4 AM frequency covering and tracking alignments (Step. 2 and 3)
Abb. 4 AM-Bereich- und Nachführungsabgleich (Schritte 2 und 3)
Fig. 4 Réglages de poursuite et d'étendue de fréquence AM (Operations 2 et 3)

BLOCK DIAGRAM · BLOCK SCHEMA · SCHEMA





DISASSEMBLY AND REPLACEMENT · ZERLEGUNG UND AUSTAUSCH · DEMONTAGE ET REMONTAGE



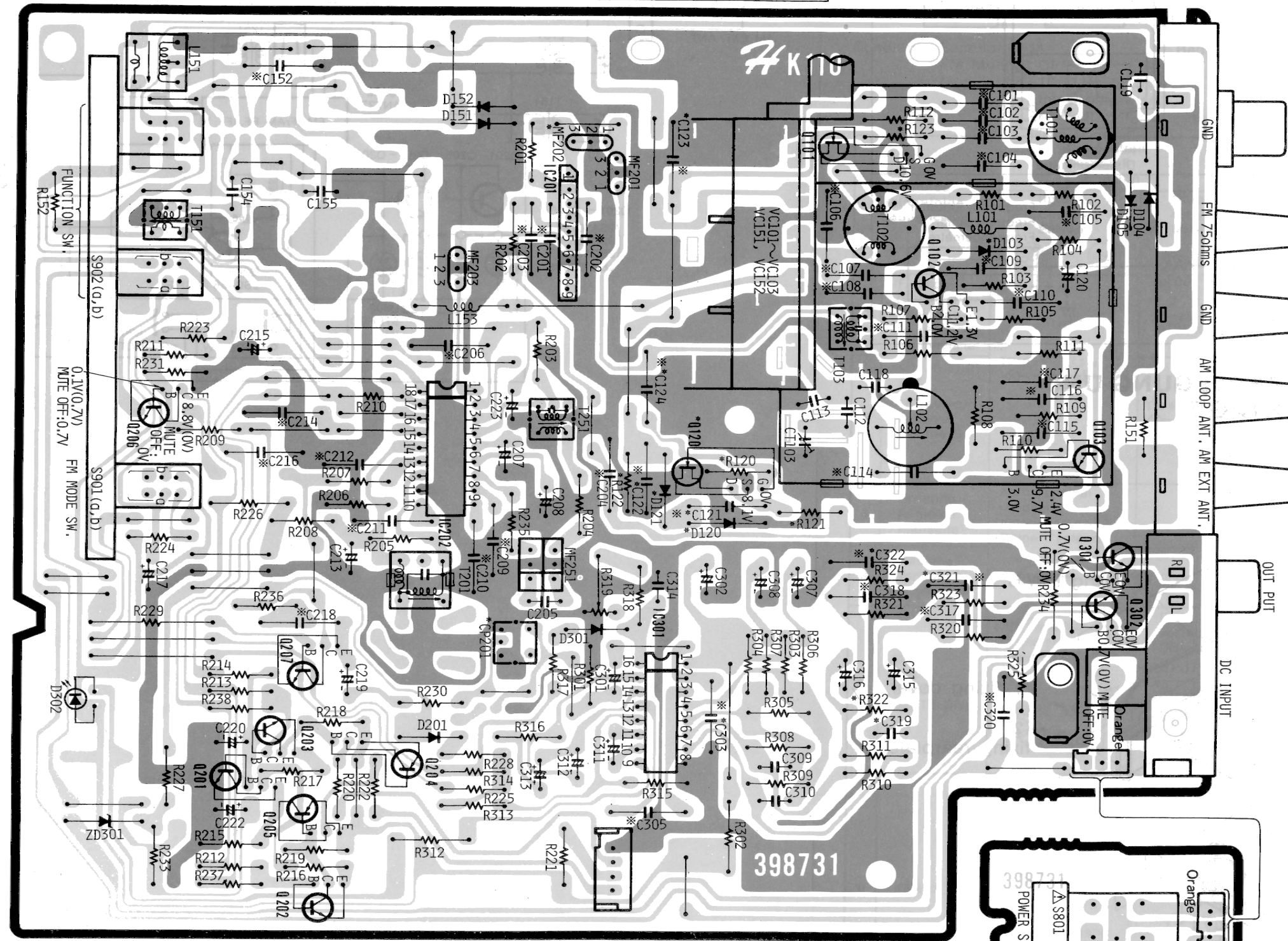
PRINTED WIRING BOARD · PRINTPLATTEN · PLAN DE BASE

FT-1

[ : Earth,  : Other]

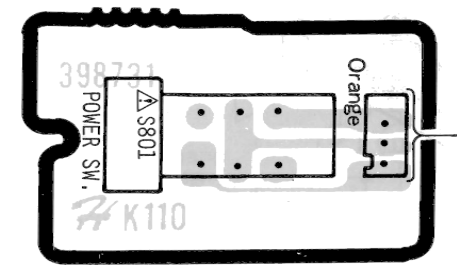
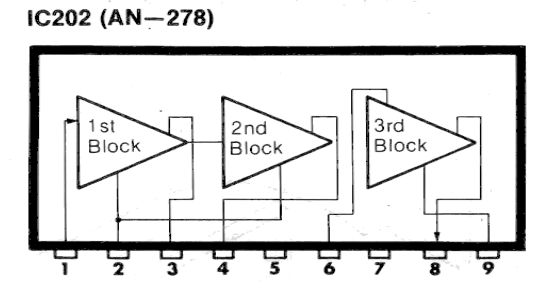
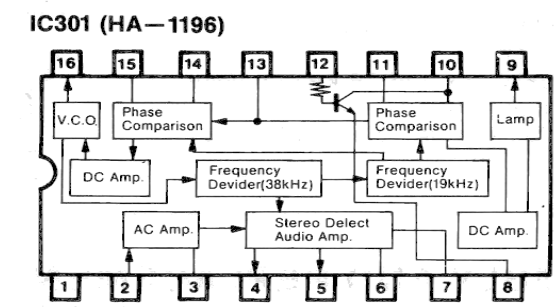
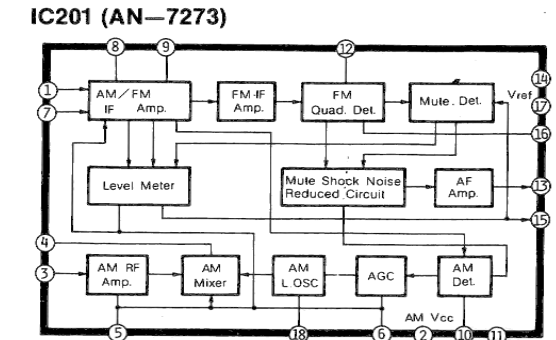
- * : Axial lead cylindrical ceramic capacitor
- * : Zylindrischer Keramik Kondensator mit axialer Zuleitung
- * : Condensateur céramique cylindrique à conducteur axial

IC201			IC202			IC301			
1	2.2V	6	2.4V	1	7.5V(9.9V)	7	7.5V(9.9V)	13	1.9V(1.7V)
2	2.2V	7	0V	2	0.6V(8.6V)	8	7.5V(9.9V)	14	7.9V(10.5V)
3	2.3V	8	1.6V	3	0.6V(8.6V)	9	7.4V(9.9V)	15	0V(0.18V)MUTE OFF:0.18V
4	2.4V	9	2.3V	4	0.6V(8.5V)	10	7.1V(9.6V)	16	1.5V(1.5V)
5	4.1V			5	0V(1.0V)	11	0V	17	1.5V(1.5V)
				6	0.3V(0.8V)	12	7.8V(10.5V)	18	0.6V(8.6V)



Q201		Q202, 203		Q204, 205		Q207	
E	0V	E	2.1V	E	14.0V	E	1.9V(1.4V)
C	2.1V	C	14.0V	C	-0.8V	C	1.9V(1.7V)
B	0V	B	1.5V	B	14.0V	B	2.6V(0V)

* : for W.Germany & Italy
() : AM position



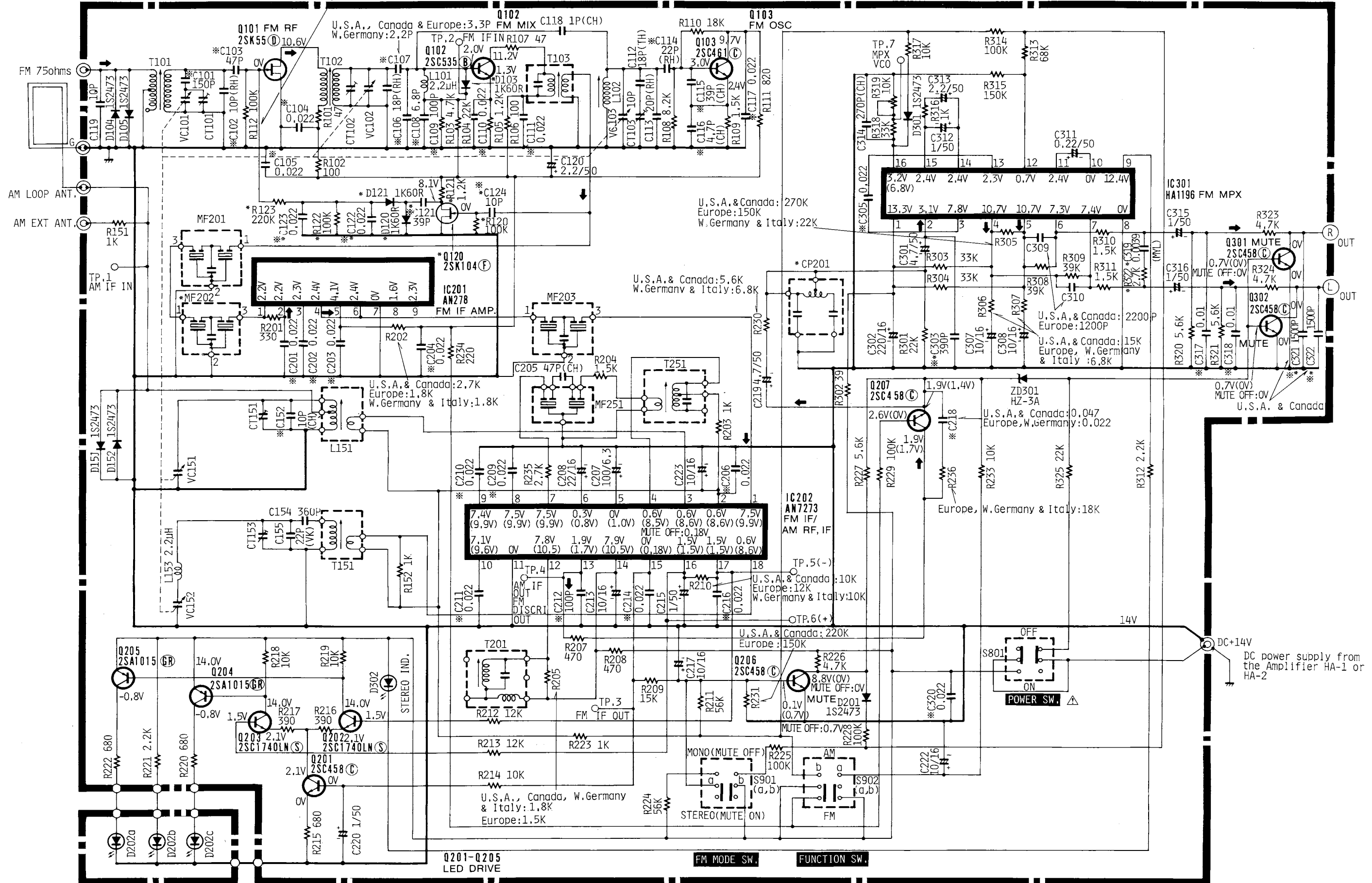
CIRCUIT DIAGRAM · SCHALTPLAN · PLAN DE CIRCUIT

FT-1

* : for W.Germany & Italy
 () : AM position
 for W.Germany & Italy:82K
 Others :100K

CAUTION
 Use the electrolytic capacitors with explosion-proof valve
 when the diameter of them is more than 10mmø.

* : Axial lead cylindrical ceramic capacitor
 * : Zylindrischer Keramik Kondensator mit axialer Zuleitung
 * : Condensateur céramique cylindrique à conducteur axial



VECTOR IND.

PRINTED WIRING BOARD · PRINTPLATTEN · PLAN DE BASE

FT-1L

[] : Earth, [] : Other

- * : Axial lead cylindrical ceramic capacitor
- * : Zylindrischer Keramikcondensator mit axialer Zuleitung
- * : Condensateur céramique cylindrique à conducteur axial

IC201

1	2.2V	6	2.4V
2	2.2V	7	0V
3	2.3V	8	1.6V
4	2.4V	9	2.3V
5	4.1V		

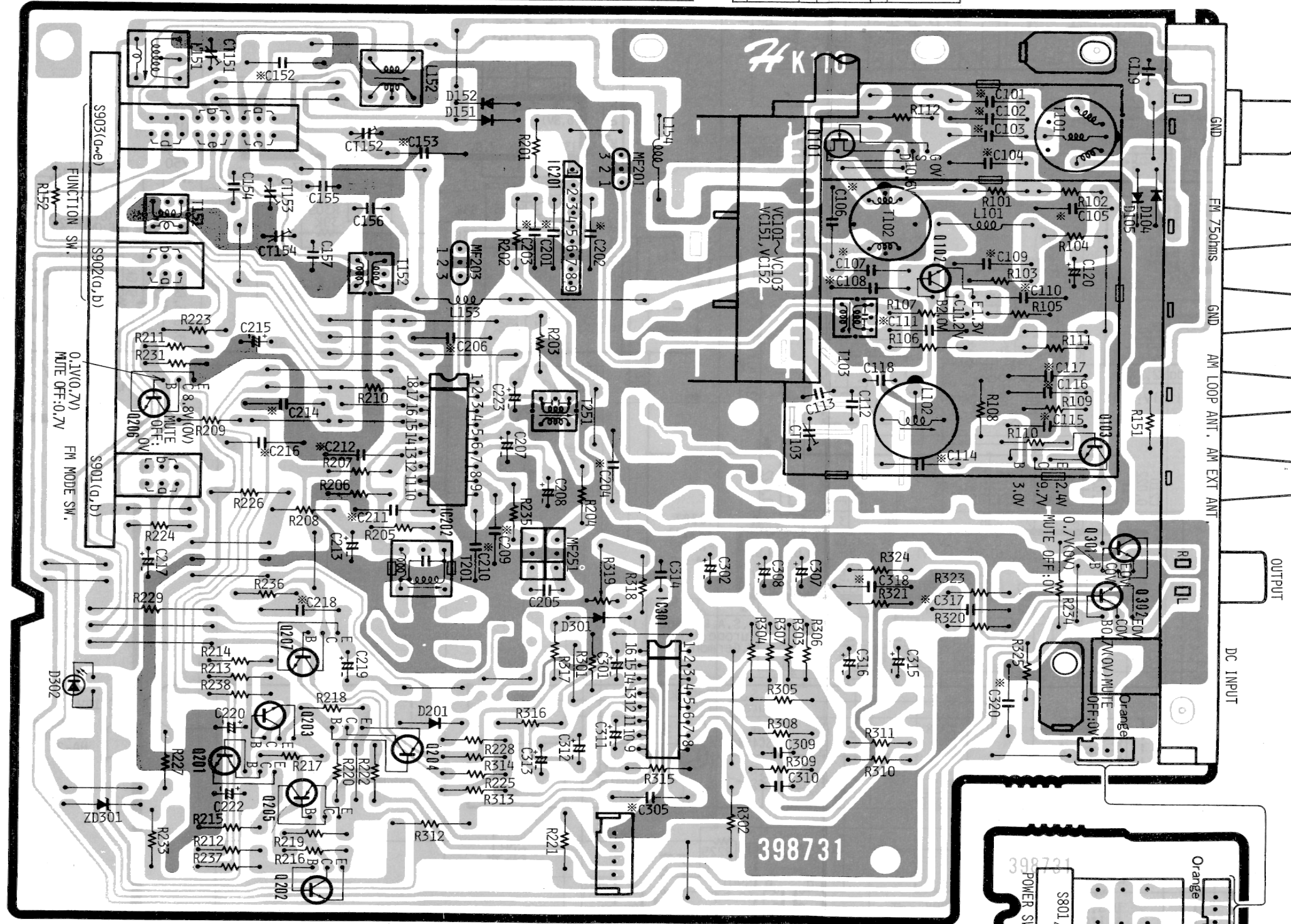
IC202

1	7.5V(9.9V)	7	7.5V(9.9V)	13	1.9V(1.7V)
2	0.6V(8.6V)	8	7.5V(9.9V)	14	7.9V(10.5V)
3	0.6V(8.6V)	9	7.4V(9.9V)	15	0V(0.18V)MUTE OFF 0.18V
4	0.6V(8.5V)	10	7.1V(9.6V)	16	1.5V(1.5V)
5	0V(1.0V)	11	0V	17	1.5V(1.5V)
6	0.3V(0.8V)	12	7.8V(10.5V)	18	0.6V(8.6V)

IC301

1	13.3V	7	7.4V	13	2.3V
2	3.1V	8	0V	14	2.4V
3	7.8V	9	12.4V	15	2.4V
4	10.7V	10	0V	16	3.2V(6.8V)
5	10.7V	11	2.4V		
6	7.3V	12	0.7V		

() : AM position



Q201

E	0V
C	2.1V
B	0V

Q202,203

E	2.1V
C	14.0V
B	1.5V

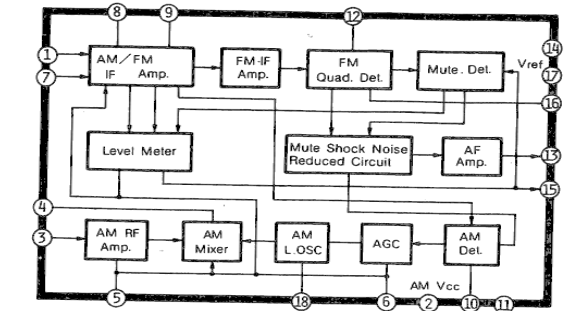
Q204,205

E	14.0V
C	-0.8V
B	14.0V

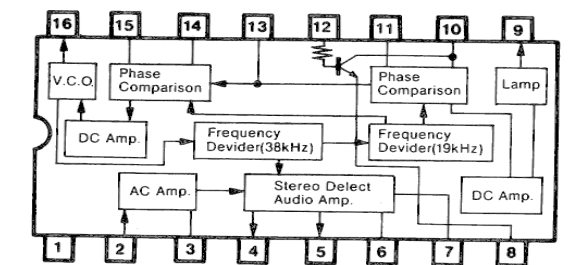
Q207

E	1.9V(1.4V)
C	1.9V(1.7V)
B	2.6V(0V)

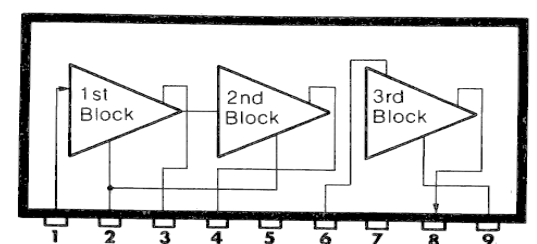
IC201 (AN-7273)



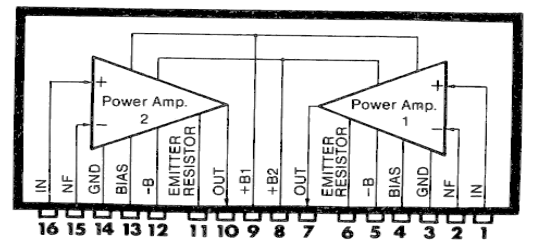
IC301 (HA-1196)



IC202 (AN-278)



IC701 (STK-463)



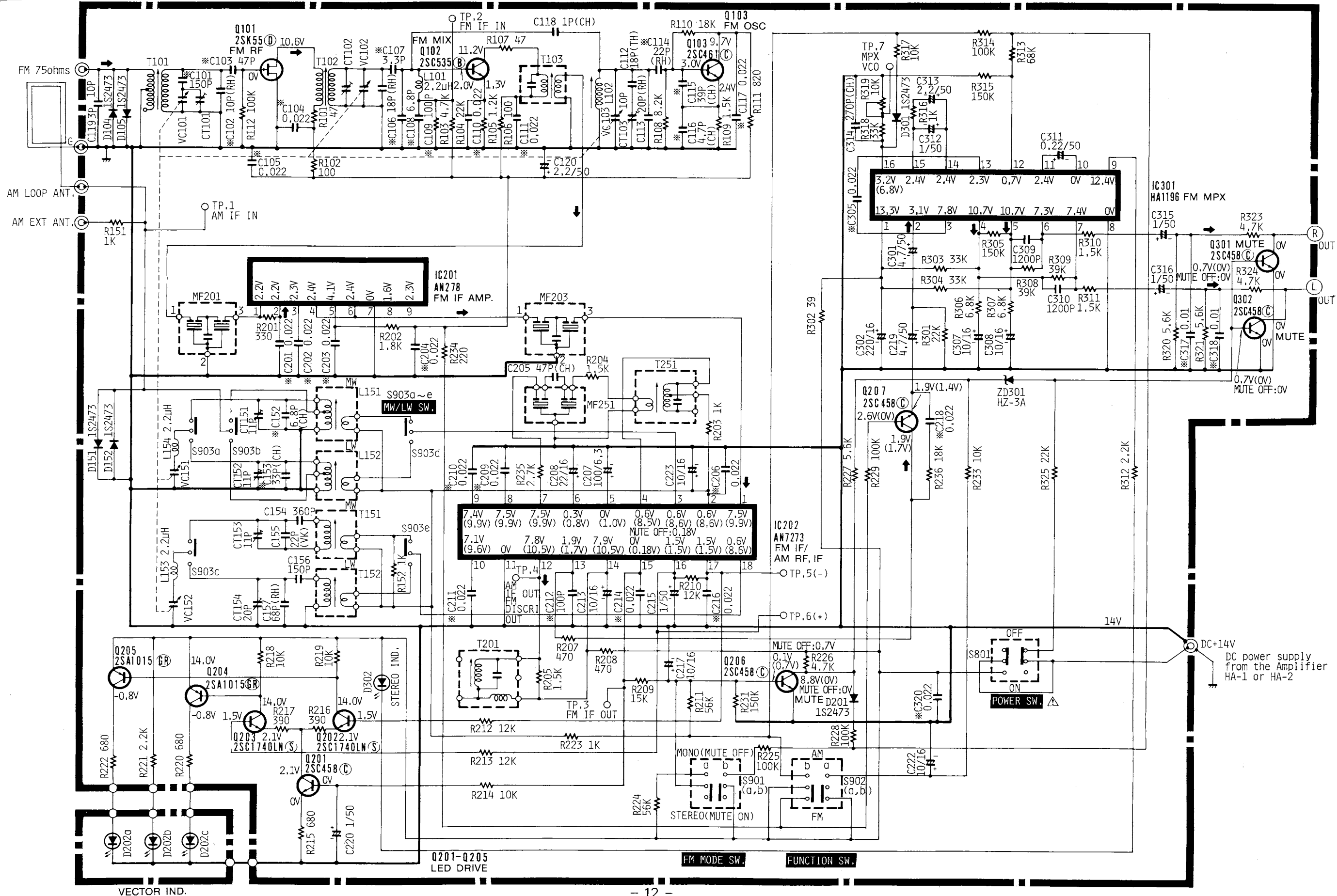
CIRCUIT DIAGRAM · SCHALTPLAN · PLAN DE CIRCUIT

FT-1L

() : AM Position

CAUTION
Use the electrolytic capacitors with explosion-proof valve when the diameter of them is more than 10mmφ.

- * : Axial lead cylindrical ceramic capacitor
- * : Zylindrischer Keramikcondensator mit axialer Zuleitung
- * : Condensateur céramique cylindrique à conducteur axial



REPLACEMENT PARTS LIST · ERSATZTEILLISTE · TABLEAU DES PIÈCE

◦ marked parts used for only FT-1, * marked parts used for only FT-1L

SYMBOL No.	PART No.	DESCRIPTION				SYMBOL No.	PART No.	DESCRIPTION			
CAPACITORS											
C101	0240002	Cylindrical ceramic	150 pF	±10%	50 V	C219	0252815	Electrolytic	4.7 μF	50 V	
C102	0230112	Cylindrical ceramic	10 pF	±5%	50 V	C220	0252811	Electrolytic	1 μF	50 V	
C103	0230028	Cylindrical ceramic	47 pF	±5%	50 V	C222	0252521	Electrolytic	10 μF	16 V	
C104	0240108	Cylindrical ceramic	0.022 μF	±30%	16 V	C223	0252521	Electrolytic	10 μF	16 V	
C105	0240108	Cylindrical ceramic	0.022 μF	±30%	16 V	C301	0252815	Electrolytic	4.7 μF	50 V	
C106	0230118	Cylindrical ceramic	18 pF	±5%	50 V	C302	0252532	Electrolytic	220 μF	16 V	
C107	0230006	Cylindrical ceramic (except W. Germany & Italy)	3.3 pF	±10%	50 V	◦ C303	0240007	Cylindrical ceramic (for W. Germany & Italy)	390 pF	±10%	50 V
◦ C107	0230004	Cylindrical ceramic (for W. Germany & Italy)	2.2 pF	±10%	50 V	C305	0240108	Cylindrical ceramic	0.022 μF	±30%	16 V
C108	0230010	Cylindrical ceramic	6.8 pF	±10%	50 V	C307	0252521	Electrolytic	10 μF	16 V	
C109	0230036	Cylindrical ceramic	100 pF	±5%	50 V	C308	0252521	Electrolytic	10 μF	16 V	
C110	0240108	Cylindrical ceramic	0.022 μF	±30%	16 V	C309	1274231	Mylar, film (except U.S.A. & Canada)	0.0012 μF	±5%	50 V
C111	0240108	Cylindrical ceramic	0.022 μF	±30%	16 V	◦ C309	0274013	Mylar, film (for U.S.A. & Canada)	0.0022 μF	±10%	50 V
C112	0248336	Ceramic, discal	18 pF	±5%	50 V	C310	1274231	Mylar, film (except U.S.A. & Canada)	0.0012 μF	±5%	50 V
C113	0248037	Ceramic, discal	20 pF	±5%	50 V	◦ C310	0274013	Mylar, film (for U.S.A. & Canada)	0.0022 μF	±10%	50 V
C114	0230120	Cylindrical ceramic	22 pF	±5%	50 V	C311	0252802	Electrolytic	0.22 μF	50 V	
C115	0230076	Cylindrical ceramic	39 pF	±5%	50 V	C312	0252811	Electrolytic	1 μF	50 V	
C116	0230058	Cylindrical ceramic	4.7 pF	±10%	50 V	C313	0252812	Electrolytic	2.2 μF	50 V	
C117	0240108	Cylindrical ceramic	0.022 μF	±30%	16 V	C314	0246470	Ceramic, discal	270 μF	±5%	50 V
C118	0246411	Ceramic, discal	1 pF	±0.25%	50 V	C315	0252811	Electrolytic	1 μF	50 V	
C119	0248640	Ceramic, discal (except U.S.A & Canada)	10 pF	±0.25%	50 V	C316	0252811	Electrolytic	1 μF	50 V	
C120	0252812	Electrolytic	2.2 μF	50 V	C317	0240106	Cylindrical ceramic	0.01 μF	±30%	25 V	
◦ C121	0230026	Cylindrical ceramic (for W. Germany & Italy)	39 pF	±5%	50 V	C318	0240106	Cylindrical ceramic	0.01 μF	±30%	25 V
◦ C122	0240108	Cylindrical ceramic (for W. Germany & Italy)	0.022 μF	±30%	16 V	◦ C319	0274034	Mylar, film (for W. Germany & Italy)	0.0039 μF	±10%	50 V
◦ C123	0240108	Cylindrical ceramic (for W. Germany & Italy)	0.022 μF	±30%	16 V	C320	0240108	Cylindrical ceramic	0.022 μF	±30%	16 V
◦ C124	0230012	Cylindrical ceramic (for W. Germany & Italy)	10 pF	±5%	50 V	◦ C321	0240101	Cylindrical ceramic (for W. Germany & Italy)	0.0015 μF	±30%	50 V
◦ C152	0230062	Cylindrical ceramic	10 pF	±5%	50 V	◦ C322	0240101	Cylindrical ceramic (for W. Germany & Italy)	0.0015 μF	±30%	50 V
* C152	0230060	Cylindrical ceramic	6.8 pF	±5%	50 V	RESISTORS					
* C153	0230074	Cylindrical ceramic	33 pF	±5%	50 V	R101	0129547	Carbon film	47 Ω	±5%	SRD1/4P
C154	0279327	Polypro-pylene	360 pF	±5%	100V	R102	0129561	Carbon film	100 Ω	±5%	SRD1/4P
C155	0241884	Ceramic, discal	22 pF	±5%	50 V	R103	0129617	Carbon film	47 Ω	±5%	SRD1/4P
* C156	0228315	Styrol	150 pF	±5%	50 V	R104	0129639	Carbon film	22 kΩ	±5%	SRD1/4P
* C157	0248050	Ceramic, discal	68 pF	±5%	50 V	R105	0129603	Carbon film	1.2 kΩ	±5%	SRD1/4P
C201	0240108	Cylindrical ceramic	0.022 μF	±30%	16 V	R106	0129561	Carbon film	100 Ω	±5%	SRD1/4P
C202	0240108	Cylindrical ceramic	0.022 μF	±30%	16 V	R107	0129547	Carbon film	47 Ω	±5%	SRD1/4P
C203	0240108	Cylindrical ceramic	0.022 μF	±30%	16 V	R108	0129623	Carbon film	8.2 kΩ	±5%	SRD1/4P
C204	0240108	Cylindrical ceramic	0.022 μF	±30%	16 V	R109	0129605	Carbon film	1.5 kΩ	±5%	SRD1/4P
C205	0246456	Ceramic, discal	47 pF	±5%	50 V	R110	0129637	Carbon film	18 kΩ	±5%	SRD1/4P
C206	0240108	Cylindrical ceramic	0.022 μF	±30%	16 V	R111	0129583	Carbon film	820 Ω	±5%	SRD1/4P
C207	0252231	Electrolytic	100 μF	6.3 V		◦ R112	0129653	Carbon film (for W. Germany & Italy)	82 kΩ	±5%	SRD1/4P
C208	0252522	Electrolytic	22 μF	±20%	16 V	R112	0129661	Carbon film (except W. Germany & Italy)	100 kΩ	±5%	SRD1/4P
C209	0250108	Cylindrical ceramic	0.022 μF	±30%	16 V	◦ R120	0129661	Carbon film (for W. Germany)	100 kΩ	±5%	SRD1/4P
C210	0240108	Cylindrical ceramic	0.022 μF	±30%	16 V	◦ R121	0129603	Carbon film (for W. Germany & Italy)	1.2 kΩ	±5%	SRD1/4P
C211	0240108	Cylindrical ceramic	0.022 μF	±30%	16 V	◦ R122	0129661	Carbon film (for W. Germany & Italy)	100 kΩ	±5%	SRD1/4P
C212	0230036	Cylindrical ceramic	100 pF	±5%	50 V	◦ R123	0129669	Carbon film (for W. Germany & Italy)	220 kΩ	±5%	SRD1/4P
C213	0252521	Electrolytic	10 μF	16 V		R151	0129601	Carbon film (except U.S.A & Canada)	1 kΩ	±5%	SRD1/4P
C214	0240108	Cylindrical ceramic	0.022 μF	±30%	16 V	R151	0134373	Carbon film (for U.S.A & Canada)	1 kΩ	±10%	RC1/2W
C215	0252811	Electrolytic	1 μF	50 V		R152	0129601	Carbon film	1 kΩ	±5%	SRD1/4P
C216	0240108	Cylindrical ceramic	0.022 μF	±30%	16 V						
C217	0252521	Electrolytic	10 μF	16 V							
◦ C218	0240220	Ceramic, discal (for U.S.A. & Canada)	0.047 μF	±10%	25 V						
C218	00240108	Cylindrical ceramic (except U.S.A. Canada)	0.022 μF	±30%	16 V						

◦ marked parts used for only FT-1, * marked parts used for only FT-1L

SYMBOL No.	PART No.	DESCRIPTION				SYMBOL No.	PART No.	DESCRIPTION			
R201	0129573	Carbon film	330 Ω	±5%	SRD1/4P	◦ R305	0129671	Carbon film	270 kΩ	±5%	SRD1/4P
R202	0129607	Carbon film (except W. Germany, Italy, U.S.A. & Canada)	1.8 kΩ	±5%	SRD1/4P	◦ R305	0129639	Carbon film (for W. Germany & Italy)	22 kΩ	±5%	SRD1/4P
◦ R202	0129611	Carbon film (for U.S.A. & Canada)	2.7 kΩ	±5%	SRD1/4P	R306	0129621	Carbon film (except U.S.A. & Canada)	6.8 kΩ	±5%	SRD1/4P
◦ R202	0129607	Carbon film (for W. Germany & Italy)	1.8 kΩ	±5%	SRD1/4P	◦ R306	0129635	Carbon film (for U.S.A. & Canada)	15 kΩ	±5%	SRD1/4P
R203	0129601	Carbon film	1 kΩ	±5%	SRD1/4P	R307	0129621	Carbon film (except U.S.A. & Canada)	6.8 kΩ	±5%	SRD1/4P
R204	0129605	Carbon film	1.5 kΩ	±5%	SRD1/4P	◦ R307	0129635	Carbon film (for U.S.A. & Canada)	15 kΩ	±5%	SRD1/4P
R205	0129605	Carbon film (except W. Germany, Italy, U.S.A. & Canada)	1.5 kΩ	±5%	SRD1/4P	R308	0129645	Carbon film	39 kΩ	±5%	SRD1/4P
◦ R205	0129607	Carbon film (except W. Germany, Italy, U.S.A. & Canada)	1.8 kΩ	±5%	SRD1/4P	R309	0129645	Carbon film	39 kΩ	±5%	SRD1/4P
R207	0129577	Carbon film	470 Ω	±5%	SRD1/4P	R310	0129605	Carbon film	1.5 kΩ	±5%	SRD1/4P
R208	0129577	Carbon film	470 Ω	±5%	SRD1/4P	R311	0129605	Carbon film	1.5 kΩ	±5%	SRD1/4P
R209	0129635	Carbon film	15 kΩ	±5%	SRD1/4P	R312	0129609	Carbon film	2.2 kΩ	±5%	SRD1/4P
R210	0129631	Carbon film (except W. Germany, Italy, U.S.A. & Canada)	10 kΩ	±5%	SRD1/4P	R313	0129651	Carbon film	68 kΩ	±5%	SRD1/4P
◦ R210	0129631	Carbon film (for W. Germany & Italy)	10 kΩ	±5%	SRD1/4P	R314	0129661	Carbon film	100 kΩ	±5%	SRD1/4P
◦ R210	0129631	Carbon film (for U.S.A. & Canada)	10 kΩ	±5%	SRD1/4P	R315	0129665	Carbon film	150 kΩ	±5%	SRD1/4P
R211	0129649	Carbon film	56 kΩ	±5%	SRD1/4P	R316	0129601	Carbon film	1 kΩ	±5%	SRD1/4P
R212	0129633	Carbon film	12 kΩ	±5%	SRD1/4P	R317	0129631	Carbon film	10 kΩ	±5%	SRD1/4P
R213	0129633	Carbon film	12 kΩ	±5%	SRD1/4P	R318	0129643	Carbon film	33 kΩ	±5%	SRD1/4P
R214	0129631	Carbon film	10 kΩ	±5%	SRD1/4P	R320	0129619	Carbon film	5.6 kΩ	±5%	SRD1/4P
R215	0129581	Carbon film	680 Ω	±5%	SRD1/4P	R321	0129619	Carbon film	5.6 kΩ	±5%	SRD1/4P
R216	0129575	Carbon film	390 Ω	±5%	SRD1/4P	◦ R322	0129611	Carbon film (for W. Germany & Italy)	2.7 kΩ	±5%	SRD1/4P
R217	0129575	Carbon film	390 Ω	±5%	SRD1/4P	R323	0129617	Carbon film	4.7 kΩ	±5%	SRD1/4P
R218	0129631	Carbon film	10 kΩ	±5%	SRD1/4P	R324	0129617	Carbon film	4.7 kΩ	±5%	SRD1/4P
R219	0129631	Carbon film	10 kΩ	±5%	SRD1/4P	R325	0129639	Carbon film	22 kΩ	±5%	SRD1/4P
R220	0129581	Carbon film	680 Ω	±5%	SRD1/4P	ICs & TRANSISTORS					
R221	0129609	Carbon film	2.2 kΩ	±5%	SRD1/4P	IC201	2368431	AN278			
R222	0129581	Carbon film	680 Ω	±5%	SRD1/4P	IC202	2387321	AN7273			
R223	0129601	Carbon film	1 kΩ	±5%	SRD1/4P	IC301	2367271	HA1196			
R224	0129649	Carbon film	56 kΩ	±5%	SRD1/4P	Q101	2327683	2SK55 (D)			
R225	0129661	Carbon film	100 kΩ	±5%	SRD1/4P	Q102	0573510	2SC535 (B)			
R226	0129617	Carbon film	4.7 kΩ	±5%	SRD1/4P	Q103	0573508	2SC461 (C)			
R227	0129619	Carbon film	5.6 kΩ	±5%	SRD1/4P	◦ Q120	2328805	2SK104 (for W. Germany & Italy)			
R228	0129661	Carbon film	100 kΩ	±5%	SRD1/4P	Q201	2328282	2SC458 (C)			
R229	0129661	Carbon film	100 kΩ	±5%	SRD1/4P	Q202	2328652	2SC1740LN (S)			
◦ R230	0129619	Carbon film (for U.S.A. & Canada)	5.6 kΩ	±5%	SRD1/4P	Q203	2328652	2SC1740LN (S)			
◦ R230	0129621	Carbon film (for W. Germany & Italy)	6.8 kΩ	±5%	SRD1/4P	Q204	2329183	2SA1015 (GR)			
◦ R231	0129669	Carbon film (for U.S.A. & Canada)	220 kΩ	±5%	SRD1/4P	Q205	2329183	2SA1015 (GR)			
R231	0129665	Carbon film (except W. Germany, Italy, U.S.A. & Canada)	150 kΩ	±5%	SRD1/4P	Q206	2328282	2SC458 (C)			
R233	0129631	Carbon film	10 kΩ	±5%	SRD1/4P	* Q207	2328282	2SC458 (C)			
R234	0129569	Carbon film	220 Ω	±5%	SRD1/4P	Q301	2328282	2SC458 (C)			
R235	0129611	Carbon film	2.7 kΩ	±5%	SRD1/4P	Q302	2328282	2SC458 (C)			
R236	0129637	Carbon film (except U.S.A. & Canada)	18 kΩ	±5%	SRD1/4P	DIODES					
R301	0129639	Carbon film	22 kΩ	±5%	SRD1/4P	◦ D1					

o marked parts used for only FT-1, * marked parts used for only FT-1L

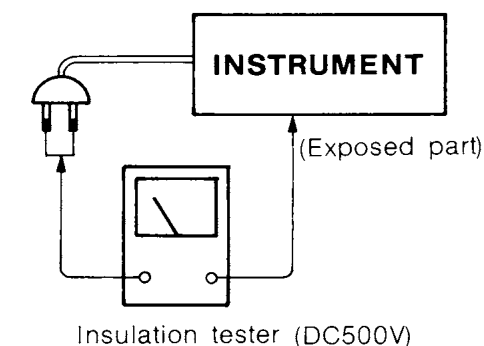
SYMBOL No.	PART No.	DESCRIPTION	SYMBOL No.	PART No.	DESCRIPTION
D151	2337601	1S2473	o	2689371	Antenna terminal (for U.S.A. & Canada)
D152	2337601	1S2473		2689372	Antenna terminal (except U.S.A. & Canada)
D201	2337601	1S2473	o	2668633	TSL pin post 4P
D301	2337601	1S2473		0282121	Variable condenser
D302	2337752	LED GL - 5PR6H	*	0282122	Variable condenser
ZD301	2337431	HZ - 3A	for FINAL ASSEMBLY		
VARIABLE RESISTOR			4450361	Top cover	
R319	0150958	10 kΩ - (B)	3297112	Knob (26) ass'y	
COILS & TRANSFORMER			4567463	4φ × 10 DT bind screw (for cover)	
L101	2227354	Choke coil - 2.2 μH	for DIAL MECHANISM ASSEMBLY		
L102	2134471	FM OSC coil	3346212	Pulley	
L151	2136501	AM antenna coil (MW)	3340321	Spring (M)	
* L152	2136502	AM antenna coil (LW)	3387625	Dial pointer ass'y	
L153	2227354	Choke coil - 2.2 μH	for CHASSIS ASSEMBLY		
* L154	2227354	Choke coil - 2.2 μH	4023686	Front panel ass'y (for U.S.A. & Canada)	
T101	2136511	FM antenna coil	4023687	Front panel ass'y (except U.S.A. & Canada)	
T102	2136513	FM RF coil	* 4023688	Front panel ass'y	
T103	2155181	FM IFT coil (7MM)	3297791	Power button ass'y (for U.S.A. & Canada)	
T151	2136491	AM OSC coil (MW)	3297792	Power button ass'y (except U.S.A. & Canada)	
* T152	2136492	AM OSC coil (LW)	3927412	Leg (10 × 21.8)	
T201	2155173	FM discriminating transformer	3958741	Push button (F) ABS	
T251	2154493	AM IFT transformer	3958751	Push button (M) ABS	
MISCELLANEOUS			3356265	Tuning (D - 1) ass'y	
CT103	0283121	Trimmer capacitor (10P White)	4113441	M9φ nut	
* CT151	0283126	Trimmer capacitor (11P White)	4567413	3φ × 10DT bind screw (for Leg)	
* CT152	0283126	Trimmer capacitor (11P White)	4567412	3φ × 8 DT bind screw (for Front panel)	
* CT153	0283126	Trimmer capacitor (11P White)	4784106	3φ × 10 bind tapping screw (for Antenna terminal, Power P.W.B.)	
* CT154	0283127	Trimmer capacitor (20P Red)	4567432	3φ × 10 DT bind screw (for Rear plate)	
o CP201	2136312	Anti - birdie filter (for W. Germany & Italy)	4567454	3φ × 12 DT bind screw (for P.W.B.)	
o MF201	2134981	FM ceramic filter 10.7MA5 (for U.S.A. & Canada)	4567412	3φ × 8 DT bind screw (for Roller holder)	
MF201	2135001	FM ceramic filter 10.7MS2 (except W. Germany, Italy, U.S.A. & Canada)	4451090	Rear plate (T) (for U.S.A.)	
o MF201	2135001	FM ceramic filter 10.7MS2 (for W. Germany & Italy)	4451093	Rear plate (T) (for Canada)	
o MF202	2135001	FM ceramic filter 10.7MS2 (for W. Germany & Italy)	4451094	Rear plate (T) (for W. Germany & Italy)	
o MF203	2135001	FM ceramic filter 10.7MS2 (for W. Germany & Italy)	4451095	Rear plate (T) (for Australia & Swden)	
o MF203	2134981	FM ceramic filter 10.7MA5 (for U.S.A. & Canada)	4451096	Rear plate (T) (for Asia & Latin American countries)	
MF203	2135001	FM ceramic filter 10.7MS2 (except W. Germany, Italy, U.S.A. & Canada)	* 4451097	Rear plate (T) IL	
MF251	2155152	AM ceramic filter SFZ450F	Δ S801	Push - switch (Power)	
			o S901 - S902	Push - switch (2 - 2 - 2)	
			* S901 - S903	Push - switch (2 - 2 - 6)	

SYMBOL No.	PART No.	ES040DESCRIPTION
for ACCESSORIES		
	2757525	FM antenna (except W. Germany & Italy)
Δ	2717512	DC cord (for U.S.A. & Canada)
Δ	2717511	DC cord (except U.S.A. & Canada)
	2749500	Patch cord
	4023261	AM Loop antenna ass'y

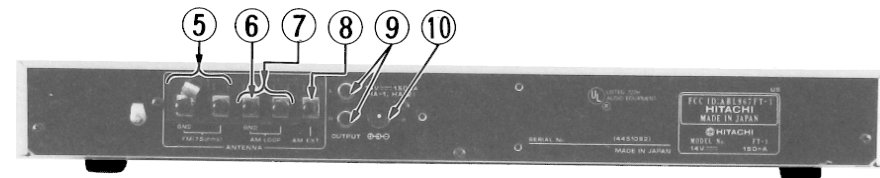
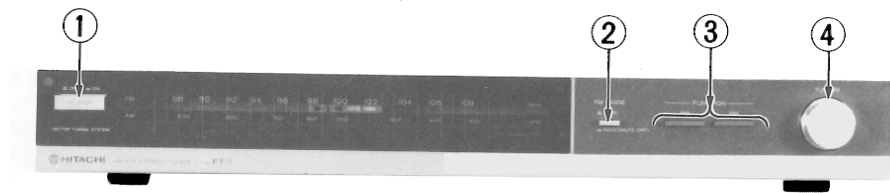
Check that exposed parts are acceptably insulated from the supply circuit before returning the instrument repaired to the customer.

● **Checking method**

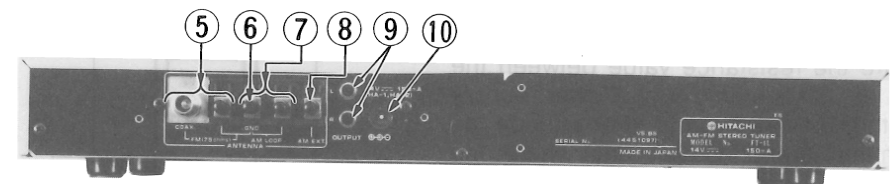
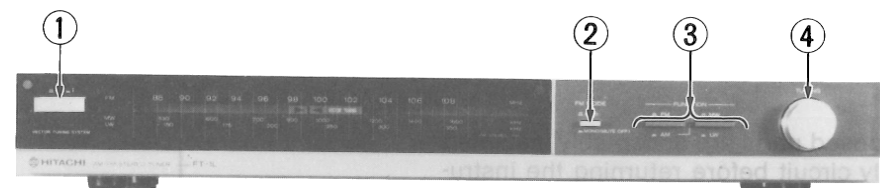
Power switch is set to ON.
Next, measure the resistance value between the both poles of attachment cup (Power supply plug) and the exposed parts (Parts such as Ground terminal, Knob, Cover, etc. where the customer is easy to touch.) and check that the resistance value is 500 kohms or more.



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



FT-1



FT-1L

- ① POWER switch
- ② FM MODE (AUTO/MONO MUTE OFF) switch
- ③ FUNCTION switch
- ④ TUNING knob
- ⑤ FM ANTENNA terminals (75 ohms)
- ⑥ Ground terminal (GND)
- ⑦ AM loop antenna terminal
- ⑧ AM ANTENNA terminal
- ⑨ Output terminals
- ⑩ DC input terminal

- ① Netzschalter (POWER)
- ② UKW-Betriebsartenschalter (FM MODE) (AUTO/MONO MUTE OFF)
- ③ Funktionswahlschalter (FUNCTION)
- ④ Abstimmknopf (TUNING)
- ⑤ UKW-Antennenanschluß (FM ANTENNA) (75 Ohm)
- ⑥ Erdungsklemme (GND)
- ⑦ AM-Zimmerantenne
- ⑧ AM-Antennenklemme (AM ANTENNA)
- ⑨ Ausgangsbuchsen
- ⑩ Gleichspannungs-Eingangsklemme

- ① Interrupteur d'alimentation (POWER)
- ② Commutateur de mode FM (MODE) (AUTO MONO MUTE OFF)
- ③ Commutateur de fonction (FUNCTION)
- ④ Bouton d'accord (TUNING)
- ⑤ Bornes d'antenne FM (FM ANTENNA) (75 ohms)
- ⑥ Borne de mise à la terre (GND)
- ⑦ Antenne cadre AM
- ⑧ Borne d'antenne AM (AM ANTENNA)
- ⑨ Prise de sortie
- ⑩ Borne d'entrée CC



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FT-1
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