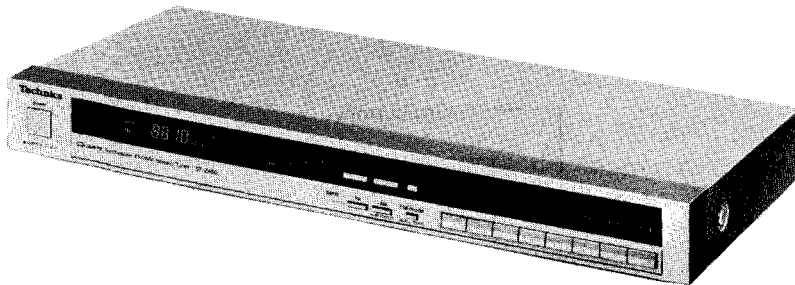


Service Manual

QUARTZ Synthesizer
FM/AM Stereo Tuner

Tuner
ST-Z450



Color

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

Color	Area
(S) (K)	[EX] ...Continental Europe.
(S)	[Ei] ...Italy.
(S) (K)	[EH] ...Holland.
(S) (K)	[EGB] ...F.R Germany.
(S) (K)	[XA] ...Asia, Latin America, Africa, Middle Near East and Oceania.
(S) (K)	[XL] ...Australia.

SPECIFICATIONS

(DIN 45 500)

■ FM TUNER SECTION

Frequency range	87.50~108.00 MHz
Sensitivity	0.95 μ V (IHF, usable)
S/N 30 dB	1.0 μ V (75 Ω)
S/N 26 dB	0.9 μ V (75 Ω)
S/N 20 dB	0.8 μ V (75 Ω)
IHF 46 dB stereo quieting sensitivity	22 μ V (75 Ω)
Total harmonic distortion	
MONO	0.15%
STEREO	0.3%
S/N	
MONO	70 dB (78 dB, IHF)
STEREO	65 dB (70 dB, IHF)
Frequency response	20 Hz~15 kHz, +0.5 dB~ -1.5 dB
Alternate channel selectivity (\pm 400 kHz)	65 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	55 dB
IF rejection at 98 MHz	90 dB
Spurious response rejection at 98 MHz	80 dB
AM suppression	55 dB
Stereo separation	
1 kHz	40 dB
10 kHz	30 dB
Carrier leak	
19 kHz	-30 dB (-35 dB, IHF)
38 kHz	-45 dB (-50 dB, IHF)
Channel balance (250 Hz~6,300 Hz)	\pm 1.0 dB
Limiting point	1.2 μ V
Bandwidth	
IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	75 Ω (unbalanced)

■ AM TUNER SECTION

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

■ GENERAL

Output voltage	0.3V (0.6V, IHF)
Power consumption	9W
Power supply	
For Australia	AC 50 Hz/60 Hz, 240V
For continental Europe	AC 50 Hz/60 Hz, 220V
For others	AC 50 Hz/60 Hz, 110V/127V/220V/240V
Dimensions (W×H×D)	430 × 53 × 200 mm (16-15/16" × 2-3/32" × 7-28/32")
Weight	1.8 kg (4 lb.)

Note:

Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

Specifications are subject to change without notice for further improvement.

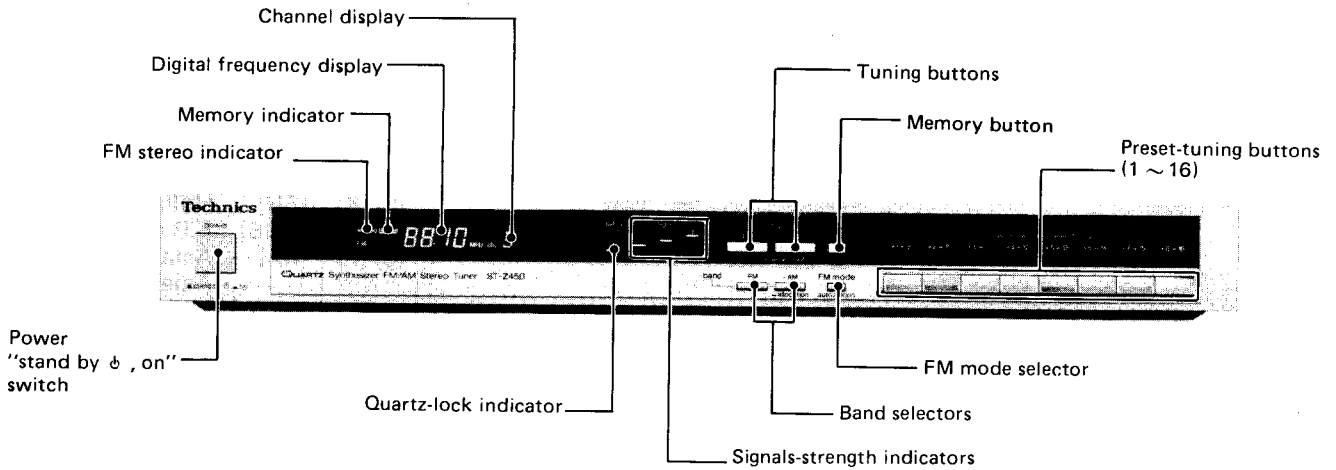
Technics

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

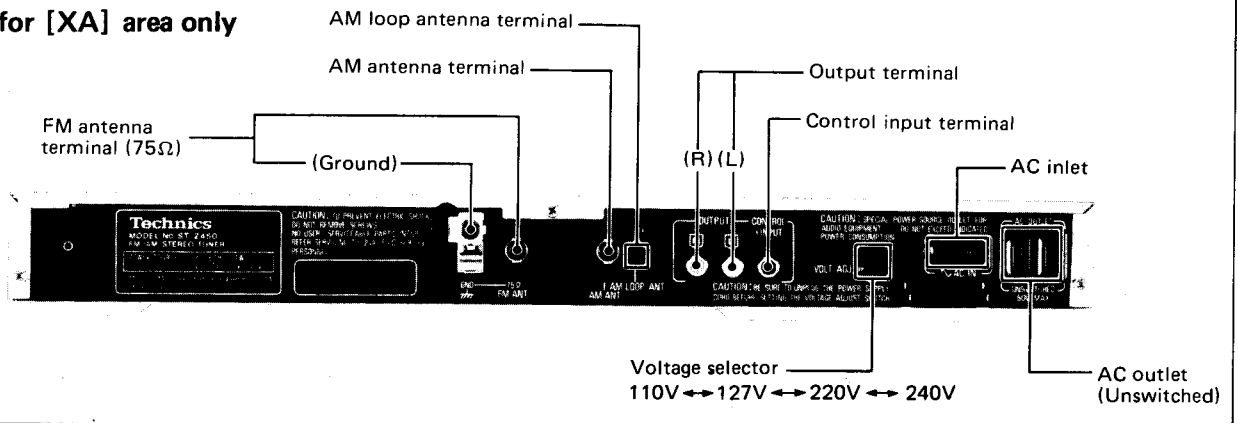
CONTENTS

	Page		Page
LOCATION OF CONTROLS	2	FUNCTION OF TERMINAL (PLL controller IC901)	10
HOW TO PRESET RADIO	2	BLOCK DIAGRAM	11
BROADCAST FREQUENCIES	3	SCHEMATIC DIAGRAM	13
DISASSEMBLY INSTRUCTIONS	5	LIQUID CRISTAL DISPLAY (LCD)	16
MEASUREMENTS AND ADJUSTMENTS	6	FM FRONT-END (TUNER) PACK	16
CIRCUIT BOARD AND WIRING	8	REPLACEMENT PARTS LIST	17
CONNECTION DIAGRAM	8	EXPLODED VIEW	19
TERMINAL GUIDE OF TRANSISTORS, IC'S AND DIODES	9		

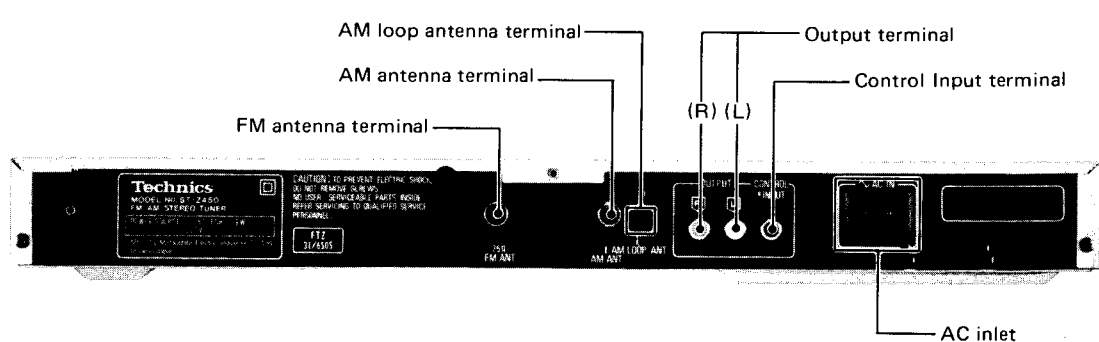
LOCATION OF CONTROLS



Product for [XA] area only



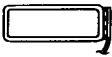
Others



- The power supply for this unit varied depending upon the areas. Also, the parts used for power supply are different. So, refer to the circuit diagram and the replacement parts list.
 - ★ 220V (50/60 Hz) for Continental Europe.
 - ★ 240V (50/60 Hz) for Australia.
 - ★ 110V/127V/220V/240V (50/60 Hz) for other areas.

HOW TO PRESET RADIO BROADCAST FREQUENCIES

Important!



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

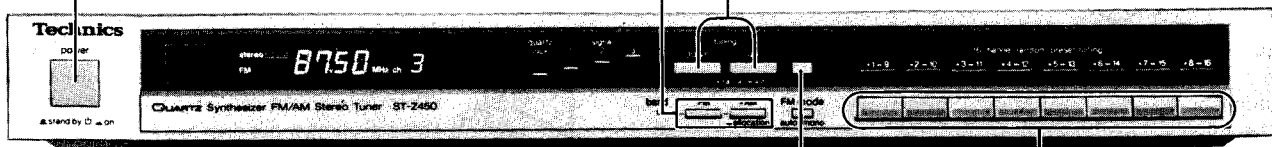
This unit is used to preset as many as 16 radio broadcast frequencies: FM/AM random presetting. After broadcast frequencies have been preset as described below, any desired station can be quickly and easily selected by simply touching one button.




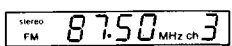

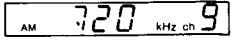
Memory presetting

There are two types of memory presetting: automatic and manual. Select whichever is preferred.

Automatic memory presetting

The FM broadcasting stations and AM broadcasting stations will be automatically preset to "channels" 1 through 16 for FM and 9 through 16 for AM, respectively.



- 1** "on" ()
- 2** Press the "FM" or "AM" button.
For AM broadcasts:
If the frequency step for your locality is 10 kHz step, press the "AM" button for approximately 4 seconds.
- 3** Set to the minimum frequency.
•FM: 87.50 MHz
•AM: 522 kHz (9 kHz step) or 530 kHz (10 kHz step)
- 4** Press. When the frequency indication begins to change, release.

(The frequency will change upward, and the automatic presetting will begin with the broadcasting station of the lowest frequency and will continue in order.)
- 5** Confirm the names (call signs, etc.) of the broadcasting stations which are preset to each channel, and enter them on the file sheet.
To check the front channels (CH 1~ 8):
Press momentarily.  → 
The frequency stored in the memory and channel number are displayed.
To check the back channels (CH9~16):
Press slightly longer.  → 
The frequency stored in the memory and channel number are displayed.

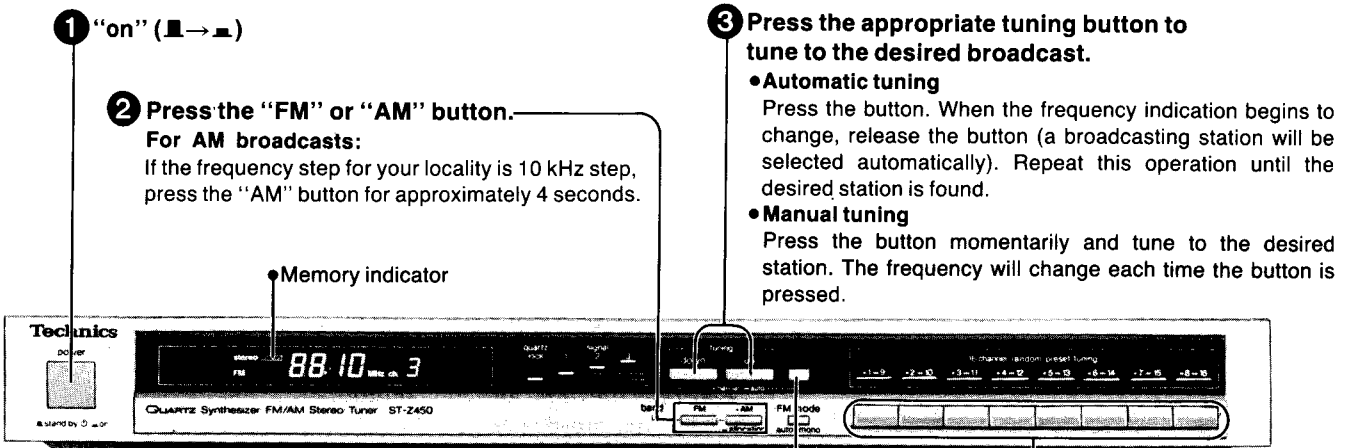
Notes:

1. For automatic presetting in areas where there are less than 16 FM stations, the remaining channels (through channel 16) will be left empty. The empty channels can be filled by using manual memory presetting.
2. If a new broadcasting station is preset into a channel, the broadcasting station which was previously entered in that

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

Manual memory presetting

Stations can be freely preset to any desired channel.



1 "on" (⏻→⏻)

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

For AM broadcasts:

If the frequency step for your locality is 10 kHz step, press the "AM" button for approximately 4 seconds.

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

• **Automatic tuning**

Press the button. When the frequency indication begins to change, release the button (a broadcasting station will be selected automatically). Repeat this operation until the desired station is found.

• **Manual tuning**

Press the button momentarily and tune to the desired station. The frequency will change each time the button is pressed.

4 Press momentarily, and then release.

(The memory indicator will illuminate for approximately 4 seconds.)



If the button is pressed continuously, the frequency will begin to change, and the memory will be preset automatically.

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

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

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

• **To preset channels 1 through 8:**



Press the button momentarily, and then release. (The frequency stored in the memory and channel number are displayed.)

• **To preset channels 9 through 16:**

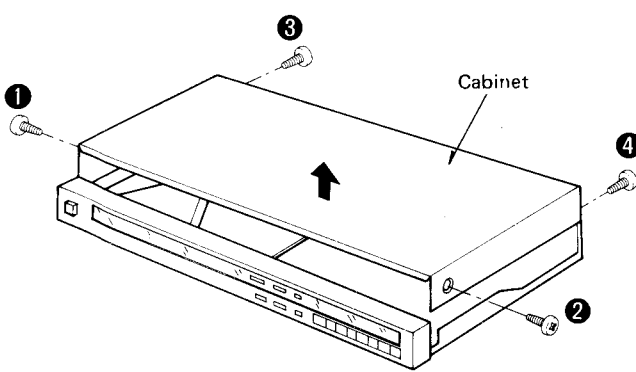
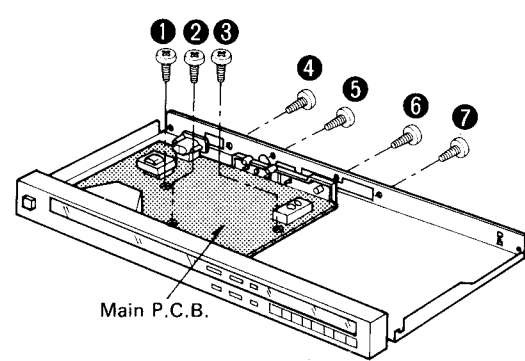
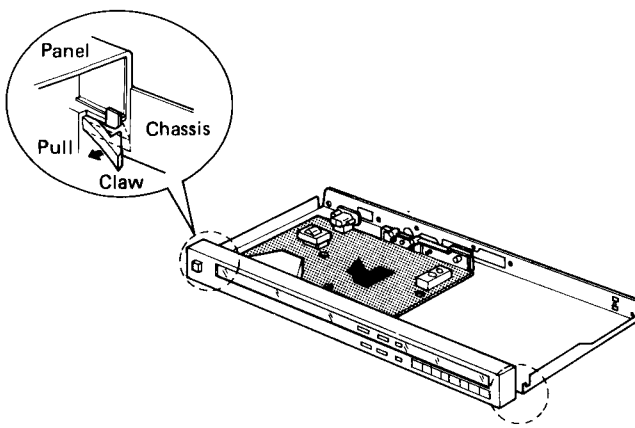
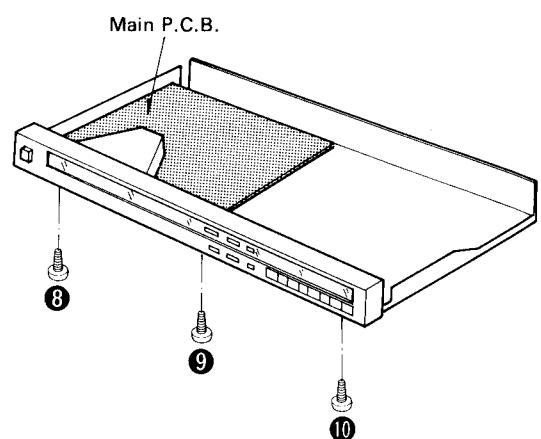
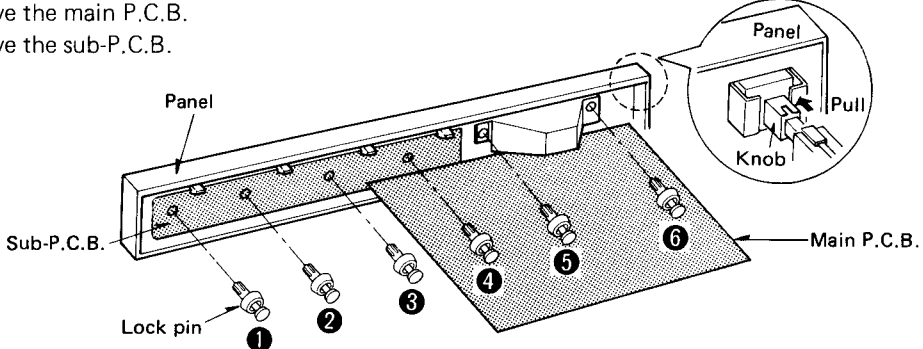


Press the button slightly longer, and then release. (The frequency stored in the memory and channel number are displayed.)

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

This completes the procedures for presetting radio broadcast frequencies. The other preset-tuning buttons can be preset in the same way by following steps 2 through 5.

DISASSEMBLY INSTRUCTIONS

Ref. No. 1	How to remove the cabinet	Ref. No. 2	How to remove the main P.C.B.
Procedure 1	<ul style="list-style-type: none"> Remove the 4 screws (1 ~ 4). 	Procedure 1 → 2	<ul style="list-style-type: none"> Remove the 7 screws (1 ~ 7).
			
<ul style="list-style-type: none"> Slightly pull the front panel toward you and remove the main P.C.B. 		<ul style="list-style-type: none"> Remove the 3 screws (8 ~ 10). 	
Ref. No. 3	How to remove the front panel		
Procedure 1 → 2 → 3	<ol style="list-style-type: none"> Remove the 6 lock pins. (1 ~ 6) Remove the power switch knob. Remove the main P.C.B. Remove the sub-P.C.B. 		
			

MEASUREMENTS AND ADJUSTMENTS

AM/FM

Control positions and equipment used

- AM and FM signal generator (AM and FM-SG).
- Stereo modulator
- Distortion analyser
- Oscilloscope
- AC and DC electronic voltmeter (EVM)
- Frequency counter
- Choke coil (100 μ H)
- Resistor (100k Ω)
- Ceramic capacitor (200pF)

Note: For **T201** (AM-IFT), **L204** (AM OSC coil) **L101** (For [EGB] area only : L.P.F.) and **L301, L302** (For [EGB] area only : 19 kHz, 38 kHz, L.P.F.), adjusted parts are supplied. So do not turn the cores of these parts.

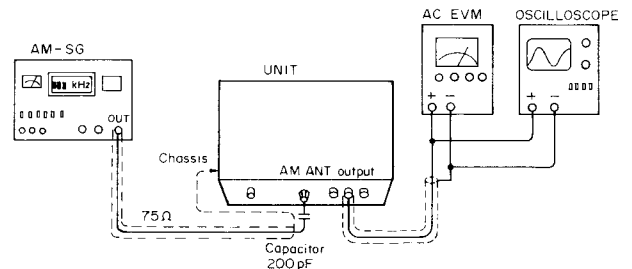
AM-RF ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "AM" position.
3. Place the radio frequency display and signal generator setting to **612 kHz**.
4. Adjust **L205** for maximum output.
5. Place the radio frequency display and signal generator setting to **1503 kHz**.
6. Adjust **CT202** for maximum output.
7. Repeat steps 3 ~ 6.

Note: Antenna input level must be as low as possible being free from AGC.

AM SIGNAL GENERATOR CONDITION

Modulation 30%
Modulation frequency..... 400 Hz



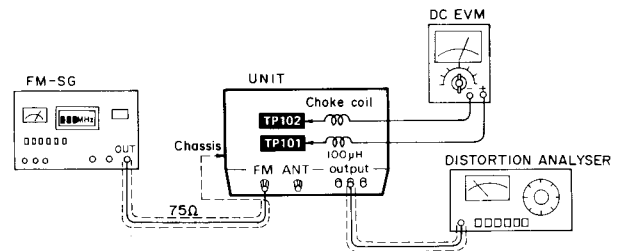
FM MONO DISTORTION ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "FM" position.
3. Place the radio frequency display and signal generator setting to **100.10 MHz**.
4. Adjust **T101** core so that voltage measured in signal mode is **0 mV (0 \pm 50 mV)** in 1V range.
5. Adjust **T102** so that the distortion factor of L ch is minimized.
6. Repeat steps 4 and 5 a few times.
7. Make sure that the distortion factors of L ch and R ch are nearly the same with each other and are less than **0.7%**.

Note: The adjusting screwdriver used should be made of resin.

FM SIGNAL GENERATOR CONDITION

Modulation..... 100%
Modulation frequency..... 400 Hz
Output level..... 66 dB

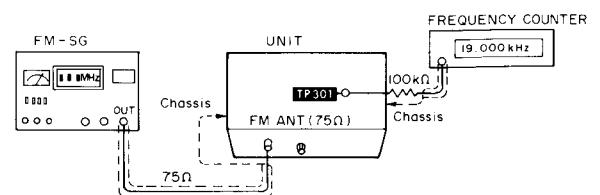


FM STEREO ADJUSTMENT (FREE RUN)

1. Test equipment connection is shown in figure.
2. Set the unit into "FM auto" position. (by FM mode select button).
3. Place the radio frequency display and signal generator setting to **100.10 MHz**
4. Adjust **VR302** for **19 kHz \pm 50 Hz** on frequency counter reading.

FM SIGNAL GENERATOR CONDITION

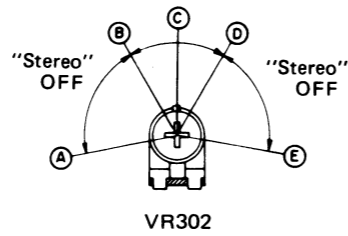
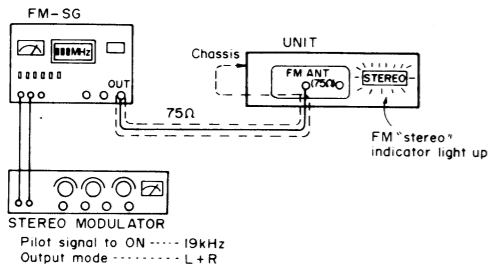
Modulation 0
Modulation frequency..... 0
Output level..... 66 dB



USING ALTERNATE SYSTEM

1. Apply stereo signal from generator or receive the stereo broadcast.
2. Adjust **VR302** until stereo indicator light up. Cement arm of **VR302** as shown figure.

FM SIGNAL GENERATOR CONDITION
 Modulation.....10%
 Modulation frequency.....Pilot (19 kHz)
 Output level.....66 dB

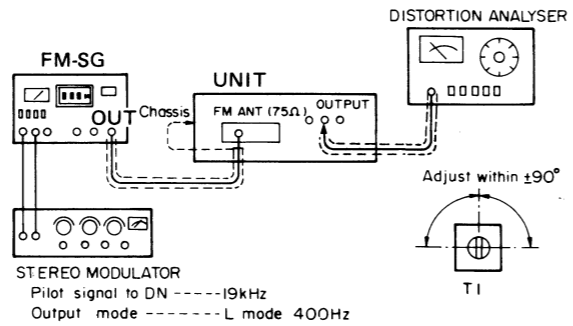


- B-D "Stereo" ON position (Indicator lighting)
- C Adjust point of pilot circuit

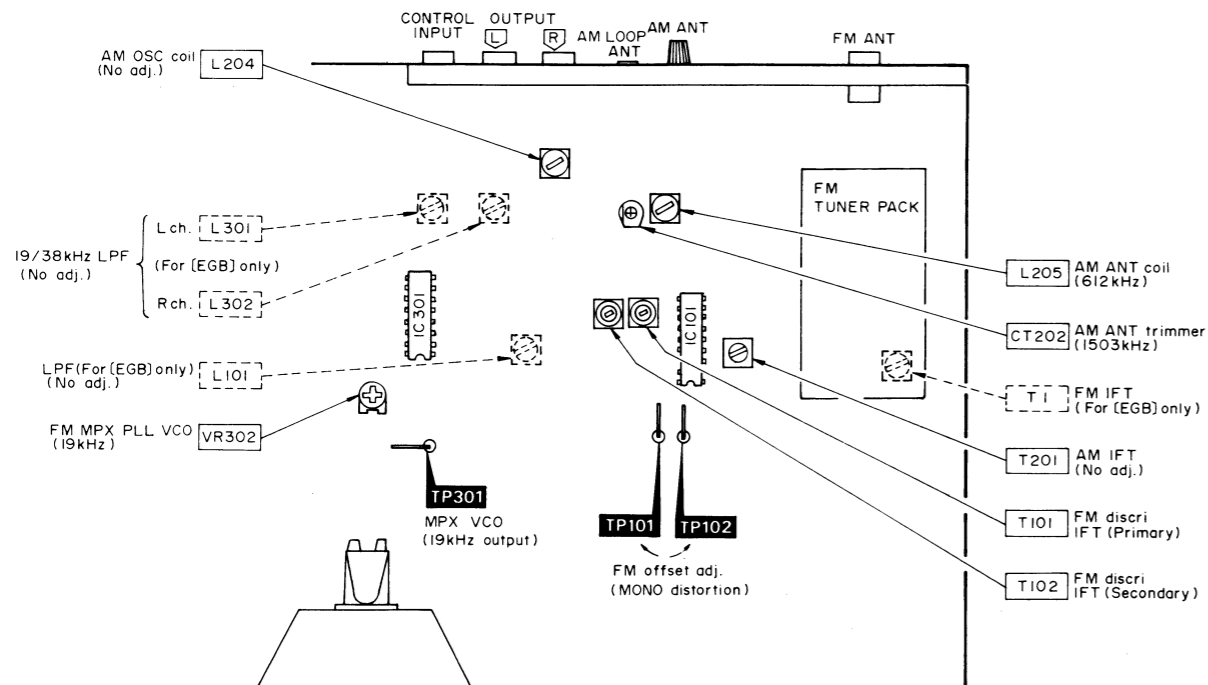
FM IFT ADJUSTMENT (FOR [EGB] AREA ONLY)

1. Test equipment connection is shown in figure.
2. Set the unit into "FM auto" position. (by FM mode select button.)
3. Place the radio frequency display and signal generator setting to **100.10 MHz**.
4. Adjust **T1** so that the distortion factor of L ch. is minimized.
5. Make sure that the distortion factors of L ch. and R ch. are nearly the same with each other and are less than **1.5%**.

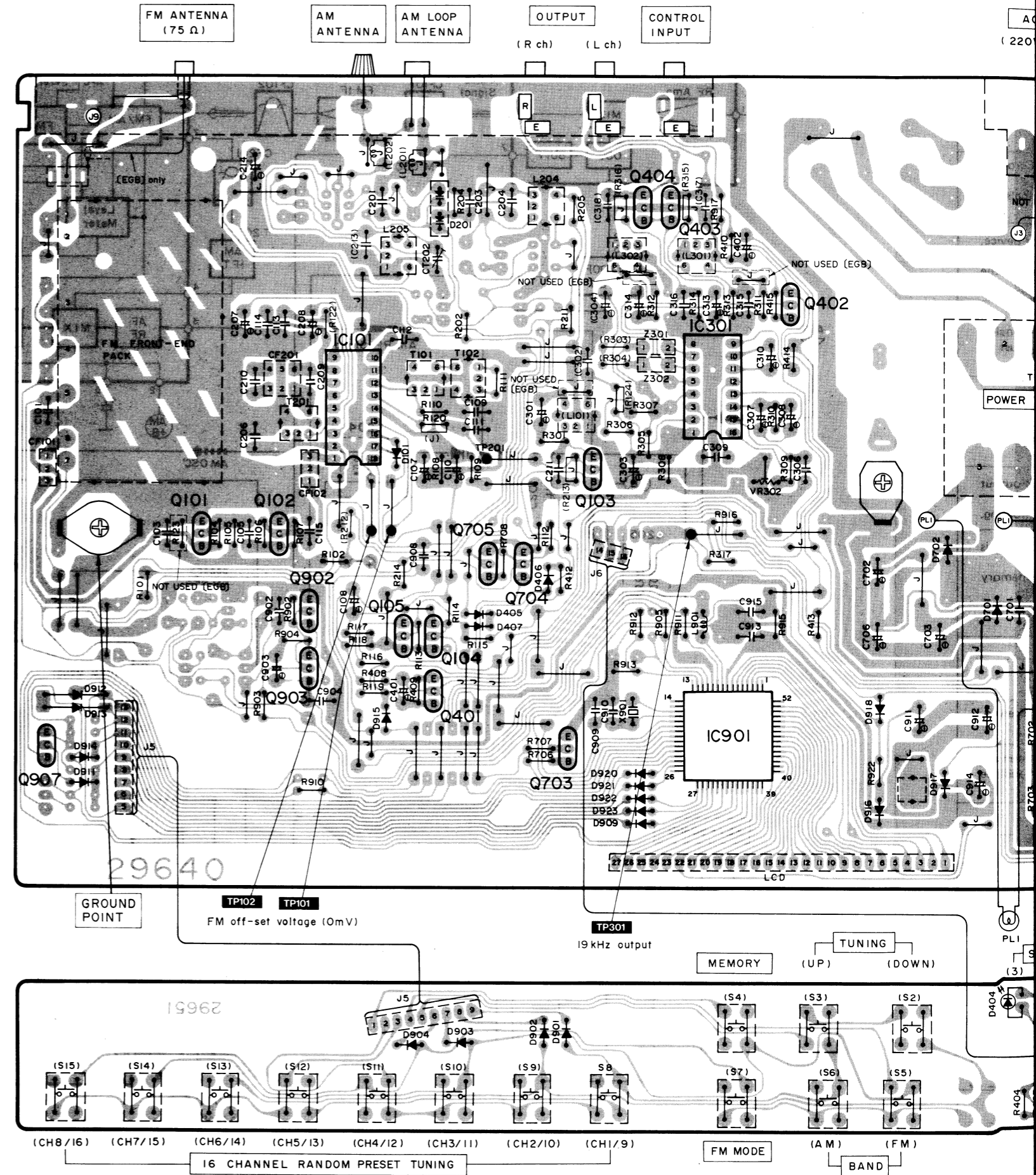
FM SIGNAL GENERATOR CONDITION
 Modulation90% (Pilot 10%)
 Modulation frequency.... L mode 400 Hz (Pilot 19 kHz)
 Output level66 dB



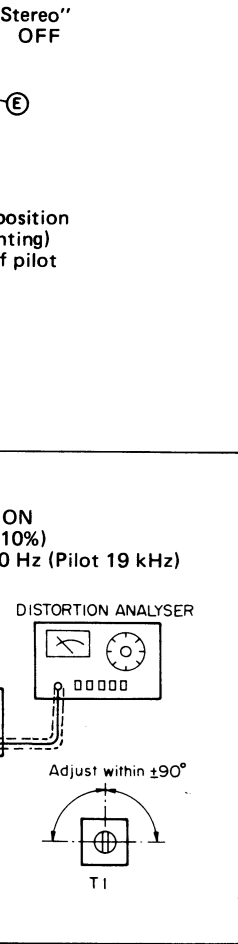
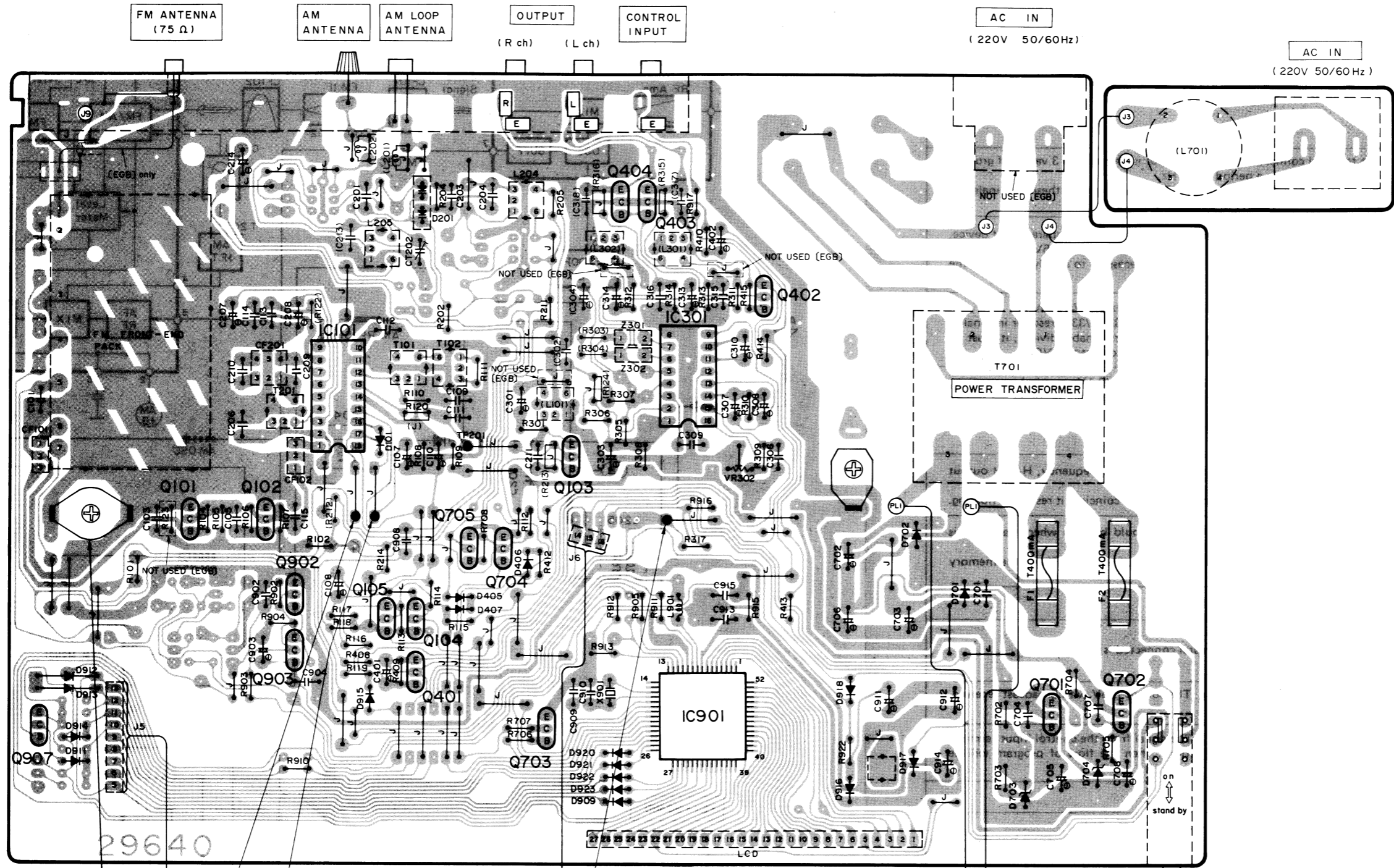
• Adjustment points



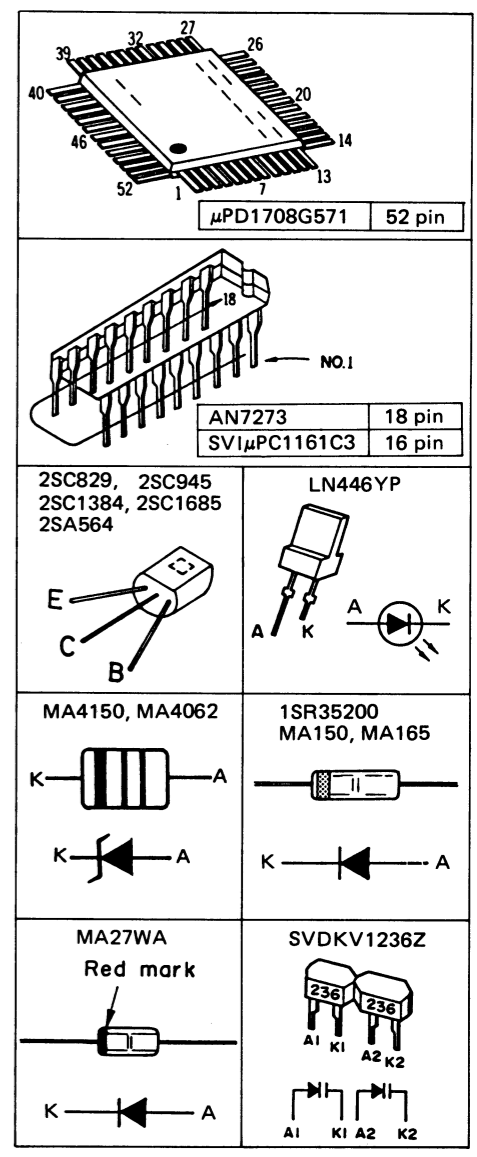
■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM



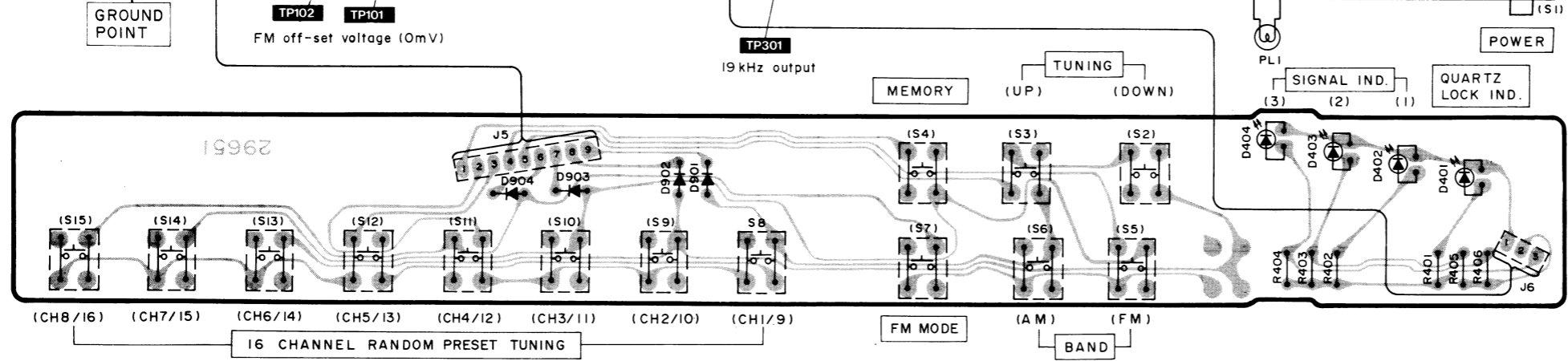
■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM



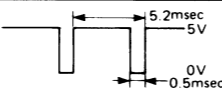
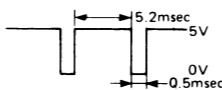
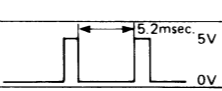
■ TERMINAL GUIDE OF TRANSISTORS, IC'S AND DIODES



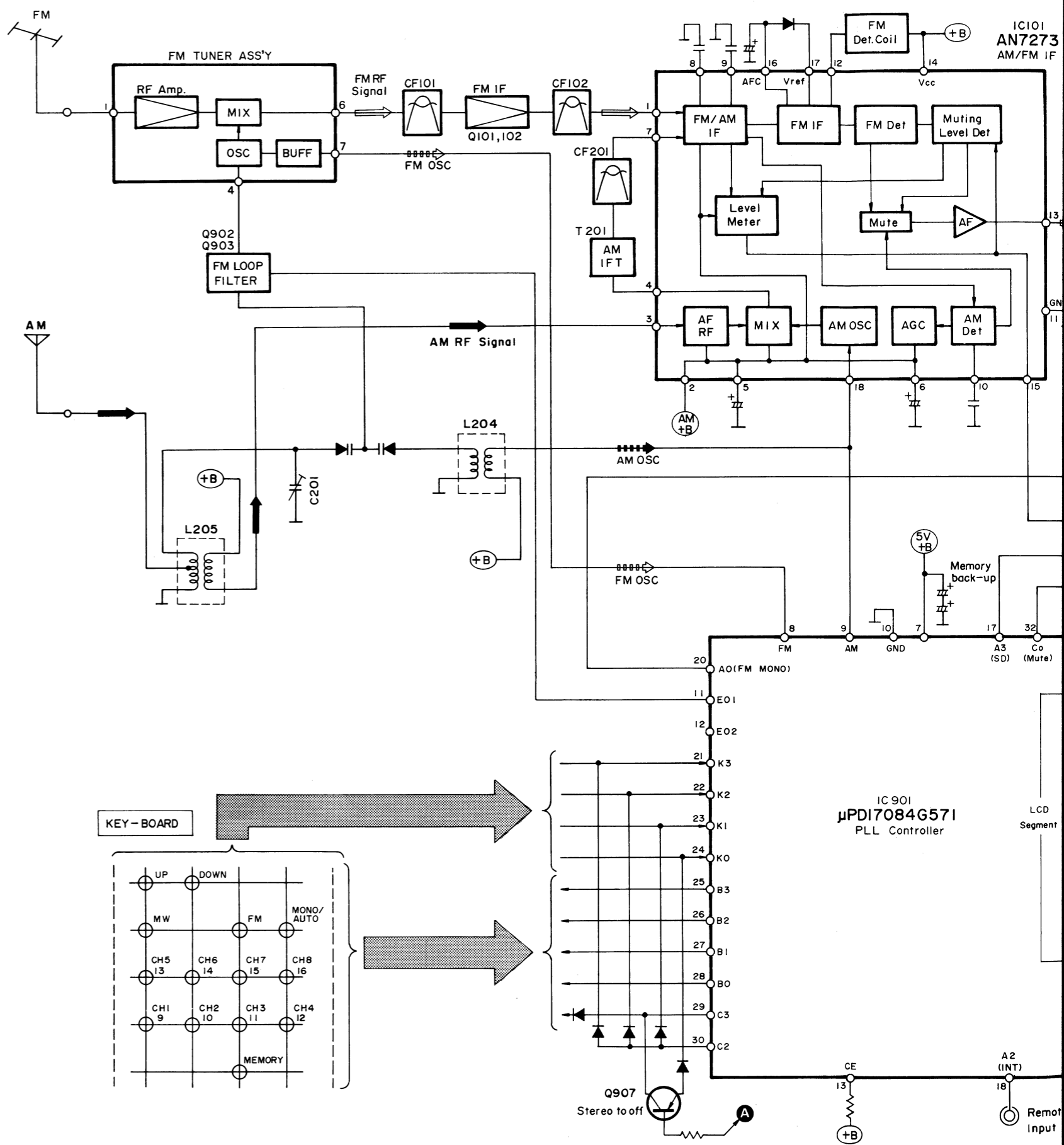
- 1 AM ANT coil (612kHz)
- 2 AM ANT trimmer (1503kHz)
- FM IFT (For EGB only)
- 1 AM IFT (No adj.)
- FM discr IFT (Primary)
- 2 FM discr IFT (Secondary)



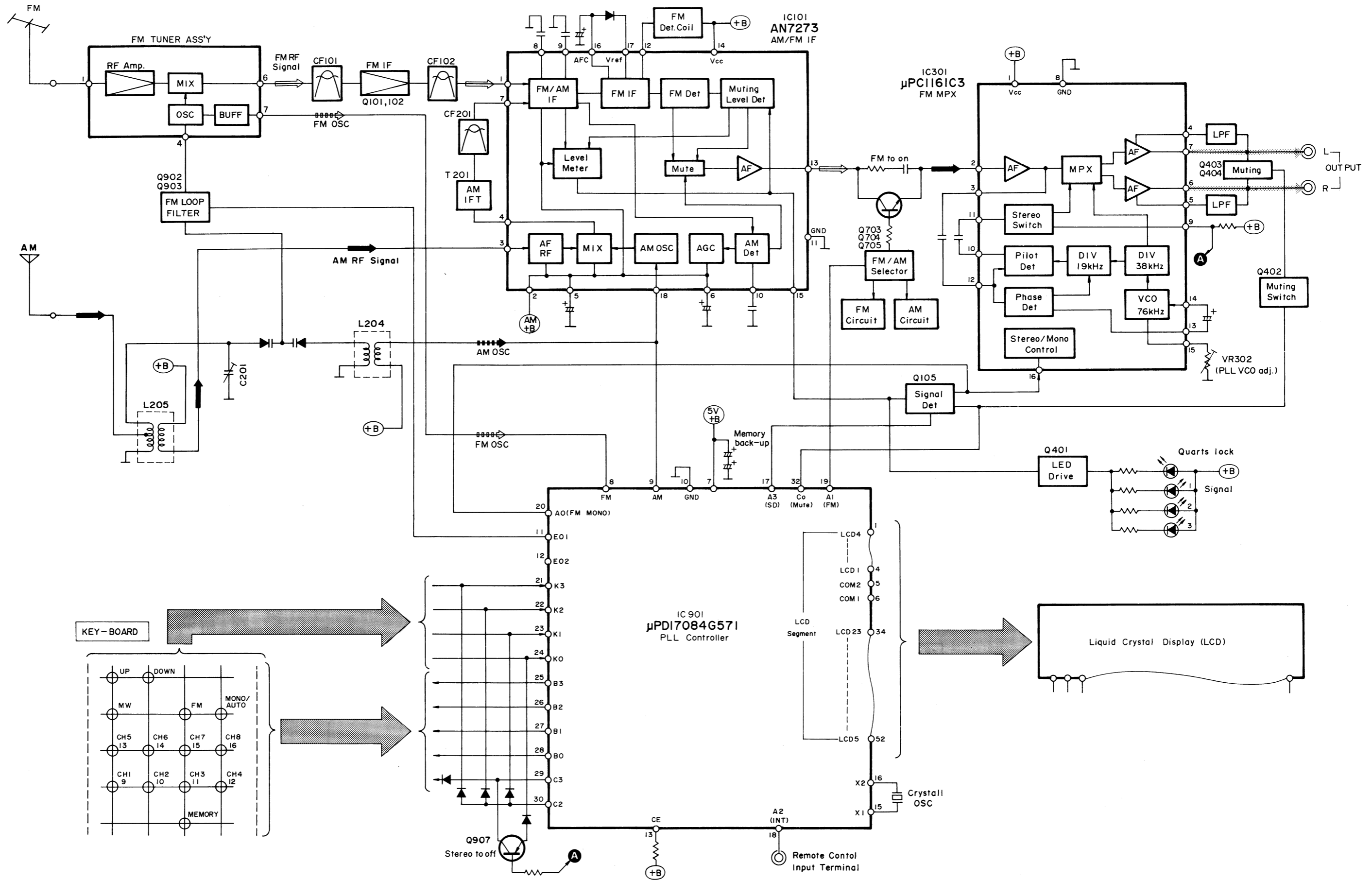
FUNCTION OF TERMINAL (PLL controller IC901)

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

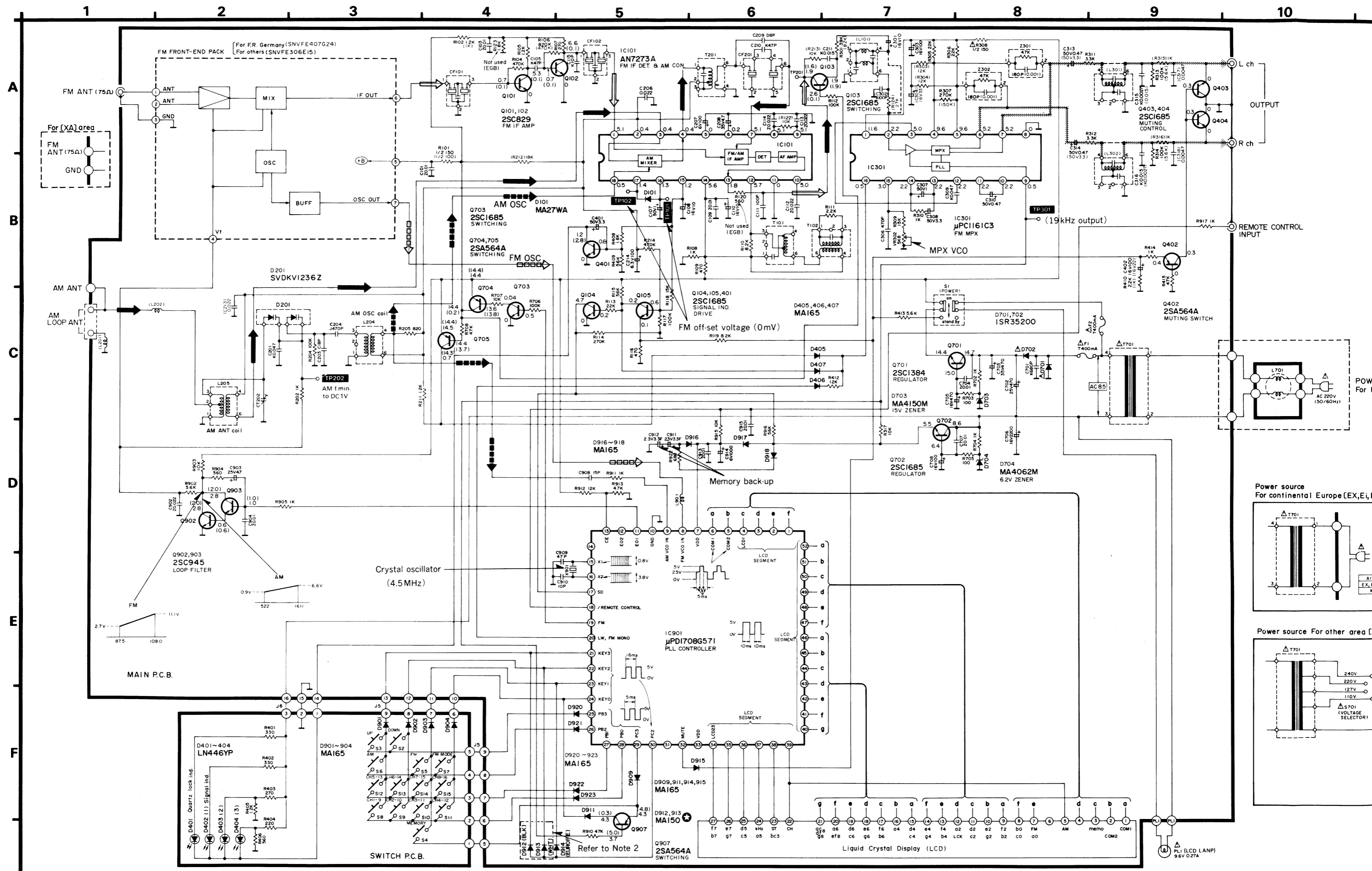
BLOCK DIAGRAM

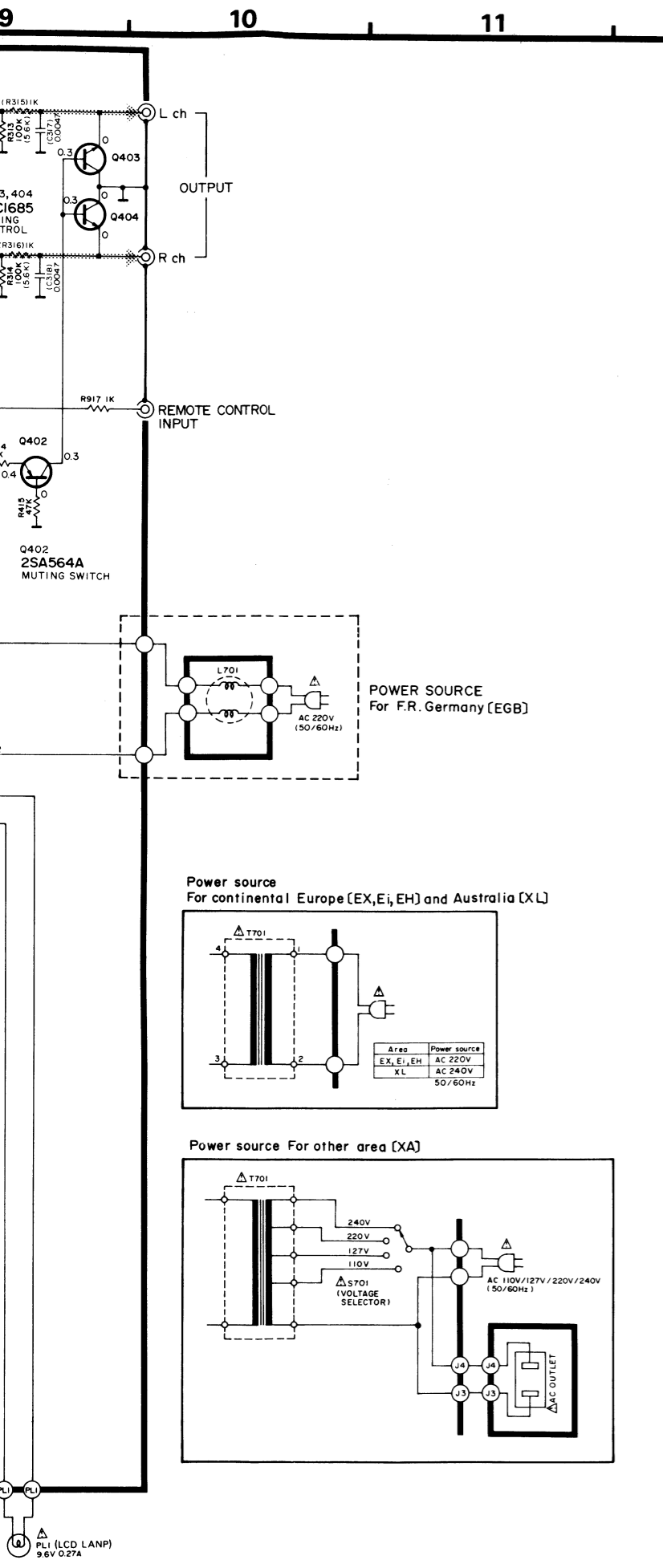


■ BLOCK DIAGRAM



f ground,
inals and
of device.
ge to the
nternally,
must be
he supply
el output
floating.
device is
memory
received,
terminal
h will be
5.2msec
5V
0V
0.5msec
5.2msec
5V
0V
0.5msec
when the
5.2msec
5V
0V
selector





■ SCHEMATIC DIAGRAM

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

*The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with \star mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement part, please use the part No. in the replacement part list.
 *This is the basic circuit diagram of this unit.
 Note that part of the circuit is subject to change depending on the areas.

Note 1:

1. **S1** : Power source switch in "on" position.
2. **S2** : Tuning (down) switch. [down : tuning to lower frequency]
3. **S3** : Tuning (up) switch. [up : tuning to higher frequency]
4. **S4** : Memory set switch. (manual \leftrightarrow auto memory)
5. **S5** : FM selector switch.
6. **S6** : AM selector switch.
7. **S7** : FM mode switch. (stereo \leftrightarrow mono)
8. **S8 ~ S15** : Preset tuning switch.
 * With it momentarily pushed (less than 0.4 sec.) and released, the 1 ~ 8 CH are received.
 * With it continuously pushed (0.4 sec. or more) and released, the 9 ~ 16 CH are received.
9. **S701 [XA] area only** : Voltage selector switch in "240V" position. 110V \leftrightarrow 127V \leftrightarrow 220V \leftrightarrow 240V
10. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
 * Figures in () stand for DC voltage in AM signal reception mode.
11. \longrightarrow Positive voltage lines \dashrightarrow AF signal lines \dashrightarrow FM signal $\square\square\square$ FM OSC \longrightarrow AM signal \dashrightarrow AM OSC
12. Important safety notice. Components identified by Δ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
13. () indicate resistors and capacitors are use product for F.R. Germany [EGB].

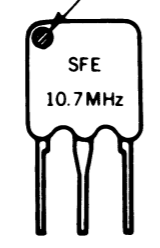
Note 2:

● Use of ceramic filters in pairs

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

At repairing and replacement, pay close attention to the diodes (D912, D913) for use as different diodes must be used depending on each rank of the ceramic filters.

Color marking (Red, Black or White)



RANK (Color)	D912	D913	CENTER FREQUENCY
Black	○	X	10.65 MHz
Red	X	X	10.70 MHz
White	X	○	10.76 MHz

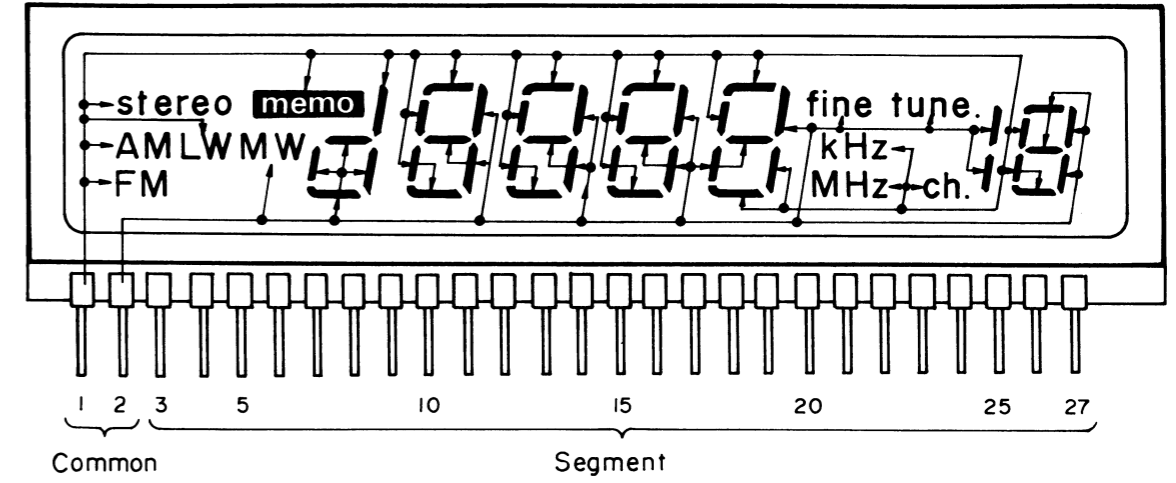
Note: ○ Mark Diode is used.
 X Mark Diode is not used.

★ Caution !

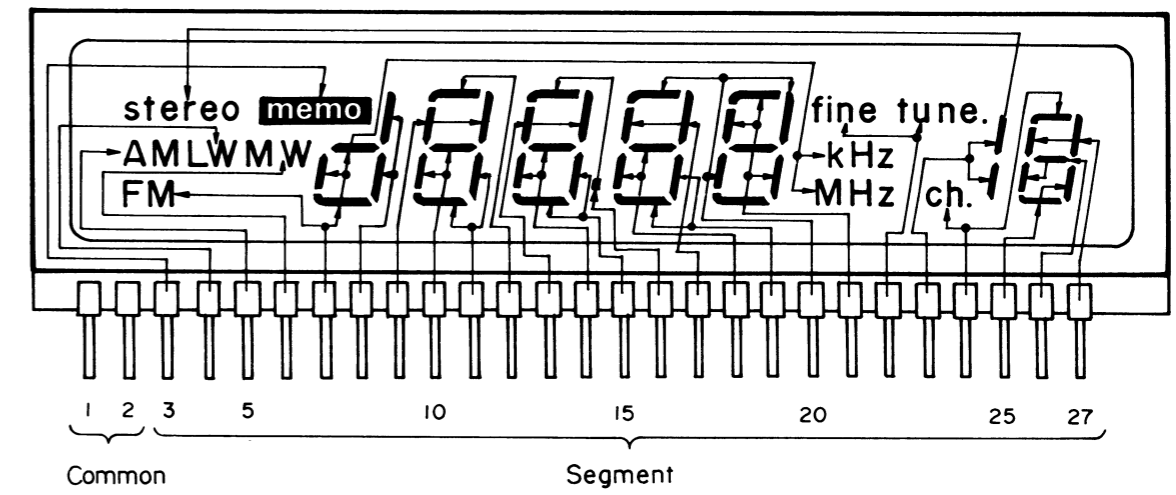
- IC and LSI are sensitive to static electricity. Secondary trouble can be prevented by taking care during repair.
- ★ Cover the parts boxes made of plastics with aluminum foil.
- ★ Ground the soldering iron.
- ★ Put a conductive mat on the work table.
- ★ Do not touch the legs of IC or LSI with the fingers directly.

■ LIQUID CRYSTAL DISPLAY (LCD)

● Common terminal (No. 1, 2)



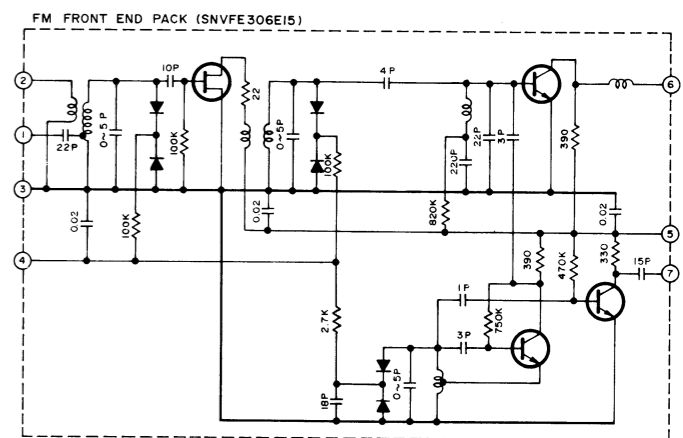
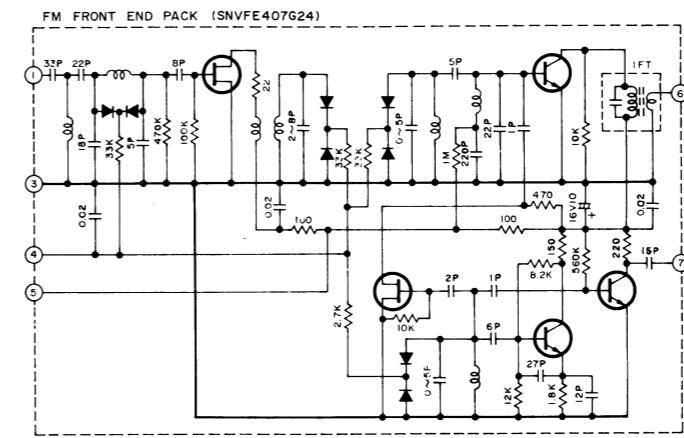
● Segment terminal (No. 3 ~ 27)



■ FM FRONT-END (TUNER) PACK

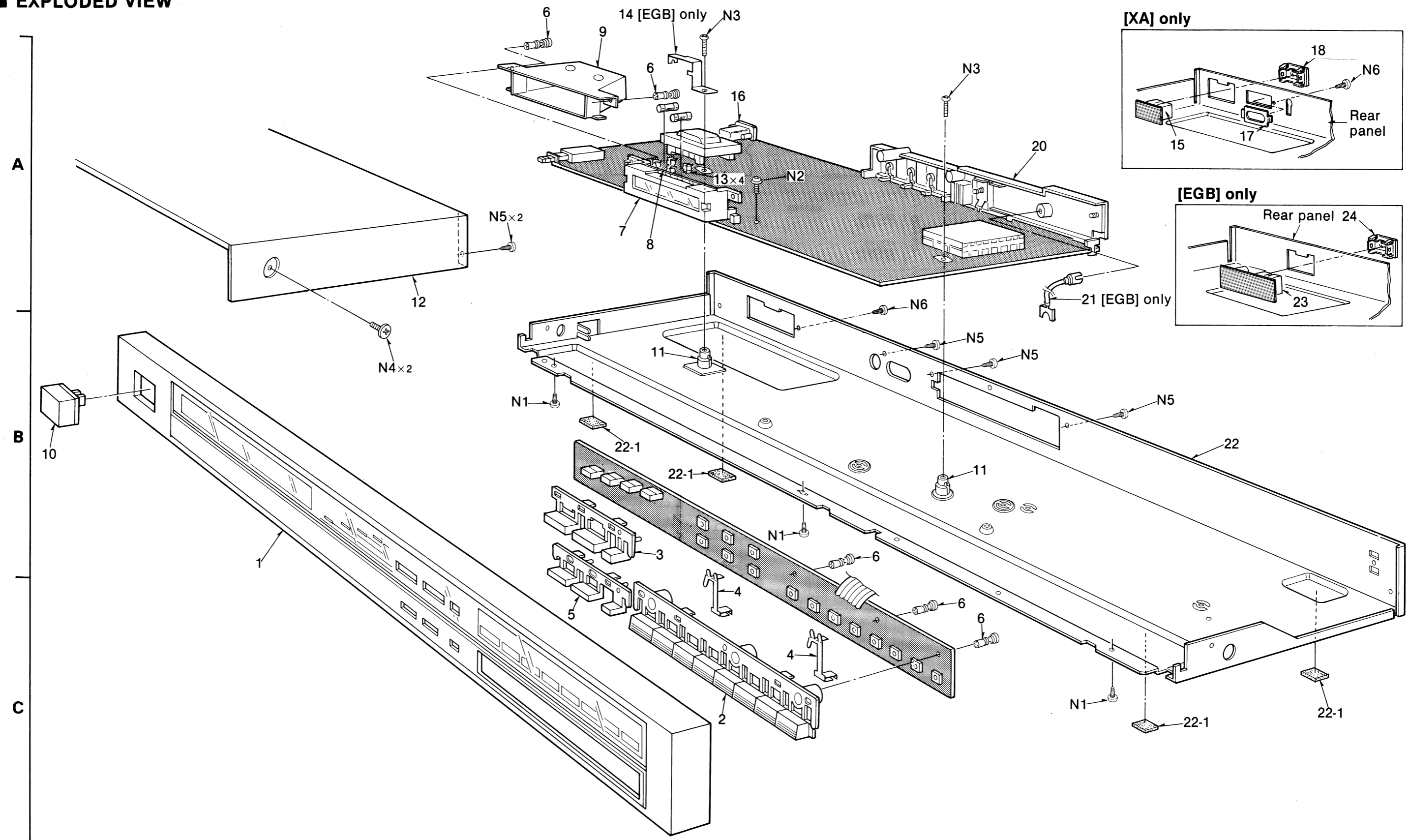
For F.R. Germany (SNVFE407G24)

For other (SNVFE306E15)



EXPLODED VIEW

Description	Quantity
RTS	
Cord	(1)
Rear Panel Ass'y	(1)
Rear Panel Ass'y	(1)
Rear Panel Ass'y	(1)
Rear Panel Ass'y	(1)
Rear Panel Ass'y	(1)
Rear Panel Ass'y (Made in Singapore)	(1)
Foot	(4)
Socket, AC Inlet	(1)
Socket Cover, AC Inlet	(1)
Sealing, $\varnothing 3 \times 8$	(3)
Sealing with Washer, $\varnothing 3 \times 8$	(1)
Sealing with Detent, $\varnothing 3 \times 12$	(2)
Cabinet (Silver Type)	(2)
Cabinet (Black Type)	(2)
Sealing with Detent, $\varnothing 3 \times 8$	(5)
Sealing with Detent, $\varnothing 3 \times 8$	(1)
AC Cord	(1)
AC Cord	(1)
AC Cord	(1)
Antenna Cord	(1)
Antenna Cord	(1)
Loop Antenna	(1)
Holder, Loop Antenna	(1)
Holder, Loop Antenna	(1)
Screw	(2)
Plug	(1)
Instruction Book	(1)
Instruction Book	(1)
Instruction Book (Made in Singapore)	(1)
Instruction Book	(1)
Polyethylene Bag (Silver Type)	(1)
Polyethylene Bag (Black Type)	(1)
Panel, Left Side	(1)
Panel, Left Side	(1)
Panel, Right Side	(1)
Panel, Right Side	(1)
Cap	(1)
Carton Box	(1)
Carton Box (Made in Singapore)	(1)
Carton Box (Silver Type)	(1)
Carton Box (Black Type)	(1)
Label (Silver Type only)	(2)



A		12		6	9	6	7	14	8	16	15		20	21		15	17	18	23	24	
B	10		1			22-1	3			11	22-1	17	6	18	11		22				
C						5				4	2	4			6	6			22-1		22-1

QUARTZ Synthesizer

FM/AM Stereo Tuner

ST-Z450

- This booklet contains the specifications and adjusting procedures for ST-Z450, written in German, French and Spanish.
- File this manual together with the ST-Z450 service manual (Order No. HAD85042472C9).
- Das vorliegende Büchlein enthält die technische Daten und Justierverfahren für den ST-Z450 in deutscher, französischer und spanischer Sprache.
- Bewahren Sie das Büchlein zusammen mit der Bedienungsanleitung für des ST-Z450 auf (Bestell-Nr. HAD85042472C9).
- Cette brochure contient les spécifications et les procédures de mises au point pour le ST-Z450, écrites en allemand, en français et en espagnol.
- Classer ce manuel en même temps qu'avec le manuel de service du ST-Z450 (N° d'ordre : HAD85042472C9).
- Este librito contiene la especificaciones y procedimientos de ajuste para ST-Z450, escritos en alemán, francés y español.
- Guardar este manual juntamente con el manual de servicio de ST-Z450 (Pedido N°. HAD85042472C9).

DEUTSCH

■ TECHNISCHE DATEN

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

(DIN 45 500)

■ UKW-TUNERTEIL

Wellenbereich	87,50 ~ 108,00 MHz
Eingangsempfindlichkeit	0,95 μ V (nutzbar nach IHF)
S/R 30 dB	1,0 μ V (75 Ω)
S/R 26 dB	0,9 μ V (75 Ω)
S/R 20 dB	0,8 μ V (75 Ω)
Stereoschaltsschwelle bei 46 dB nach IHF	22 μ V (75 Ω)
Gesamtklirrfaktor	
Mono	0,15%
Stereo	0,3%
Geräuschabstand	
Mono	70 dB (78 dB nach IHF)
Stereo	65 dB (70 dB nach IHF)
Frequenzgang	20 Hz ~ 15 kHz (+0,5 dB ~ -1,5 dB)
Trennschärfe bei Störsender (\pm 400 kHz)	65 dB
Einfangverhältnis	1,0 dB
Spiegelfrequenz-Dämpfung bei 98 MHz	55 dB
ZF-Dämpfung bei 98 MHz	90 dB
Ansprechdämpfung auf Nebenfrequenzen bei 98 MHz	80 dB
MW-Unterdrückung	55 dB
Übersprechdämpfung	
1 kHz	40 dB
10 kHz	30 dB
Trägerrest	
19 kHz	-30 dB (-35 dB nach IHF)
38 kHz	-45 dB (-50 dB nach IHF)

Kanalabweichung (250 Hz ~ 6300 Hz)	\pm 1,0 dB
Begrenzereinsatz	1,2 μ V
Bandbreite	
ZF-Verstärker	180 kHz
UKW-Demodulator	1000 kHz
Antennenanschluß	75 Ω (unsymmetrisch)

■ MW-TUNERTEIL

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

■ ALLGEMEINE DATEN

Ausgangsspannung	0,3 V (0,6 V, IHF)
Leistungsaufnahme	9W
Netzspannung	
Für Kontinentaleuropa	Wechselstrom 50 Hz/60 Hz, 220V
Für andere Länder	Wechselstrom 50 Hz/60 Hz, 110V/127V/220V/240V
Abmessungen (B×H×T)	430 × 53 × 200 mm
Gewicht	1,8 kg

■ MESSUNGEN UND JUSTIERUNGEN

MW/UKW

Einstellungen der Bedienelemente und zu verwendende Geräte.

- MW/UKW-Meßsender (MW/UKW-MS)
- Stereo-Modulator
- Verzerrungs-Analysator
- Oszilloskop
- Elektronische Wechselstrom- und Gleichstrom-Voltmeter (EVM).
- Frequenzzähler
- Drosselspule (100 μ H)
- Widerstand (100k Ω)
- Keramischer Kondensator (200pF)

Anmerkung: Für **T201** (MW-ZFT), **L204** (MW-Osz.-Spule), **L101** (nur für [EGB]-Gebiet : L.P.F.) und **L301, L302** (nur für [EGB]-Gebiet : 19 kHz/38 kHz L.P.F.) werden justierte Ersatzteile geliefert. Die Kerne dieser Teile daher nicht drehen.

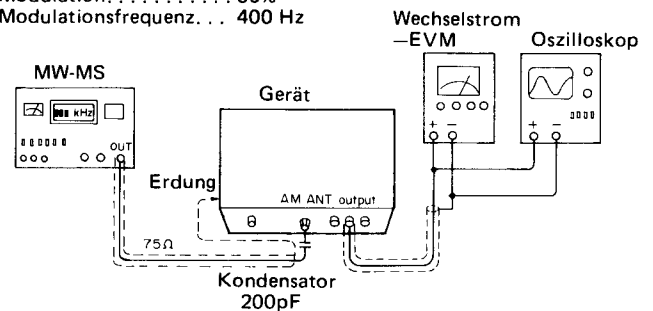
AM (MW)-HF-JUSTIERUNG

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Das Gerät auf "AM (MW)" einstellen.
3. Die Radiofrequenzanzeige und den Meßsender auf **612 kHz** einstellen.
4. **L205** auf maximale Ausgangsleistung abgleichen.
5. Die Radiofrequenzanzeige und den Meßsender auf **1503 kHz** einstellen.
6. **CT202** auf maximale Ausgangsleistung abgleichen.
7. Die Schritte 3—6. wiederholen.

Anmerkung: Der Antenneneingang-Signalpegel muß so niedrig wie möglich und frei von automatischer Verstärkungsregelung (AGC) sein.

ZUSTAND DES MW-MESSENDERS

Modulation..... 30%
Modulationsfrequenz... 400 Hz



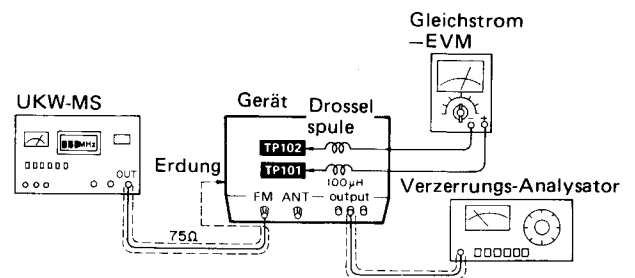
UKW-MONO-VERZERRUNGS-JUSTIERUNG

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Das Gerät auf "FM (UKW)" einstellen.
3. Die Radiofrequenzanzeige und den Meßsender auf **100.10 MHz** einstellen.
4. Den Kern von **T101** so justieren, daß die im Signalzustand gemessene Spannung **0 mV (0 \pm 50 mV)** im 1V-Bereich beträgt.
5. **T102** so justieren, daß der Verzerrungsfaktor des linken Kanals minimal wird.
6. Schritte 4 und 5 einige Male wiederholen.
7. Überprüfen, daß die Verzerrungsfaktoren des linken und rechten Kanals fast gleich sind und weniger als **0,7%** betragen.

Anmerkung: Für die Justierung ist ein Schraubendreher aus Kunststoff zu verwenden.

ZUSTAND DES UKW-MESSENDERS

Modulation..... 100%
Modulationsfrequenz... 400 Hz
Ausgangspegel..... 66 dB

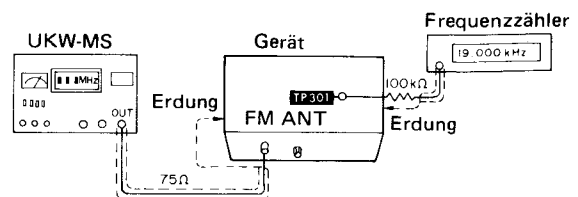


UKW-STEREO-JUSTIERUNG (FREIER LAUF)

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Den UKW-Betriebsart-Wahlschalter in die "FM auto" Position stellen.
3. Die Radiofrequenz-Anzeige und den Meßsender auf **100,10 MHz** einstellen.
4. **VR302** auf **19 kHz \pm 50 Hz** auf der Frequenzzähleranzeige justieren.

ZUSTAND DES UKW-MESSENDERS

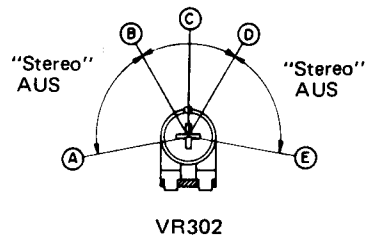
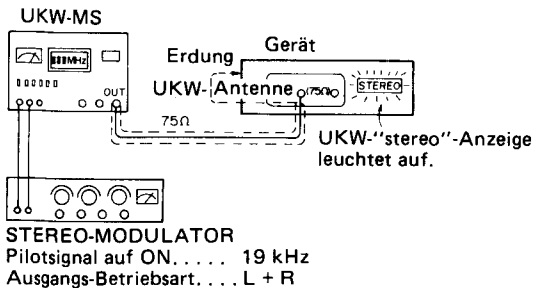
Modulation..... 0
Modulationsfrequenz... 0
Ausgangspegel..... 66 dB



*** VERWENDUNG EINES ALTERNATIVSYSTEMS**

1. Stereosignal vom Meßsender eingeben oder eine Stereo-Sendung empfangen.
2. **VR302** justieren, bis die Stereo-Anzeige aufleuchtet. Den Arm von **VR302** mit Lack sichern, wie in der Abbildung gezeigt.

ZUSTAND DES UKW-MESSENDERS
 Modulation..... 10%
 Modulationsfrequenz... Pilot (19 kHz)
 Ausgangspegel..... 66 dB

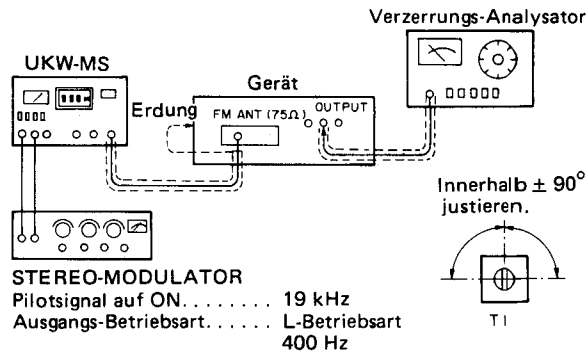


- Ⓑ – Ⓓ..... “Stereo“-EIN-Position (Anzeige leuchtet)
- Ⓒ..... Punkt der Pilotschaltung justieren.

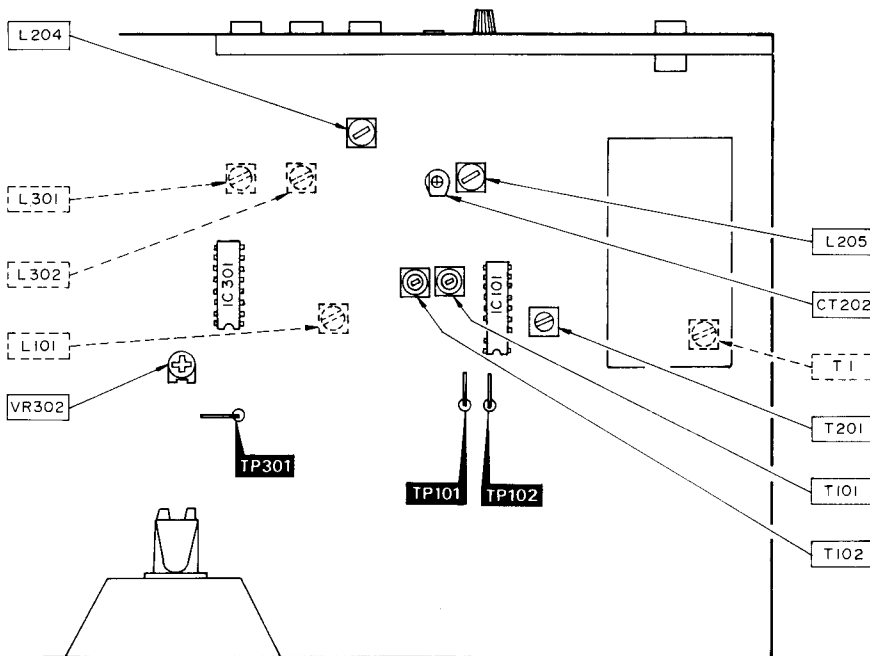
UKW ZFT JUSTIERUNG (NUR FÜR [EGB]-GEBIET)

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Den UKW-Betriebsart-Wahlschalter in die “**FM auto**” Position stellen.
3. Die Radiofrequenz-Anzeige und der Meßsender auf **100,10 MHz** einstellen.
4. **T1** so justieren, daß der Verzerrungsfaktor des linken Kanals minimal wird.
5. Überprüfen, daß die Verzerrungsfaktoren des linken und rechten Kanals fast gleich sind und weniger als **1,5%** betragen.

ZUSTAND DES UKW-MESSENDERS
 Modulation..... 90% (Pilotsignal 10%)
 Modulationsfrequenz... “L” Betriebsart 400 Hz (Pilot 19 kHz)
 Ausgangspegel..... 66 dB



• Zu justierende Punkte



FRANÇAIS

■ CARACTERISTIQUES

(Sujet à changement sans préavis)

(DIN 45 500)

■ SECTION SYNTONISATEUR FM

Gamme de fréquence	87,50~108,00 MHz
Sensibilité	0,95 μ V (IHF utilisable)
S/B 30 dB	1,0 μ V (75 Ω)
S/B 26 dB	0,9 μ V (75 Ω)
S/B 20 dB	0,8 μ V (75 Ω)
Sensibilité stéréo au seuil de 46 dB, IHF	22 μ V(75 Ω)
Distorsion harmonique totale	
MONO	0,15%
STEREO	0,3%
Signal/Bruit	
MONO	70 dB (78 dB, IHF)
STEREO	65 dB (70 dB, IHF)
Réponse de fréquence	20 Hz~15 kHz, +0,5 dB~ -1,5 dB
Sélectivité alternée par canal (\pm 400 kHz)	65 dB
Taux de capture	1,0 dB
Rejection d'image à 98 MHz	55 dB
Rejection FI à 98 MHz	90 dB
Rejection de réponse parasite à 98 MHz	80 dB
Suppression AM	55 dB
Séparation stéréophonique	
1 kHz	40 dB
10 kHz	30 dB
Fuite de porteuse	
19 kHz	-30 dB (-35 dB, IHF)
38 kHz	-45 dB (-50 dB, IHF)

Equilibrage de canaux (250 Hz~6,300 Hz)	\pm 1,0 dB
Point de limite	1,2 μ V
Largeur de bande	
Amplificateur FI	180 kHz
Démodulateur FM	1000 kHz
Bornes d'antenne	75 Ω (asymétrique)

■ SECTION SYNTONISATEUR AM

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

■ DIVERS

Tension de sortie	0,3 V (0,6 V, IHF)
Consommation	9W
Alimentation	
Pour l'Europe	CA 50 Hz/60 Hz, 220V
Autres	CA 50 Hz/60 Hz, 110V/127V/220V/240V
Dimensions (L×H×Pr)	430 × 53 × 200 mm
Poids	1,8 kg

■ MESURAGES ET REGLAGES

A.M./M.F.

Positionnements des commandes et équipement utilisé

- Générateur de signaux M.F. et A.M. (AM et FM-SG).
- Modulateur stéréophonique
- Analyseur de distorsion
- Oscilloscope
- Voltmètre électronique à C.A. et C.C. (EVM).
- Compteur de fréquence
- Bobine d'amortissement d'arrêt (100 μ H)
- Résistance (100k Ω)
- Condensateur céramique (200pF)

Nota: Pour **T201** (MA-Transf. de fréq. interm.), **L204** (bobine oscil. de MA), **L101** (Pour seulement les zones [EGB] : filtre passe-bas) et **L301, L302** (Pour seulement les zones [EGB] : filtre passe-bas de 19 kHz/38 kHz), des éléments réglés sont fournis. Aussi, ne pas tourner les noyaux de ces pièces.

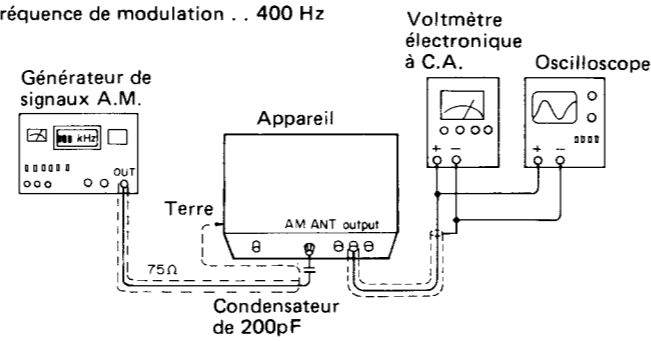
REGLAGE DE A.M.-H.F.

1. Le raccordement de l'équipement d'essai est montré sur l'illustration.
2. Régler l'appareil sur la position "AM".
3. Ajuster le réglage de l'affichage de radiofréquence et du générateur de signaux sur **612 kHz**.
4. Régler **L205** pour une sortie maximale.
5. Ajuster le réglage de l'affichage de radiofréquence et du générateur de signaux sur **1503 kHz**.
6. Régler **CT202** pour une sortie maximale.
7. Répéter les étapes 3 ~ 6.

Nota: Le niveau d'entrée d'antenne doit être aussi bas que possible étant libéré de la commande automatique de gain.

CONDITION DU GENERATEUR DE SIGNAUX A.M.

Modulation 30%
Fréquence de modulation ... 400 Hz



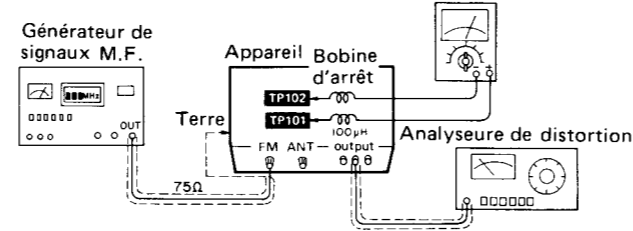
REGLAGE DE DISTORSION MONOPHONIQUE M.F.

1. Le raccordement de l'équipement d'essai est montré sur l'illustration.
2. Régler l'appareil sur la position "FM" (M.F.).
3. Ajuster le réglage de l'affichage de radiofréquence et du générateur de signaux sur **100,10 MHz**.
4. Régler le noyau de **T101** de telle sorte que la tension mesurée sur le mode de signaux soit de **0 mV (0 ± 50 mV)** dans une plage de 1V.
5. Ajuster **T102** de telle sorte que le facteur de distorsion du canal de gauche soit minimisé.
6. Répéter les étapes 4 et 5 quelques fois.
7. S'assurer que les facteurs de distorsion du canal de gauche et du canal de droite soient sensiblement les mêmes l'un par rapport à l'autre et soient inférieurs à **0,7%**.

Nota: Le tournevis de réglage utilisé devra être fait en résines.

CONDITION DU GENERATEUR DE SIGNAUX M.F.

Modulation 100%
Fréquence de modulation ... 400 Hz
Niveau de sortie 66 dB

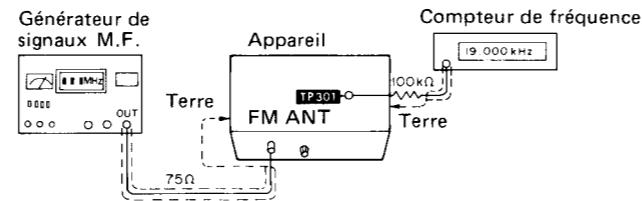


REGLAGE STEREO M.F. (NON-ASSERVIE)

1. Le raccordement de l'équipement d'essai est montré sur la figure.
2. Régler l'appareil sur la position "FM auto". (Avec le bouton-sélecteur de mode FM.)
3. Disposer le réglage du générateur de signaux et l'affichage de radiofréquence sur **100,10 MHz**.
4. Ajuster **VR302** pour **19 kHz ± 50 Hz** sur le compteur de lecture de fréquences.

CONDITION DU GENERATEUR DE SIGNAUX M.F.

Modulation 0
Fréquence de modulation ... 0
Niveau de sortie 66 dB

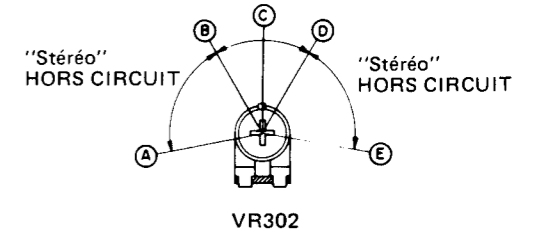
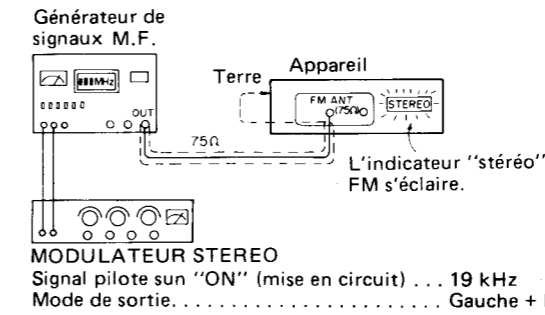


*** EN UTILISANT UN SYSTEME ALTERNATIF**

1. Appliquer un signal stéréo à partir du générateur ou recevoir une émission stéréo.
2. Ajuster **VR302** jusqu'à ce que l'indicateur stéréo s'éclaire. Coller le bras de **VR302** comme il est montré sur la figure.

CONDITION DU GENERATEUR DE SIGNAUX M.F.

Modulation 10%
Fréquence de modulation ... Pilote (19 kHz)
Niveau de sortie 66 dB



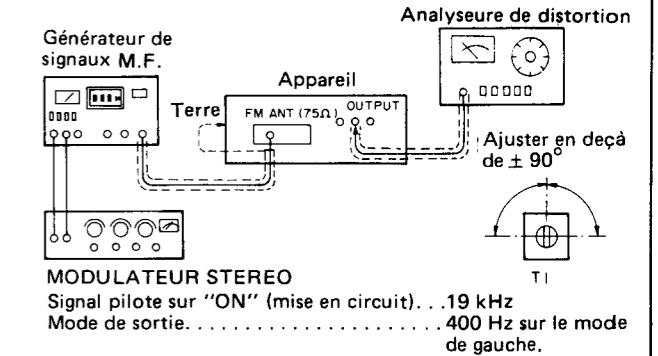
B - D Position de MISE EN CIRCUIT "Stéréo". (Eclairage de l'indicateur)
C Point de réglage du circuit pilote.

REGLAGE DE M.F. TRANSF. DE FI (POUR SEVLEMENT LES ZONES [EGB])

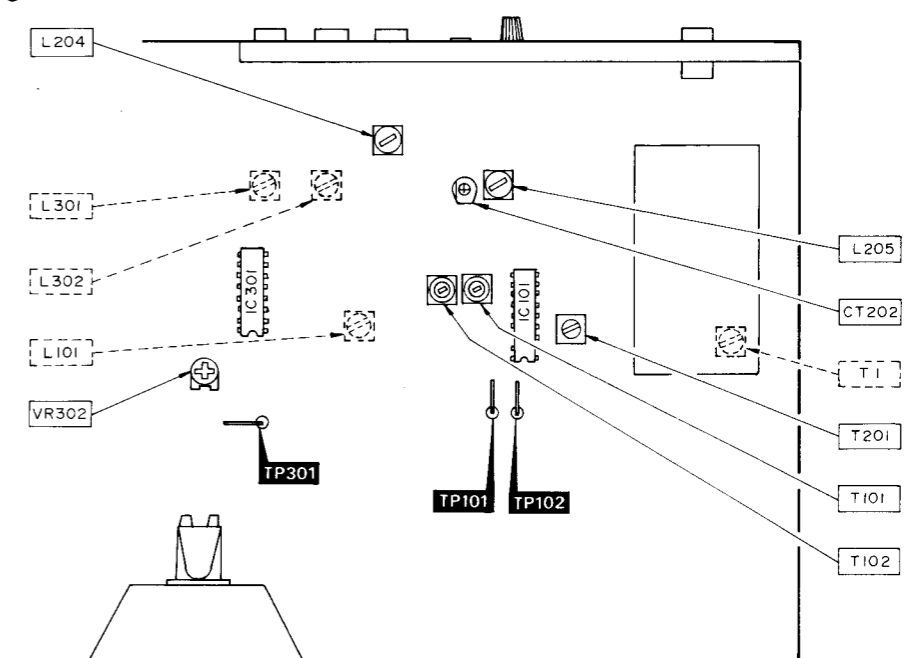
1. Le raccordement de l'équipement d'essai est montré sur la figure.
2. Régler l'appareil sur la position "FM auto". (Avec le bouton-sélecteur de mode FM.)
3. Disposer le réglage du générateur de signaux et l'affichage de radiofréquence sur **100,10 MHz**.
4. Ajuster **T1** de telle sorte que le facteur de distorsion du canal de gauche soit minimisé.
5. S'assurer que les facteurs de distorsion du canal de gauche et du canal de droite soient sensiblement les mêmes l'un par rapport à l'autre et soient inférieurs à **1,5%**.

CONDITION DU GENERATEUR DE SIGNAUX M.F.

Modulation 90% (Signal de commande à 10%)
Fréquence de modulation ... "L" mode 400 Hz (Pilot 19 kHz)
Niveau de sortie 66 dB



• Points de réglage



ESPAÑOL

■ ESPECIFICACIONES

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

(DIN 45 500)			
■ SECCION PARA SINTONIZADOR FM			
Gama de frecuencias	87,50~108,00 MHz	Equilibrio de canales 250 Hz~6 300 Hz	±1,0 dB
Sensibilidad	0,95 μ V (IHF, utilizable)	Punto de límite	1,2 μ V
Señal a ruido 30 dB	1,0 μ V (75 Ω)	Ancho de banda	
Señal a ruido 26 dB	0,9 μ V (75 Ω)	Amplificador FI	180 kHz
Señal a ruido 20 dB	0,8 μ V (75 Ω)	Demodulador FM	1000 kHz
Sensibilidad de acallamiento estíreo de 46 dB IHF	22 μ V(75 Ω)	Bornes de antena	75 Ω (no equilibrado)
■ SECCION PARA SINTONIZADOR AM			
Distorsión armónica total		Gama de frecuencias	522 kHz~1611 kHz (pasos de 9 kHz)
MONO. (MONO)	0,15%	530 kHz~1620 kHz (pasos de 10 kHz)	
ESTEREO (STEREO)	0,3%	Sensibilidad (Relación de señal a ruido de 20 dB)	20 μ V, 300 μ V/m
Relación de señal a ruido		Selectividad (\pm9 kHz)	55 dB
MONO. (MONO)	70 dB (78 dB, IHF)	Rechazo de imagen a 999 kHz	40 dB
ESTEREO (STEREO)	65 dB (70 dB, IHF)	Rechazo de F.I. a 999 kHz	60 dB
Respuesta de frecuencia	20 Hz~15 kHz, +0,5 dB~-1,5 dB	■ GENERAL	
Selectividad alternada de canal (\pm400 kHz)	65 dB	Voltaje de salida	0,3V (0,6V, IHF)
Relación de captura	1,0 dB	Consumo de energía	9W
Rechazo de imagen a 98 MHz	55 dB	Alimentación de energía	
Rechazo de F.I. a 98 MHz	90 dB	Para Europa continental	CA 50 Hz/60 Hz, 220V
Rechazo de respuesta espuria a 98 MHz	80 dB	Para otros países	CA 50 Hz/60 Hz, 110V/127V/220V/240V
Supresión AM	55 dB	Dimensiones (An.\timesAl.\timesProf.)	430 \times 53 \times 200 mm
Separación estereofónica		Peso	1,8 kg
1 kHz	40 dB		
10 kHz	30 dB		
Fuga de onda portadora			
19 kHz	-30 dB (-35 dB, IHF)		
38 kHz	-45 dB (-50 dB, IHF)		

■ MEDICIONES Y AJUSTES

AM/FM

Posiciones de control y equipo usado

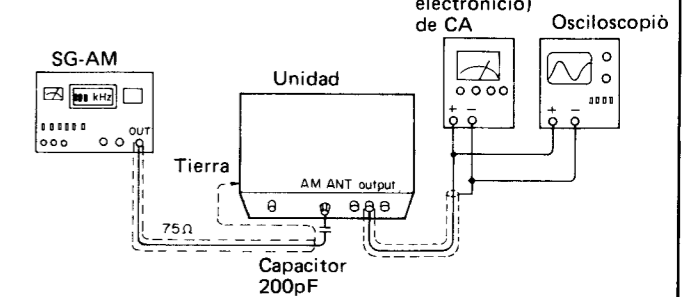
- | | |
|--|---|
| <ul style="list-style-type: none"> ● Generador de señales de AM y FM (AM & FM-SG) ● Modulador estéreo ● Analizador de distorsiones ● Osciloscopio ● Voltímetro electrónico de CA y CC (EVM) | <ul style="list-style-type: none"> ● Frecuencímetro ● Bobina de choque (100μH) ● Resistor (100kΩ) ● Capacitor cerámico (200pF) |
|--|---|

Nota: Para **T201** (AM-TFI), **L204** (bobina de OSC. AM), **L101** (Sólo para área [EGB] : L.P.F.) y **L301, L302** (sólo para área [EGB] : L.P.F. de 19 kHz/38 kHz) son suministradas piezas ajustadas. Por lo tanto, no gire los núcleos de estas piezas.

AJUSTE DE AM-RF

1. La conexión del equipo de prueba se muestra en la figura.
 2. Ajustar la unidad a la posición "AM".
 3. Colocar la puesta del indicador de radiofrecuencia y generador de señales a **612 kHz**.
 4. Ajustar **L205** para salida máxima.
 5. Colocar la puesta del indicador de radiofrecuencia y generador de señales a **1503 kHz**.
 6. Ajustar **CT202** para salida máxima.
 7. Repetir los pasos 3 ~ 6.
- Nota:** El nivel de entrada de antena ha de ser lo más bajo posible estando libre de AGC (control automático de ganancia).

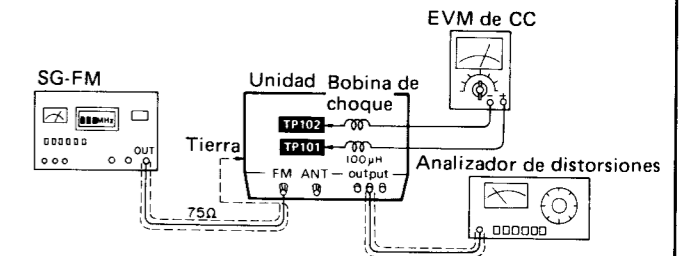
CONDICION DE GENERADOR DE SEÑALES DE AM
 Modulación 30%
 Frecuencia de modulación ... 400 Hz



AJUSTE DE DISTORSION MONO FM

1. La conexión del equipo de prueba se muestra en la figura
 2. Ajustar la unidad a la posición "FM".
 3. Colocar la puesta del indicador de radiofrecuencia y generador de señales a **100,10 MHz**.
 4. Ajustar el núcleo de **T101** de manera que el voltaje medido en modalidad de señal sea **0 mV (0 \pm 50 mV)**.
 5. Ajustar **T102** de manera que el factor de distorsión de CH I se minimice.
 6. Repetir los pasos 4 y 5 algunas veces.
 7. Asegurarse de que los factores de distorsión de CH I y CH D sean casi los mismos uno con el otro y sean menos de **0,7%**.
- Nota:** El destornillador de ajuste usado debe estar hecho de resina.

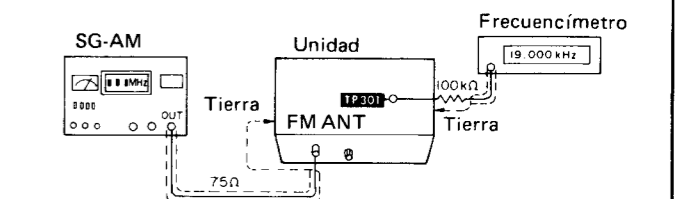
CONDICION DE GENERADOR DE SEÑALES DE FM
 Modulación 100%
 Frecuencia de modulación ... 66 dB



AJUSTE DE ESTERO FM (FUNCTIONAMIENTO LIBRE)

1. La conexión del equipo de prueba se muestra en la figura.
2. Poner la unidad en la posición de "FM auto". (Mediante el botón selector de modalidad FM).
3. Colocar el indicador de radiofrecuencia y la puesta de generador de señales en **100,10 MHz**.
4. Ajustar **VR302** para **19 kHz \pm 50 Hz** en lectura de contador de frecuencia.

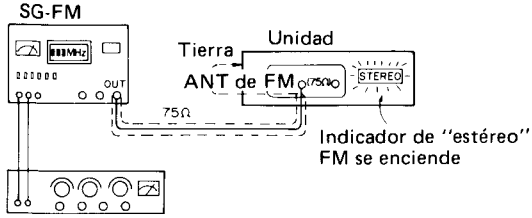
CONDICION DE GENERADOR DE SEÑALES DE AM
 Modulación Modalidad de "I" o modalidad de "D" 90%, Piloto 10%
 Frecuencia de modulación ... 1 kHz, Piloto (19 kHz)
 66 dB



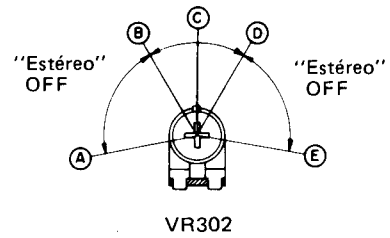
*** USANDO SISTEMA ALTERNATIVO**

1. Aplicar señal estereofónica del generador o recibir la emisión estereofónica.
2. Ajustar **VR302** hasta que el indicador de estéreo se encienda. Cementar brazo de **VR302** como se muestra en la figura.

CONDICION DE GENERADOR DE SEÑALES DE FM
 Modulación..... 10%
 Frecuencia de modulación... Pilot (19 kHz)
 66 dB



MODULADOR ESTÉREO
 Señal piloto a ON..... 19 kHz
 Modalidad de salida..... Izquierdo + Derecho

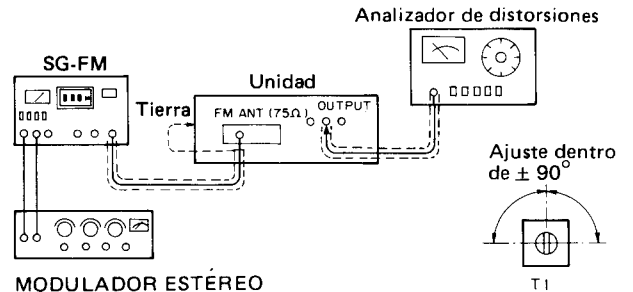


- B - D Póición de "estéreo" ON (indicador encendido)
- C Punto de ajuste de circuito piloto

AJUSTE DE FM-TFI (SÓLO PARA ÁREA [EGB])

1. La conexión del equipo de prueba se muestra en la figura.
2. Poner la unidad en la posición de "FM auto". (Mediante el botón selector de modalidad FM).
3. Colocar el indicador de radiofrecuencia y la puesta de generador de señales en **100,10 MHz**.
4. Ajustar **T1** de manera que el factor de distorsión de CH I se minimice.
5. Asegurarse de que los factores de distorsión de CH I y CH D sean casi los mismos uno con el otro y sean menos de **1,5%**.

CONDICION DE GENERADOR DE SEÑALES DE AM
 Modulación..... 90% (Piloto 10%)
 Frecuencia de modulación... Modalidad de "L" 400 Hz
 (Piloto 19 kHz)
 66 dB



MODULADOR ESTÉREO
 Señal piloto a ON..... 19 kHz
 Modalidad de salida..... Modalidad L 400 Hz

● Puntos de ajuste

