

Service Manual

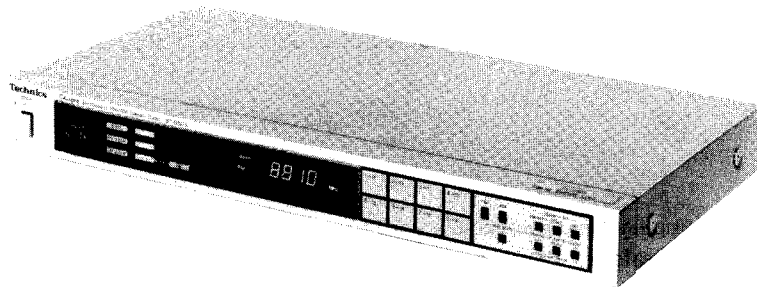
QUARTZ Synthesizer FM/AM Stereo Tuner

ST-S505

[EGA]

ST-S505(K)

[EGA]



* [EGA] is available in F.R. Germany.

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

TECHNISCHE DATEN

Spezifikationen Können infolge von Verbesserungen ohne Ankündigung geändert werden.

(DIN 45 500)

■ UKW-TUNERTEIL

Wellenbereich	87,50 ~ 108,00 MHz
	87,525 ~ 108,00 MHz (+25 kHz shift)
Eingangsempfindlichkeit	
S/R 30 dB	1,3 μ V (75 Ω)
S/R 26 dB	1,2 μ V (75 Ω)
S/R 20 dB	0,9 μ V (75 Ω)
Nutzempfindlichkeit nach IHF	1,5 μ V (nach IHF '58)
Stereumschaltsschwelle bei 46 dB nach IHF	28 μ V/75 Ω
Gesamtklirrfaktor	
Mono	0,04%
Stereo	0,05%
Geräuschabstand	
Mono	70 dB (78 dB nach IHF)
Stereo	65 dB (70 dB nach IHF)
Frequenzgang	5 Hz ~ 18 kHz (+0,2 dB ~ -0,5 dB)
Trennschärfe bei Störsender	
normal \pm 400 kHz	55 dB
super narrow \pm 200 kHz	25 dB
Einfangverhältnis	1,0 dB
Spiegelfrequenz-Dämpfung bei 98 MHz	75 dB
ZF-Dämpfung bei 98 MHz	100 dB
Ansprechdämpfung auf Nebenfrequenzen bei 98 MHz	100 dB
MW-Unterdrückung	55 dB
Übersprechdämpfung	
1 kHz	60 dB
Trägerrest	
19 kHz	-65 dB (-70 dB nach IHF)
38 kHz	-48 dB (-50 dB nach IHF)

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

■ MW-TUNERTEIL

Wellenbereiche	522 kHz~1611 kHz (9 kHz)
	530 kHz~1620 kHz (10 kHz)
Eingangsempfindlichkeit (S/R 20 dB)	20 μ V, 290 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	1,0 V
Leistungsaufnahme	9W
Netzspannung	Wechselstrom 50 Hz/60 Hz, 220V
Abmessungen (B×H×T)	430 × 53 × 245 mm
Gewicht	2,4 kg

Bemerkung:

Der Gesamtklirrfaktor wurde mit einem digitalen Rauschspektrometer (Anlage H.P. 3045) gemessen.

Technics

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

CONTENTS

	Page		Page
SAFETY PRECAUTION	2	CIRCUIT BOARD AND	
FEATURES	2 ~ 3	WIRING CONNECTION DIAGRAM	11 ~ 12
LOCATION OF CONTROLS	3 ~ 4	BLOCK DIAGRAM	13 ~ 14
HOW TO OPERATE	4 ~ 6	TERMINAL OPERATION OF	
DISASSEMBLY INSTRUCTIONS	7 ~ 8	PLL CONTROLLER (IC901)	15 ~ 18
MEASUREMENTS AND ADJUSTMENTS	8 ~ 10	SCHEMATIC DIAGRAM	19 ~ 22
ADJUSTMENT POINTS	10	REPLACEMENT PARTS LIST	23 ~ 24
		EXPLODED VIEWS	25 ~ 26

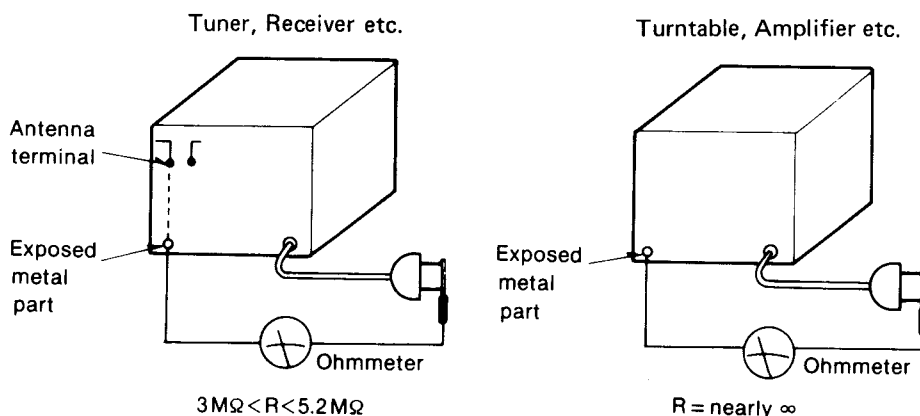
SAFETY PRECAUTION

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

Insulation resistance test (See figure below.)

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

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



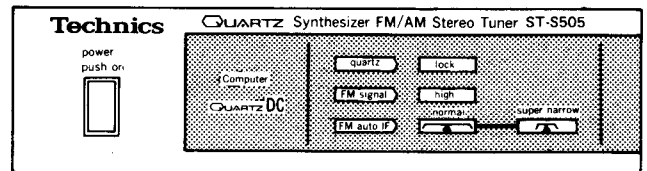
where, R: resistance value

FEATURES

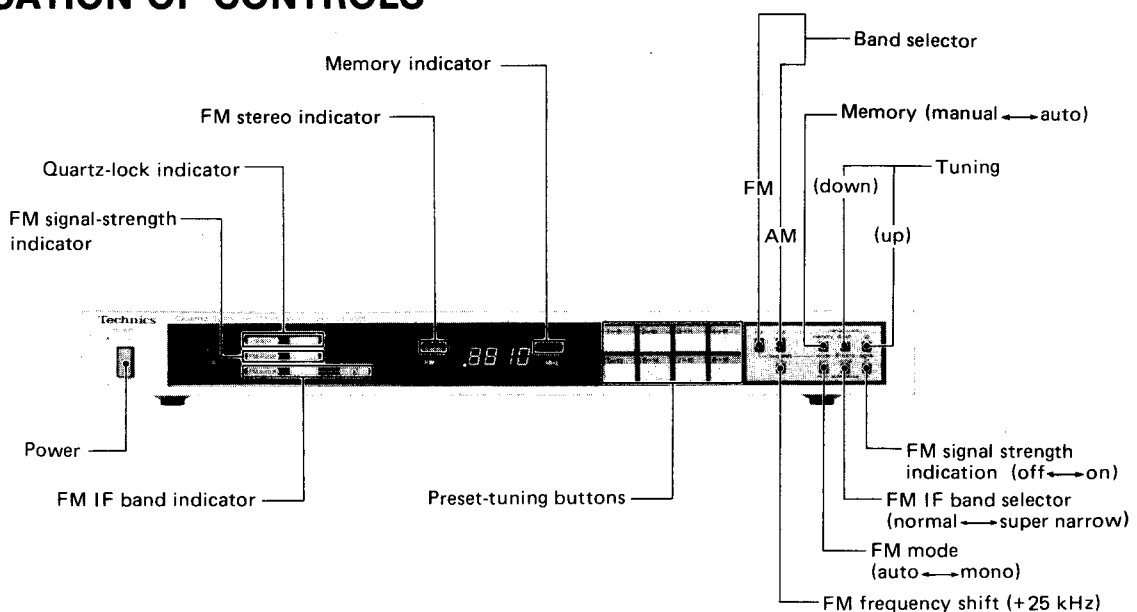
- Computer quartz DC (auto pilot canceller, jitter distortion eliminator, sub-carrier eliminator) tuner featuring wave-form transmission.
- Automatic IF selector circuit built in.
- Auto scan/auto memory/FM/AM 8-station preset tuning.
- FM signal input strength is indicated every 2 dB.
- "High" monitor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

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

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

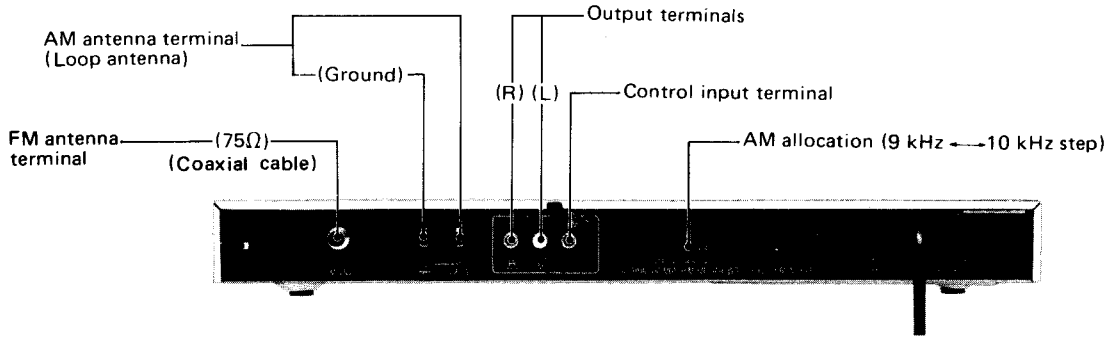


■ LOCATION OF CONTROLS



* The FM signal indicator (high) lights up when the signal level is about 40 dB.

ST-S505



■ HOW TO OPERATE

• Listening to radio broadcasts

Important!

AM loop antenna

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

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

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

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

• Auto tuning



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

• Manual tuning



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

2 Power: "on" ()

3-2 Station selection by using preset tuning buttons:

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

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



• To select the back channels (CH 9~16):

Press slightly longer. Release the button when the channel number is displayed. Frequency stored in the memory is displayed.



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

4 Station selection:

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

• Automatic memory presetting

Beginning at the frequency indicated by the digital display, the FM broadcasting stations and AM broadcasting stations will be automatically preset to "channels" 1 through 8 for FM and 9 through 16 for AM, respectively. Note that in mountainous or remote areas, broadcasting stations which have weak broadcasting signals cannot be automatically preset into the memory.

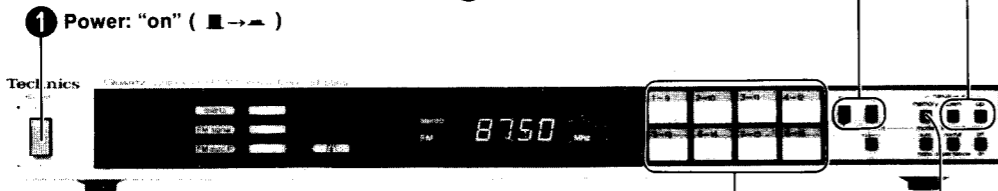
- ③ • **To preset FM broadcasting stations: Set to 87.50 MHz.**
 • **To preset AM broadcasting stations: Set to 522 kHz (or 530 kHz).**

Tuning

- ① Press the button and hold slightly (frequency will change continuously).
 ② Release it at 87.50 MHz for FM or 522 kHz (or 530 kHz) for AM, and then press the button again momentarily (frequency change will stop).
 ③ Press the button momentarily (frequency will change each time the button is pressed), and tune to one of the above frequencies.



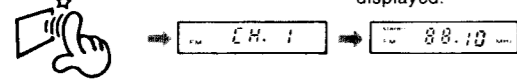
- ② Press the "FM" or "AM" button.



- ⑤ Confirm the names (call signs, etc.) of the broadcasting stations which are preset to each channel, and enter them on the file sheet.

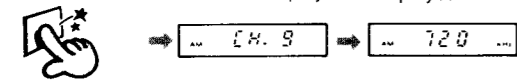
To check the front channels (CH1~8):

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



To check the back channels (CH 9~16):

Press slightly longer. Release the button when the channel number is displayed. Frequency stored in the memory is displayed.



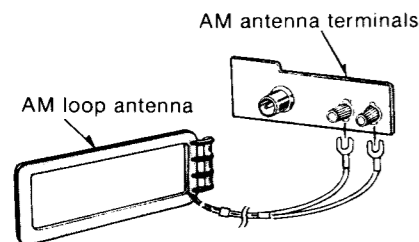
- ④ Press. When the frequency indication begins to change, release.

(The frequency will change upward, and the automatic presetting will begin with the broadcasting station of the lowest frequency and will continue in order.)

• How to use the AM loop antenna

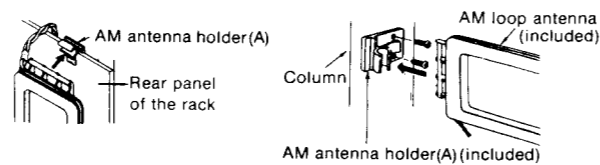
This unit includes a highly sensitive loop antenna for AM broadcast reception. If this antenna is not installed, AM broadcast will not be received. No outdoor antenna is necessary unless this unit is used in an area where signals are especially weak. (Connect the AM loop antenna even when an outdoor antenna is used.)

1. Connect the AM loop antenna to the AM antenna terminals located on the rear panel of the unit.



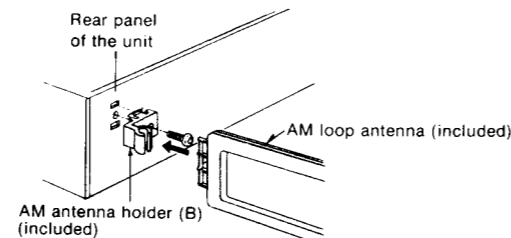
2. Find the height and direction of the antenna where reception is best and then fix it vertically to the wall, rack, etc.

- 1) When attaching the antenna to a wall, column or rack.



- 2) When attaching the antenna to the unit.

This type of installation may cause impaired reception or result in signal noise. If possible, attach the antenna to the rack, a wall, or a column.



5

• Manual memory presetting

Stations can be freely preset to any desired channel.

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

• Auto tuning

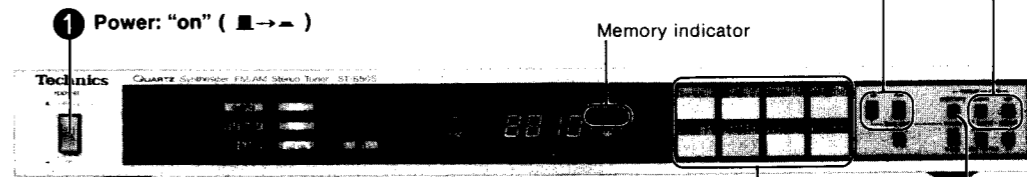
Press the button. When the frequency indication begins to change, release the button (a broadcasting station will be selected automatically). Repeat this operation until the desired station is found.

• Manual tuning

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



- ② • Press the "FM" or "AM" button.



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

- To preset channels 1 through 8:

Press the button momentarily, and then release.

- To preset channels 9 through 16:

Press the button slightly longer, and then release.

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

Note:

- If the memory indication illumination stops before you press the button, once again repeat step (4) and then step (5).
- If a new broadcasting station is preset into a channel, the broadcasting station which was previously entered in that channel will be automatically erased.

- ④ Press momentarily, and then release. (The memory indicator will illuminate for approximately 4 seconds.)



Note:

If the button is pressed continuously, the frequency will begin to change, and the memory will be preset automatically. In order to stop the automatic selection, press either the "up" button or the "down" button.

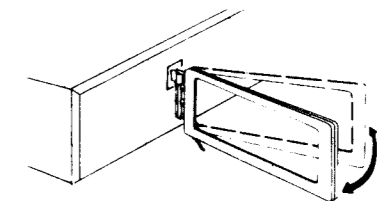
- ⑥ Enter the name (call sign, etc.) of the preset broadcasting station on the file sheet (page 14).

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

Pay attention to the following points when attaching the antenna.

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

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



6

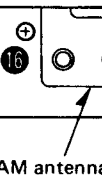
■ DISA

• How to r

- Remove the cabinet.
- Move the Fig. 1.
- Remove the Fig. 2) of in Fig. 2 a rear panel.
- Pressing the panel in the front panel arrow (C) (Raise the

• How to r

- Remove the (Refer to
- Remove the bracket of it in the di
- The claws panel are e Disengage remove the



FM/AM antenna

• Manual memory presetting

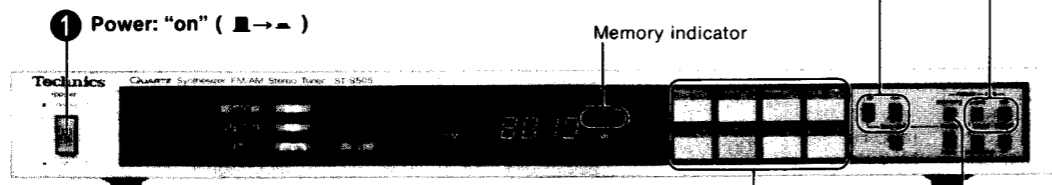
Stations can be freely preset to any desired channel.

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

- **Auto tuning**
Press the button. When the frequency indication begins to change, release the button (a broadcasting station will be selected automatically). Repeat this operation until the desired station is found.
- **Manual tuning**
Press the button momentarily (the frequency will change each time the button is pressed) and tune to the desired station.



② • Press the "FM" or "AM" button.



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

• To preset channels 1 through 8:

Press the button momentarily, and then release.

• To preset channels 9 through 16:

Press the button slightly longer, and then release.

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

Note:

1. If the memory indication illumination stops before you press the button, once again repeat step (4) and then step (5).
2. If a new broadcasting station is preset into a channel, the broadcasting station which was previously entered in that channel will be automatically erased.

④ Press momentarily, and then release.
(The memory indicator will illuminate for approximately 4 seconds.)



Note:

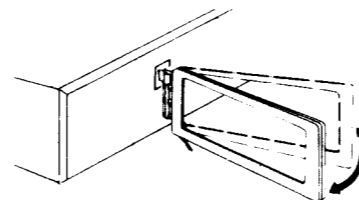
If the button is pressed continuously, the frequency will begin to change, and the memory will be preset automatically. In order to stop the automatic selection, press either the "up" button or the "down" button.

⑥ Enter the name (call sign, etc.) of the preset broadcasting station on the file sheet (page 14).

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

Pay attention to the following points when attaching the antenna.

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



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

■ DISASSEMBLY INSTRUCTIONS

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

• How to remove the printed circuit board

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

(Raise the printed circuit board when repairing.)

• How to remove the front sub-panel

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

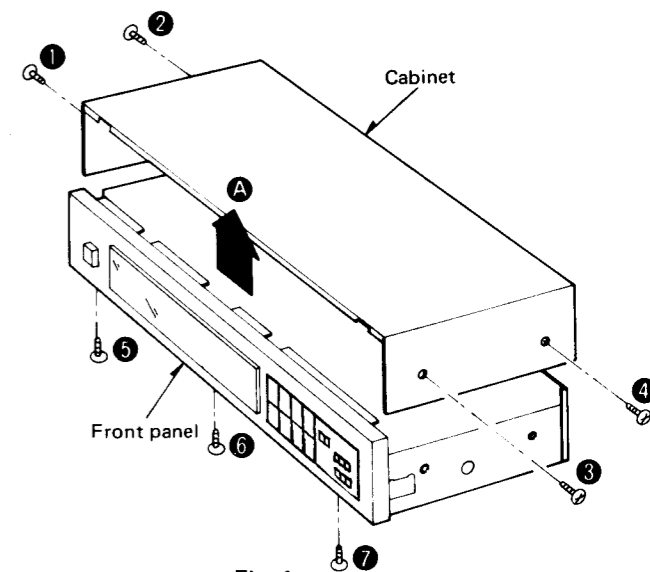


Fig. 1

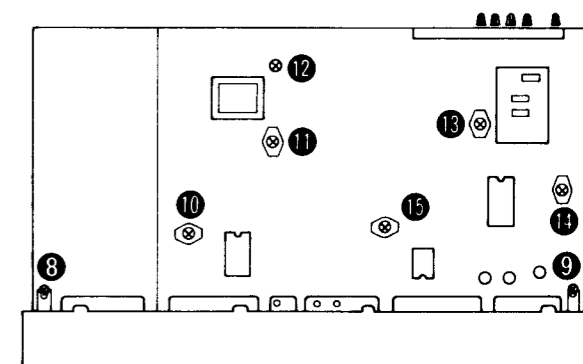


Fig. 2

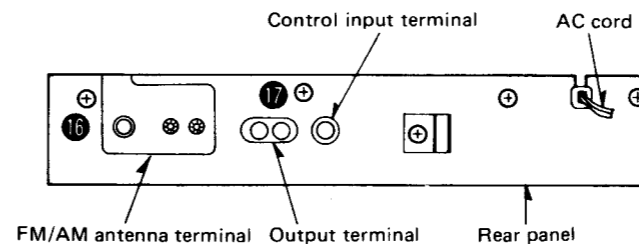


Fig. 3

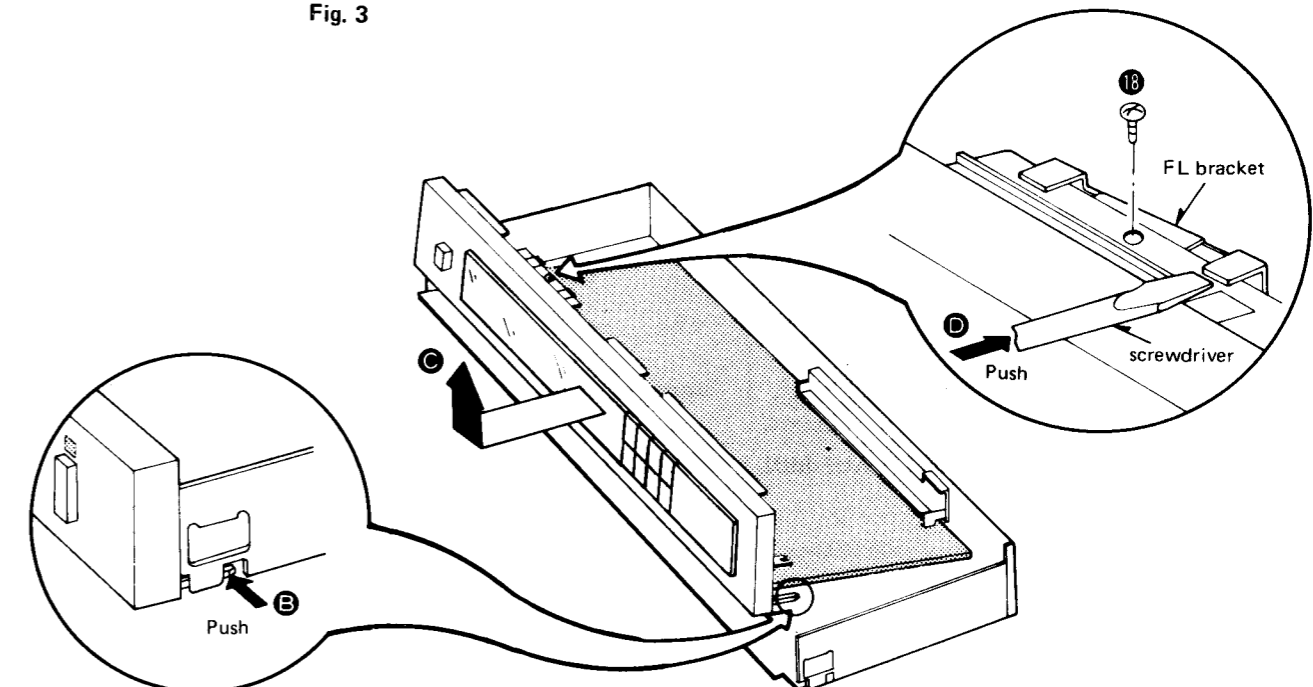


Fig. 4

na where reception is best and

olumn or rack.

AM loop antenna (included)

holder(A) (included)

paired reception or result in signal the rack, a wall, or a column.

AM loop antenna (included)

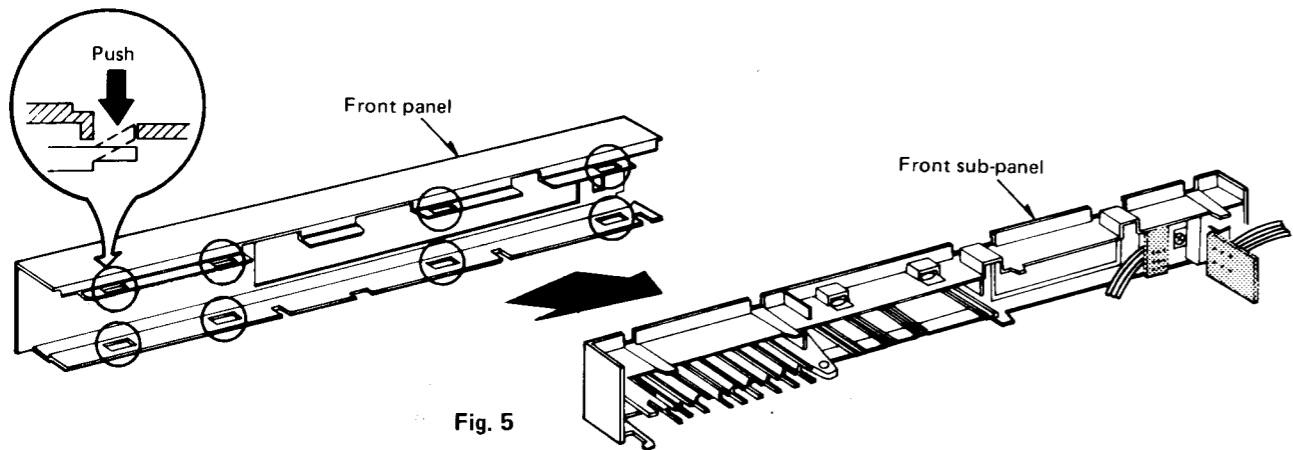


Fig. 5

MESSUNGEN UND JUSTIERUNGEN

Anmerkung: AM-OSC-Spule (L203) und Filter (L303) sind bereits justiert und benötigen daher keine Justierung.

AM (MW)-EINSTELLUNG

- * Stellungen und zu benutzende Geräte**
1. Elektronische Voltmeter für Wechsel- und Gleichstrom (VTVM).
 2. AM (MW)-Meßsender (AM-SG).
 3. Bereichsschalter AM
 4. AM (MW) Wellenverteilungs-Wahlschalter auf position "9 kHz" stellen.
 5. Netzspannung auf ihren Sollwert halten.
 6. Der Ausgang des Meßsenders darf nicht höher sein als unbedingt notwendig für eine gute ablesung.
 7. Einen nichtmetallischen Schraubenzieher für die Einstellungen verwenden.

AM (MW)-MESSENDER		ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICH-SPUNKTE	ABGLEICH-SVERFAHREN
ANSCHLUSS	FREQUENZ				

AM (MW)-ZF-ABGLEICH

Nr.	ANSCHLUSS	FREQUENZ	VORBEREITUNG	ABGLEICH-SPUNKTE	ABGLEICH-SVERFAHREN
1	AM-MO über 200 pF Kondensator an den AM-Antennenanschluß anschließen, wie in Abb. 6 gezeigt. (Starker Eingang.)	450 kHz (400 Hz Modulat., 30%)	Kein Empfang	Wechselstrom voltmeter oder Oszillograph über den Ausgang "OUTPUT" schließen.	Die Eingangsfrequenz und die Einstellungspunkte so adustieren, daß der Ausgang den maximalen Wert erreicht.

AM (MW)-HF-ABGLEICH

Nr.	ANSCHLUSS	FREQUENZ	VORBEREITUNG	ABGLEICH-SPUNKTE	ABGLEICH-SVERFAHREN
2	AM-MO über 200 pF Kondensator an den AM-Antennenanschluß anschließen, wie in Abb. 6 gezeigt. (Starker Eingang.)	612 kHz (400 Hz Modulat., 30%)		L202 (Ant. Spule)	1. Auf max. Ausgang abgleichen. 2. Den Ferritkern von L202 mit einem Schraubendreher justieren.
3		1503 kHz (400 Hz Modulat., 30%)		CT201 (Ant. Trimmer)	1. Auf max. Ausgang abgleichen. 2. Die Schritte (2) und (3) wiederholen, bis die Frequenz genau mit der Skalanzeige übereinstimmt.

FM (UKW)-EINSTELLUNG

- * Stellungen und zu benutzenden Geräte**
1. UKW-Meßsender (FM-SG)
 2. Klirrfaktor-Meßbrücke.
 3. Elektronische Voltmeter für Wechsel- und Gleichstrom (VTVM).
 4. Signalfrequenzmesser (meßbar für 19 kHz und 108 MHz).
 5. Bereichsschalter FM
 6. Den UKW-Betriebsartenschalter auf die "mono"-position stellen.
 7. Die anderen Einstellungen sind gleich wie beider MW-Justierung.
- * Vorbereitung des UKW-Meßoszillators (UKW-MO)**
Die Normal-Eingangsleistung dieses Gerätes beträgt 60 dB (1 mV), 400 Hz, 100% Modulation. (Wegen der Dämpfung bei Verwendung von Koaxialkabeln, muß die MO-Ausgangsleistung 6 dB oder mehr betragen: d.h. wenn die Eingangsleistung 60 dB beträgt, muß der MO-Ausgang 66 dB betragen.)

FM (UKW)-MESSENDER		ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICH-SPUNKTE	ABGLEICH-SVERFAHREN
ANSCHLUSS	FREQUENZ				

ABGLEICH AUF MIN. VERZERRUNG IN STELLUNG UKW-MONO

Nr.	ANSCHLUSS	FREQUENZ	VORBEREITUNG	ABGLEICH-SPUNKTE	ABGLEICH-SVERFAHREN
4	Verbinden UKW-MO zu FM Antennende, wie in Abb. 7 gezeigt. (60 dB in den Antenneneingang leiten.)	100.10 MHz (400 Hz Modulat., 100%)		T101 (Diskriminator FT)	Den Kern von T101 so justieren, daß die gemessene Spannung im signallosen Modus 0 mV im 300 mV Bereich beträgt.
5		100.10 MHz (400 Hz Modulat., 100%)		T102 (Diskriminator FT)	T102 Kern für minimale Verzerrung der rechten und linken Kanäle justieren.

UKW-STEREO-DEKODER-ABGLEICH					
UNTER VERWENDUNG EINES ZÄHLERS			ALTERNATIV-MEß METHODE		
1. Unmoduliers Mono-Signal 100 MHz in das Gerät speisen. (Vgl. Abb. 8) 2. FM muting/mode-Schalter auf "on/FM auto" stellen. 3. Zähler über einen Widerstand 100k ohm an TP301 schließen. 4. VR301 auf 19 kHz ± 30 Hz einstellen.			1. Stereosignal entweder von einem Stereogenerator, oder einem Sender einspeisen. 2. VR301 so einstellen, bis die Stereoламpe auf leuchtet. Schleifer von VR301 sichern, wie in Abb. 9 gezeigt.		
FM (UKW)-MESSENDER		ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICH-SPUNKTE	ABGLEICH-SVERFAHREN
ANSCHLUSS	FREQUENZ				
PILOTSIGNAL-UNTERDRÜCKUNGS-JUSTIERUNG (19 kHz)					
7	FM-SG an FM-Antennenanschluß gemäß Abb. 10 anschließen. (60 dB an Antennenanschluß anlegen.)	100.10 MHz (400 Hz Modulat., 100%)	100.10 MHz	Wechselstrom-Röhren-voltmeter oder Oszilloskop zwischen TP302 und Masse anschließen.	L301 (Pilotsignal-Unterdrückung 19 kHz) VR302 (Pilotsignal-Unterdrückung 19 kHz) Auf minimale Ausgangsleistung abgleichen.
AUSGANGSLECKTRÄGER-JUSTIERUNG					
8	FM-SG an FM-Antennenanschluß gemäß Abb. 11 anschließen. (60 dB an Antennenanschluß anlegen.)	100.10 MHz (400 Hz Modulat., 100%)	100.10 MHz	Oszilloskop an die "OUTPUT"-Anschlüsse anschließen. Anmerkung: Der Leckträger wird stark durch die Ablenkung der empfangenen Frequenz beeinflusst. Es ist daher wichtig, daß die Frequenz des FM-signal-frequenzgenerators (FM-SG) korrekt eingestellt wird.	VR303 (Ausgangs-leckträger) VR303 so abgleichen, daß die Wellenform so ist, wie in Abb. 12-1 gezeigt. Anmerkung: Abb. 12-2 ist die durch schlechte Justierung von VR303 verursachte Wellenform. Abb. 12-3 ist die durch schlechte Justierung von VR301 oder VR302 verursachte Wellenform.
STEREOVERZERRUNGS-JUSTIERUNG					
9	FM-SG an den FM-Antennenanschluß anschließen. (60 dB an den Antennenanschluß anlegen. (Pilotsignal 10% Mod., Stereosignal))	100.10 MHz (100% Mod. mit 400 Hz) (L- oder R-Betrieb)	100.10 MHz	Verzerrungs-Analysator durch Tiefpassfilter an "OUTPUT"-Anschlüsse des Gerätes anschließen. (fc = 15 kHz - 19 kHz)	T1 (IFT) Den Kern von T1 so abgleichen, daß die Verzerrung des rechten Kanals minimal ist.
TRENNUNGS-JUSTIERUNG					
10	FM-SG an den FM-Antennenanschluß anschließen. (Pilotsignal 10% Mod. Stereosignal)	100.10 MHz (1 kHz Modulat., 100%) (L- oder R-Betrieb)	100.10 MHz	Wechselstrom-Röhren-voltmeter durch Tiefpassfilter an die "OUTPUT"-Anschlüsse des Gerätes anschließen. (fc = 15 kHz - 19 kHz)	VR304 (Trennungs) VR304 so abgleichen, daß die R-Ausgangsleistung minimal wird, wenn der Stereomodulator im L-Betrieb (L-Kanal-Modulation) ist, und daß die L-Ausgangsleistung bei R-Betrieb minimal ist.
SIGNALSTÄRKEPEGEL-JUSTIERUNG					
11	FM-SG an den FM-Antennenanschluß anschließen. (54 dB an den Antennenanschluß anlegen.)	100.10 MHz (400 Hz Modulat., 100%)	100.10 MHz		VR501 (Signalstärkepegel) VR501 so abgleichen, daß 54 dB angezeigt wird. Überprüfen, daß der Signalstärkepegel 22 - 38 dB beträgt, wenn die Eingangsleistung 30 dB beträgt.

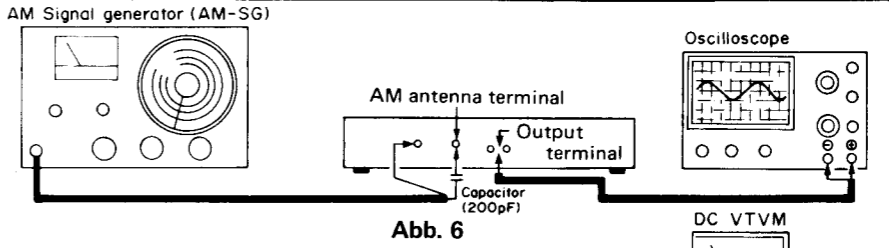
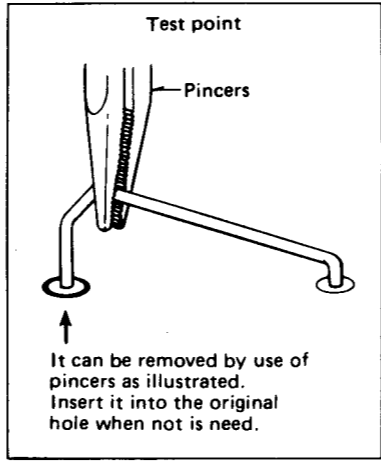


Abb. 6

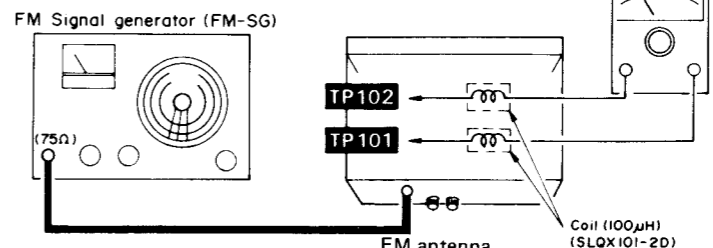
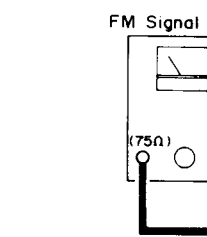
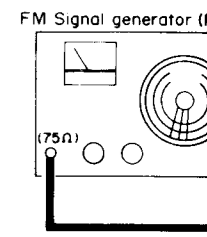


Abb. 7



ADJUST

UKW-STEREO-DEKODER-ABGLEICH					
Nr.	UNTER VERWENDUNG EINES ZÄHLERS		ALTERNATIV-MEß METHODE		
	6	1. Unmoduliertes Mono-Signal 100 MHz in das Gerät speisen. (Vgl. Abb. 8) 2. FM muting/mode-Schalter auf "on/FM auto" stellen. 3. Zähler über einen Widerstand 100k ohm an TP301 schließen. 4. VR301 auf 19 kHz ± 30 Hz einstellen.		1. Stereosignal entweder von einem Stereogenerator, oder einem Sender einspeisen. 2. VR301 so einstellen, bis die Stereolampe auf leuchtet. Schleifer von VR301 sichern, wie in Abb. 9 gezeigt.	
	FM (UKW)-MESSENDER		ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICH-SPUNKTE
	ANSCHLUSS	FREQUENZ			ABGLEICH-SVERFAHREN
PILOTSIGNAL-UNTERDRÜCKUNGS-JUSTIERUNG (19 kHz)					
7	FM-SG an FM-Antennenanschluß gemäß Abb. 10 anschließen. (60 dB an Antennenanschluß anlegen.)	100.10 MHz (400 Hz Modul., 100%)	100.10 MHz	Wechselstrom-Röhren-voltmeter oder Oszilloskop zwischen TP302 und Masse anschließen.	L301 (Pilotsignal-Unterdrückung 19 kHz) VR302 (Pilotsignal-Unterdrückung 19 kHz)
AUSGANGSLECKTRÄGER-JUSTIERUNG					
8	FM-SG an FM-Antennenanschluß gemäß Abb. 11 anschließen. (60 dB an Antennenanschluß anlegen.)	100.10 MHz (400 Hz Modul., 100%)	100.10 MHz	Oszilloskop an die "OUTPUT"-Anschlüsse anschließen. Anmerkung: Der Leckträger wird stark durch die Ablenkung der empfangenen Frequenz beeinflusst. Es ist daher wichtig, daß die Frequenz des FM-signal-frequenzgenerators (FM-SG) korrekt eingestellt wird.	VR303 (Ausgangs-leckträger)
STEREOVERZERRUNGS-JUSTIERUNG					
9	FM-SG an den FM-Antennenanschluß anschließen. (60 dB an den Antennenanschluß anlegen. (Pilotsignal 10% Mod., Stereosignal))	100.10 MHz (100% Mod. mit 400 Hz) (L-oder R-Betrieb)	100.10 MHz	Verzerrungs-Analysator durch Tiefpassfilter an "OUTPUT"-Anschlüsse des Gerätes anschließen. (fc = 15 kHz - 19 kHz)	T1 (IFT)
TRENNUNGS-JUSTIERUNG					
10	FM-SG an den FM-Antennenanschluß anschließen. (Pilotsignal 10% Mod. Stereosignal)	100.10 MHz (1 kHz Modul., 100%) (L-oder R-Betrieb)	100.10 MHz	Wechselstrom-Röhren-voltmeter durch Tiefpassfilter an die "OUTPUT"-Anschlüsse des Gerätes anschließen. (fc = 15 kHz - 19 kHz)	VR304 (Trennungs)
SIGNALSTÄRKEPEGEL-JUSTIERUNG					
11	FM-SG an den FM-Antennenanschluß anschließen. (54 dB an den Antennenanschluß anlegen.)	100.10 MHz (400 Hz Modul., 100%)	100.10 MHz		VR501 (Signalstärkepegel)

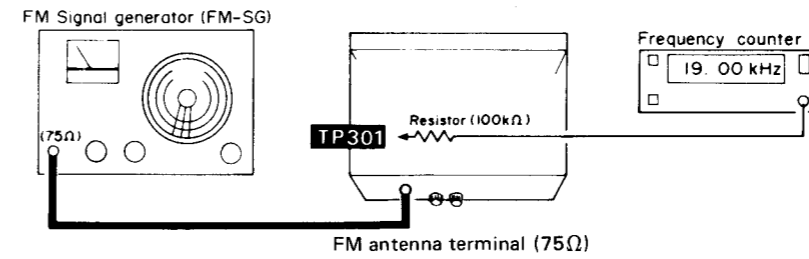
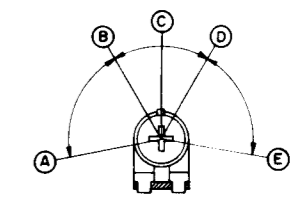


Abb. 8



VR301

(A-B, D-E) : Stereo OFF position.
 (B-D) : Stereo ON position.
 (indicator lighting)
 (C) : Adjust point of pilot circuit

Abb. 9

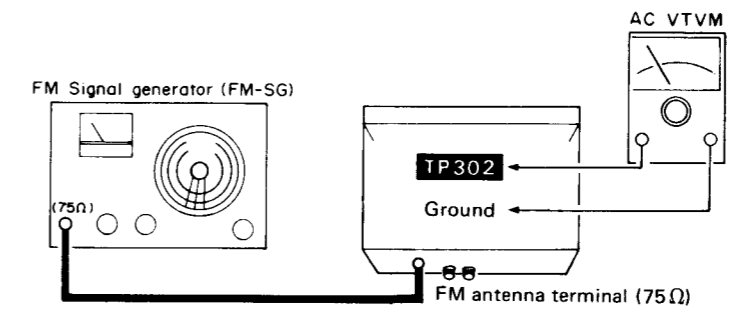


Abb. 10

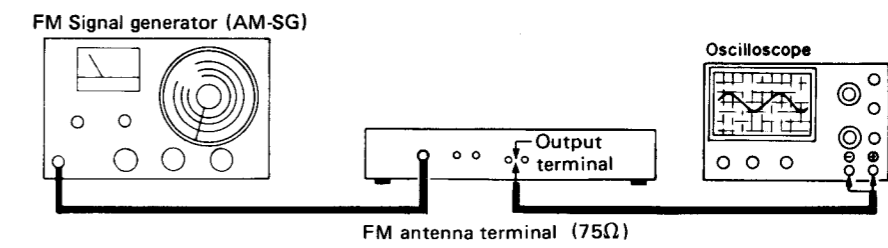


Abb. 11

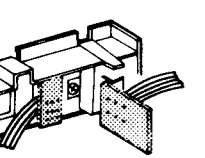
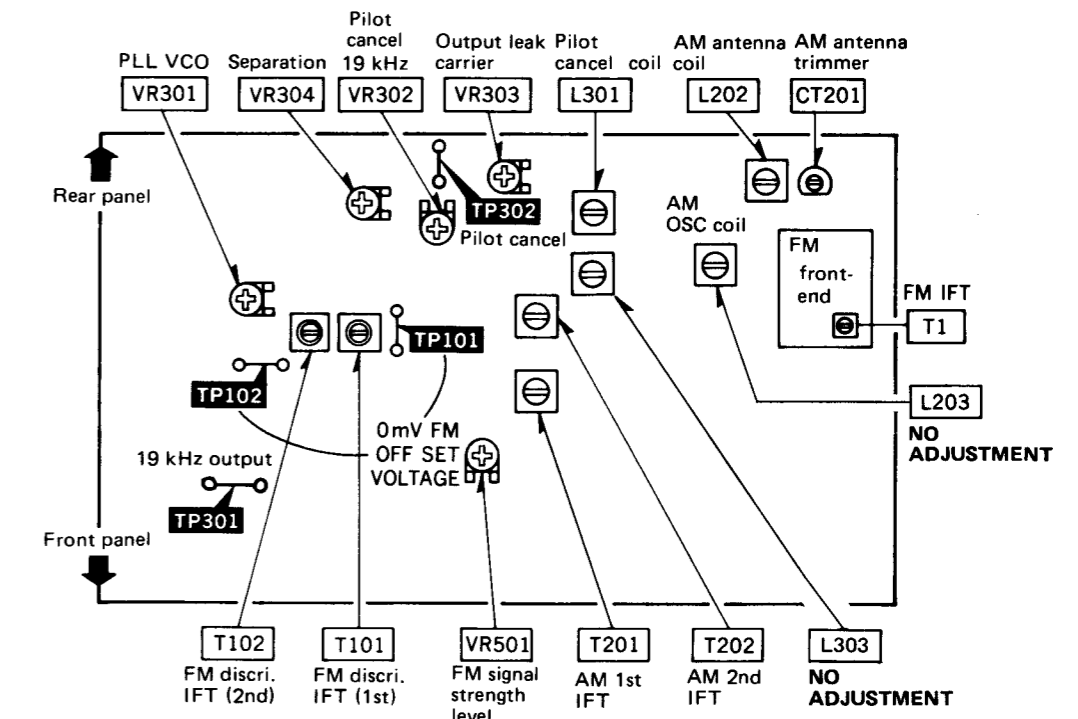


Abb. 12-1

Abb. 12-2

Abb. 12-3

ADJUSTMENT POINTS



ustierung.

er sein als unbedingt

r die Einstellungen

HSVERFAHREN

frequenz und die

unkte so adustieren,

ang den maximalen

Ausgang abgleichen.

tkern von L202 mit

raubendreher

Ausgang abgleichen.

te (2) und (3)

en, bis die Frequenz

der Skalanzeige

mmt.

W-MO)

eträgt 60 dB

n der Dämpfung bei

MO-Ausgangsleistung

ingangsleistung

bringen.

EICH-SVERFAHREN

Kern von T101 so

ren, daß die gemessene

ung im signallosen

s 0 mV im 300 mV

h beträgt.

Kern für minimale

rrung der rechten und

Kanäle justieren.

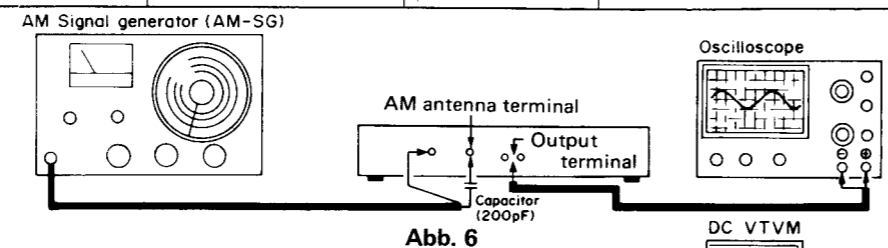
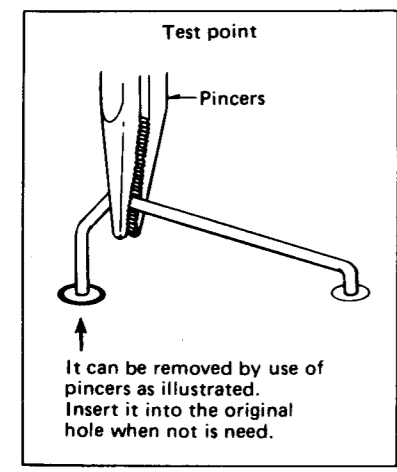


Abb. 6

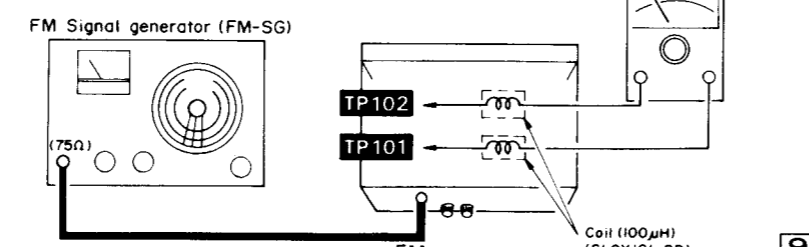
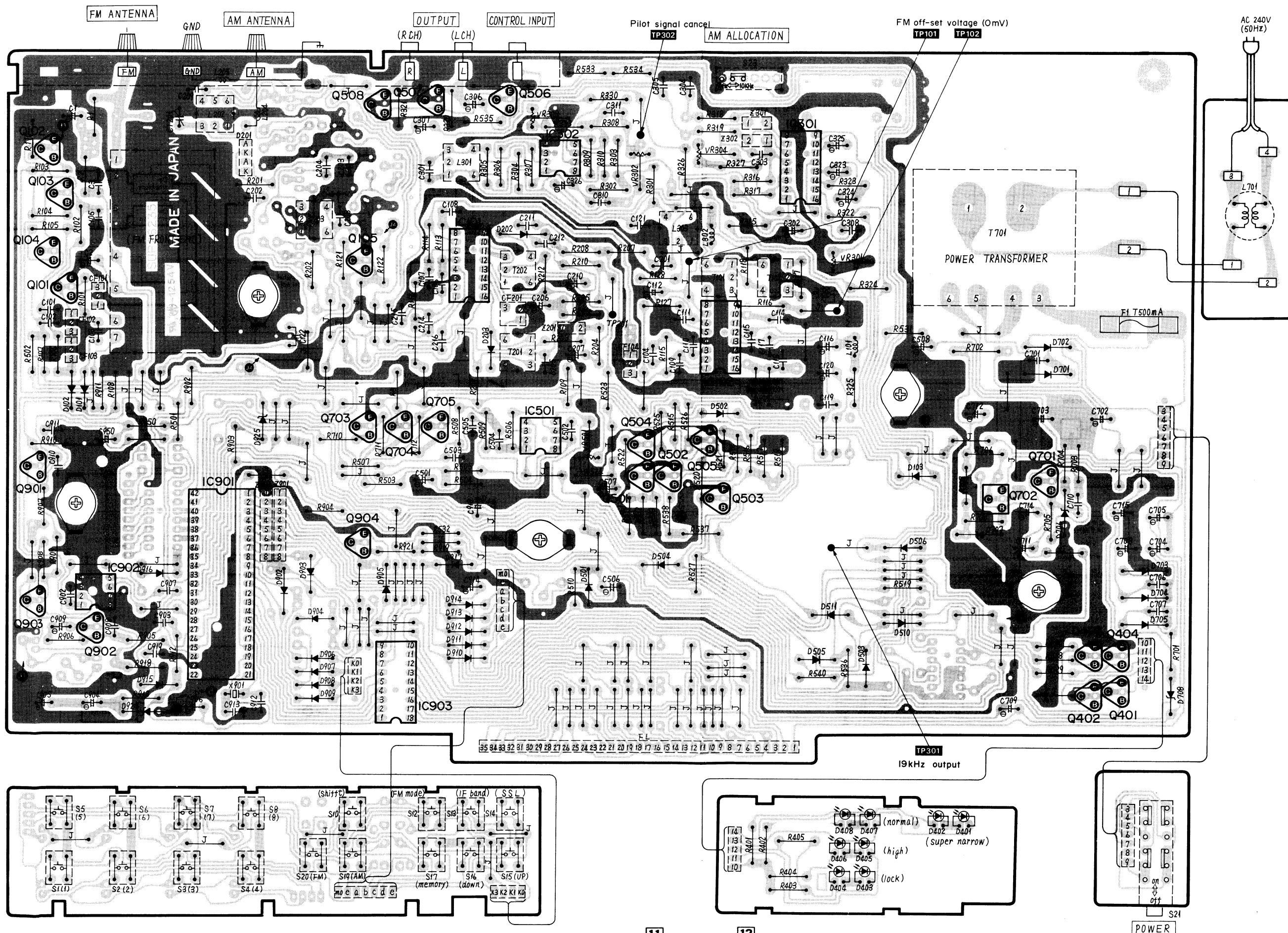


Abb. 7

ST-S505 ST-S505

CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

Ground (Earth) lines



11

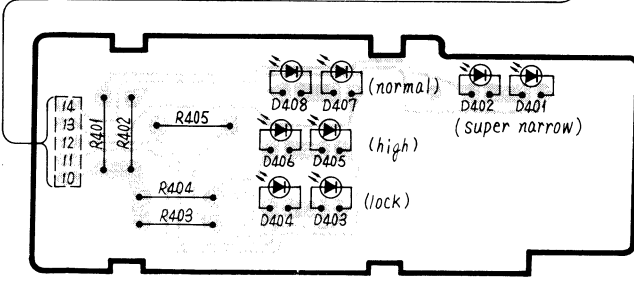
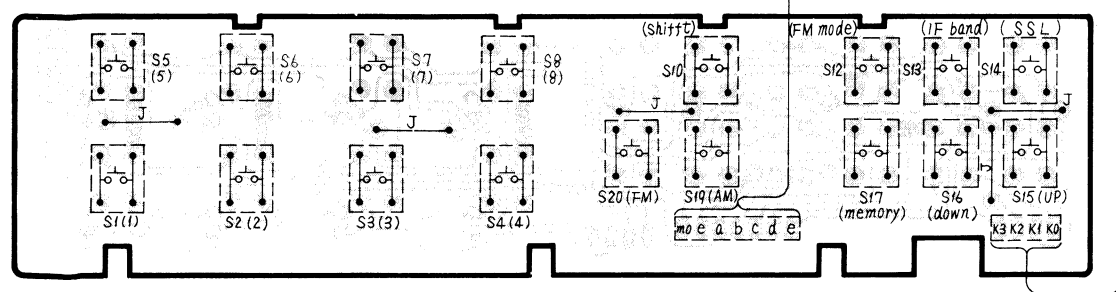
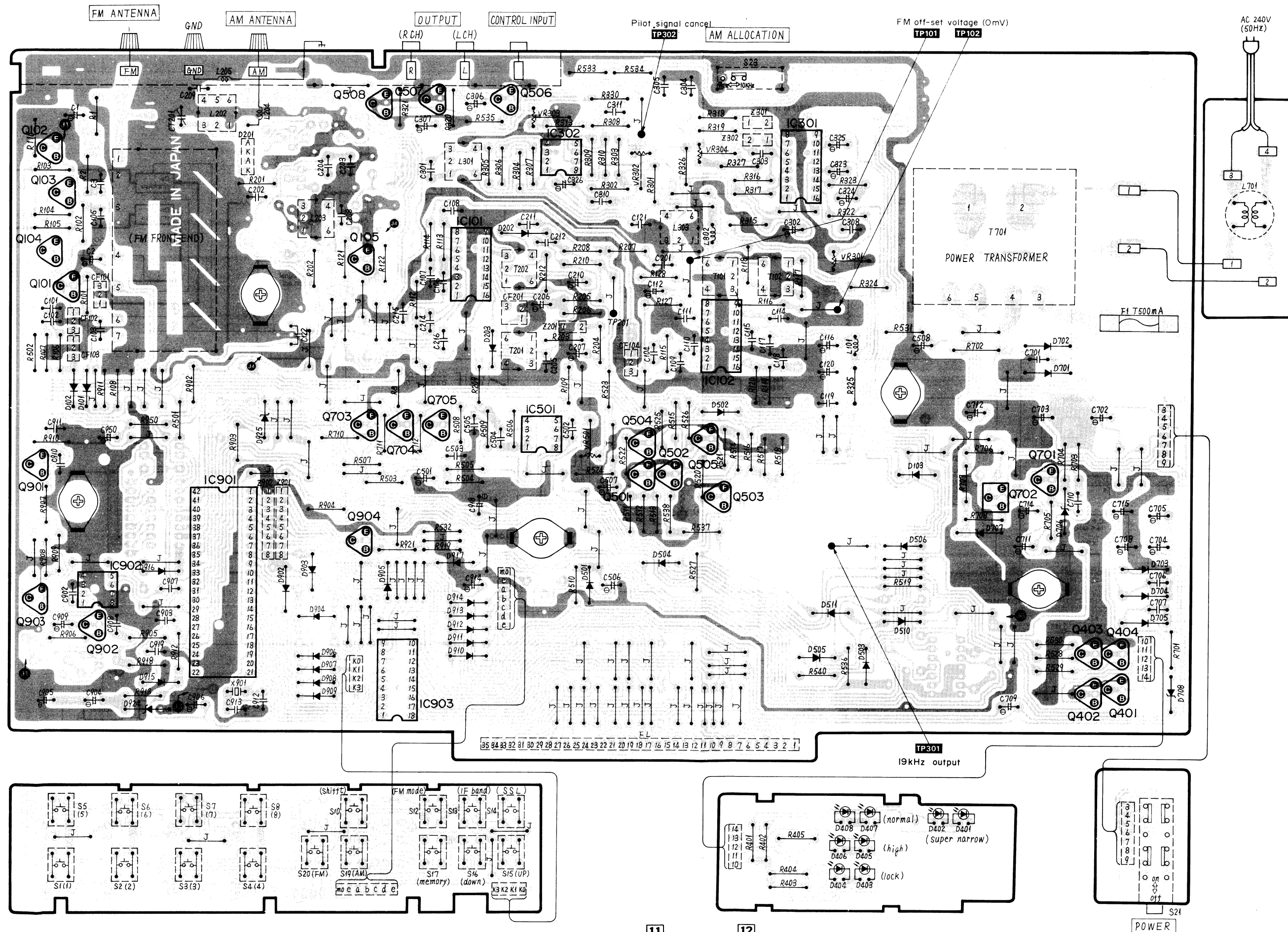
12

POWER

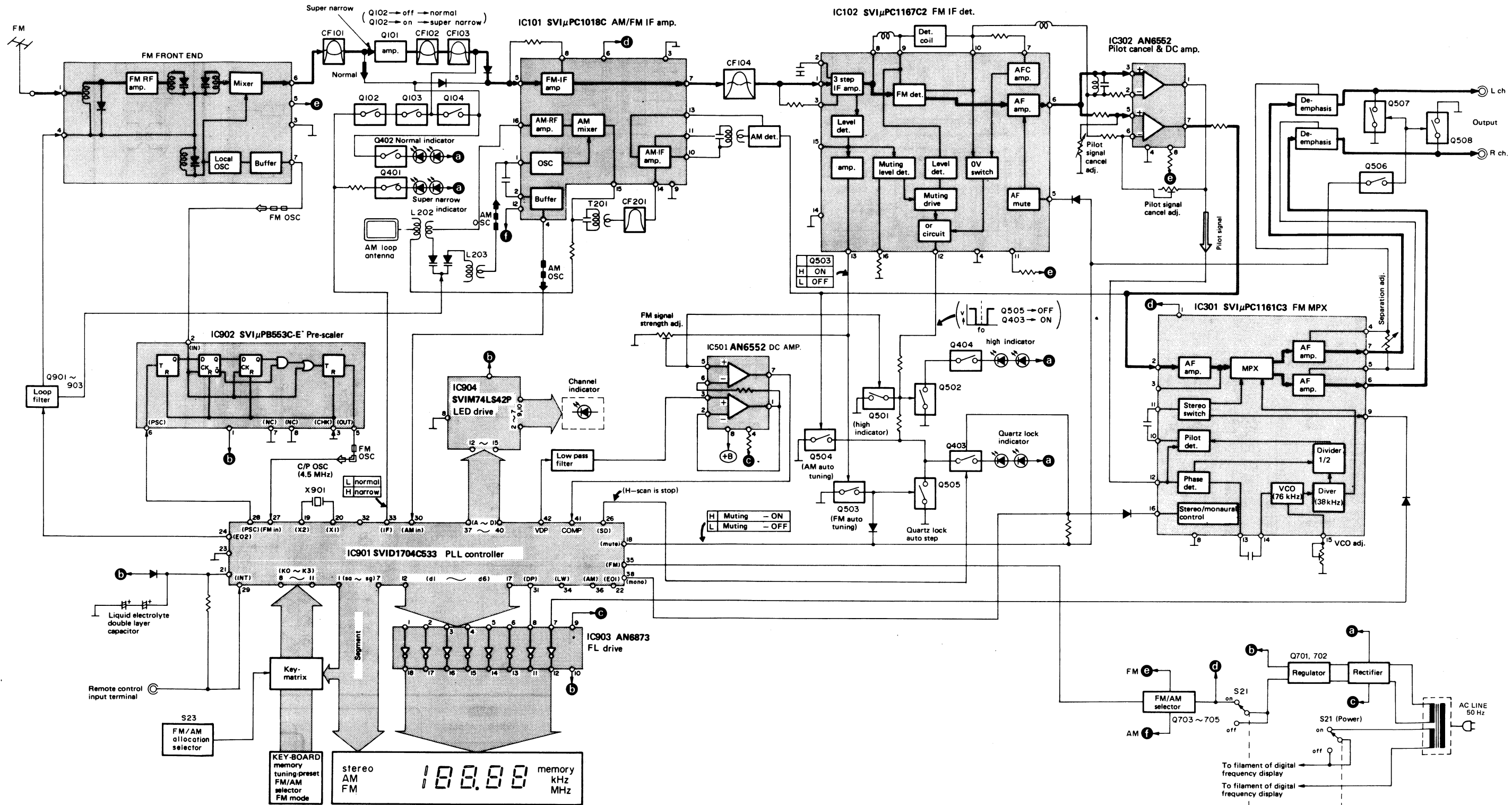
ST-S505 ST-S505

CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

Ground (Earth) lines



■ BLOCK DIAGRAM

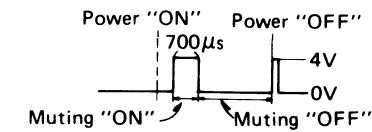


FUNCTION OF TERMINAL (PLL CONTROLLER IC901)

Pin No.	Mark	Description of terminal
1	Sa	Segment signal output terminal for display. (Refer to Fig. 13)
2	Sb	
3	Sc	
4	Sd	
5	Se	
6	Sf	
7	Sg	
8	K0	Input terminal for key return signal from external key matrix. The output of segment terminals (a ~ g) is used as the key return signal source.
9	K1	
10	K2	
11	K3	

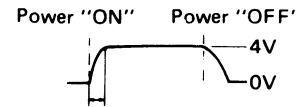


Pin No.	Mark	Description of terminal
12	D6	Digit signal output terminal for display. (Refer to Fig. 13)
13	D5	
14	D4	This is the output terminal to eliminate shock noise due to unlocking at PLL. When the CE terminal is at low level, the output from this terminal is at high level.
15	D3	
16	D2	
17	D1	
18	MT	
19	X2	Connecting terminal for crystal oscillator. The crystal connected is at 4.5 MHz.
20	X1	
21	VDD	Power supply terminal of the device.



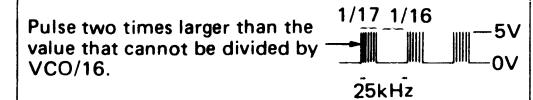
15

Pin No.	Mark	Description of terminal
22	E01	Not used in this unit.
23	GND	Ground terminal.
24	E02	When the divided oscillation frequency is higher than the standard frequency, H-level output is delivered from these terminals. When it is lower, L-level (0V) output is delivered. When they coincide, it results in floating.
25	CE	This is the selected signal input terminal of the device. When operating the device, make the level high, and when it is not used, make the level low. When this terminal is at low level, all the segment (a ~ g) and digits (D1 ~ D6) terminals are off, but the memory is held.



The device does not operate during this period.

Pin No.	Mark	Description of terminal
26	SD	This input terminal detects the reception of a broadcasting station. The voltage is 4.2V during reception, and otherwise 0V.
27	FM	Input terminal for FM OSC output frequency-divided to 1/16 or 1/17 by pre-scaler.
28	PSC	This is the terminal to deliver the frequency dividing ratio changeover output signal to the pre-scaler. The terminal continues to produce pulses at the rise of the signal applied to FM terminal (27) until the content of the inside swallow counter is 0. When the swallow counter comes to 0; the terminal level becomes low, then the frequency dividing ratio of pre-scaler is 1/16.
29	INT	This is the interrupt demand signal input terminal. The signal from the control input terminal is put into this terminal, demanding for interruption, then the flow of program will be unconditionally shifted to the address No. 1.



16

Pin No.	Mark	Description of terminal
30	AM	Inp
31	Dp	2-b ind tion
32	Lamp	
33	IF	4-B terr mo (36
34	LW	
35	FM	
36	AM	
37	A	4-b Ch
38	B	
39	C	
40	D	

tion of terminal

al detects the réception of ation. The voltage is 4.2V and otherwise 0V.

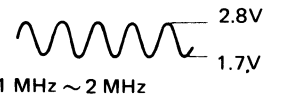
FM OSC output frequency- 1/17 by pre-scaler.

al to deliver the frequency ngeover output signal to the riminal continues to produce of the signal applied to FM il the content of the inside is 0. When the swallow o 0; the terminal level be- the frequency dividing ratio 6.

than the 1/17 1/16 5V 0V 25kHz

rupt demand signal input nal from the control input o this terminal, demanding then the flow of program nally shifted to the address

16

Pin No.	Mark	Descripton of terminal
30	AM	Input terminal for AM OSC output. 
31	Dp	2-bit input/output. Dp (31) is decimal point indication output terminal for digital indication. Lamp (32) is not used in this unit.
32	Lamp	
33	IF	
34	LW	
35	FM	4-Bit output port. FM (35) is FM/AM output terminal; 5V in FM and 0V in AM. IF (33) terminal level is "H" at "L" narrow in normal mode. LW (34) is not used in this unit. AM (36) not used in this unit.
36	AM	
37	A	4-bit output port. Channel light.
38	B	
39	C	
40	D	

Pin No.	Mark	Descripton of terminal
41	COMP	1-bit input port. Comparison voltage input terminal, regulating the duty pulses to let it follow the signal voltage.
42	VDP	Variable duty pulse at 1.34 kHz is delivered to compare it with signal voltage.

17

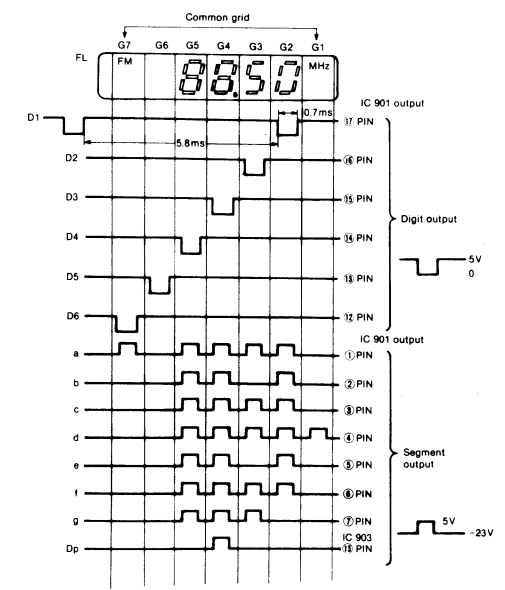


Fig. 13

18

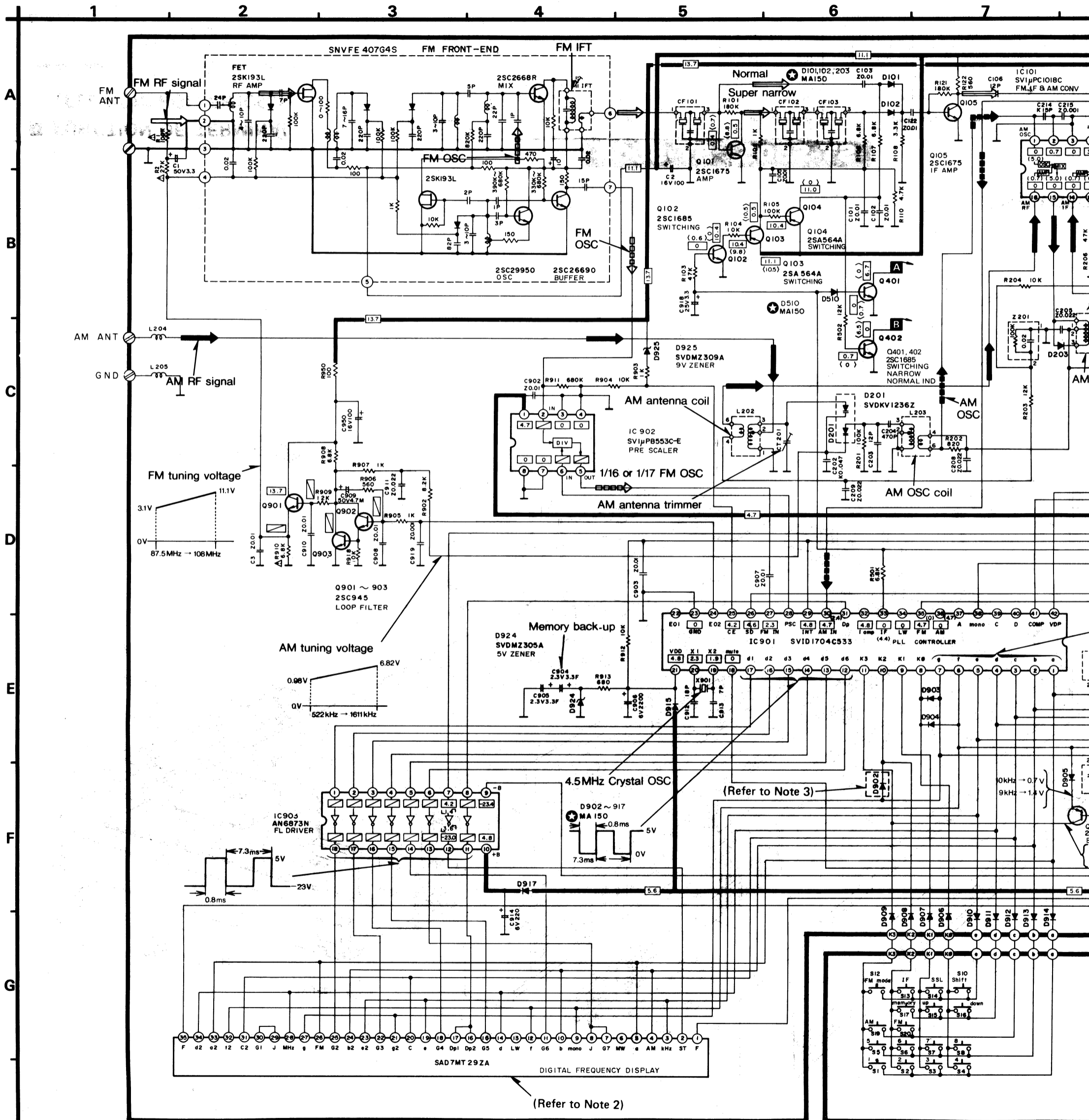
SCHEMATIC DIAGRAM

(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.

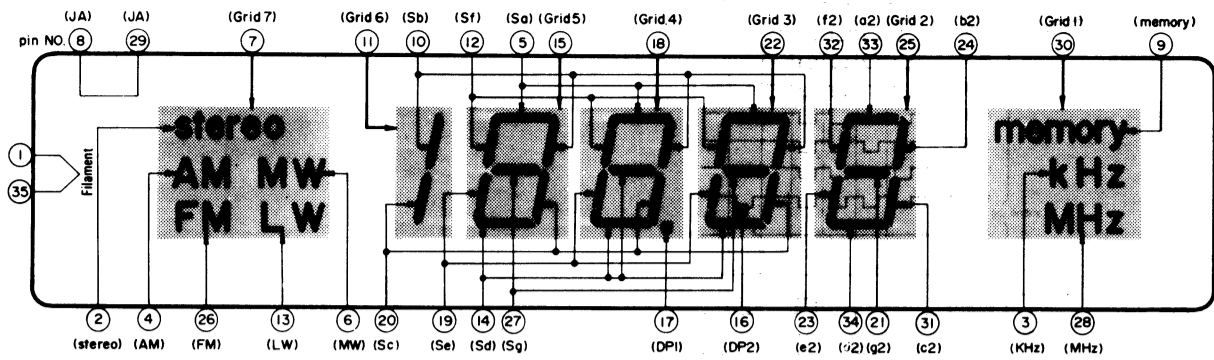
Note1:

- | | |
|--|--|
| 1. S1 ~ S8 : Preset tuning switch.
1 ~ 16 CH | 6. S15 : Tuning (up) switch. (manual \leftrightarrow auto)
[up : tuning to higher frequency] |
| 2. S10 : FM frequency shift switch. (off \leftrightarrow 25 kHz) | 7. S16 : Tuning (down) switch. (manual \leftrightarrow auto)
[down : tuning to lower frequency] |
| 3. S12 : FM mode switch. (auto \leftrightarrow mono) | 8. S17 : Memory switch. (manual \leftrightarrow auto) |
| 4. S13 : FM IF band selector switch.
normal \leftrightarrow super narrow | 9. S19 : AM selector switch. |
| 5. S14 : FM signal strength level call switch.
off \leftrightarrow on | 10. S20 : FM selector switch. |
| | 11. S21 : Power source switch in "on" position. |
| | 12. S23 : AM (MW) allocation switch in "10 kHz step" position
9 kHz step \leftrightarrow 10 kHz step |



Note 2:

• Digital frequency display tube (FL)



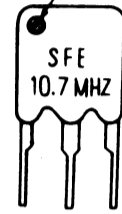
Note 3:

• Use of ceramic filters in pairs

The ceramic filters (CF101 ~ CF104) for FM-IF circuit are available in two ranks. For this machine, be sure to use the ceramics of the same rank in a pair.

At repairing and replacement, pay close attention to the diode (D902) for use as different diodes must be used depending on each rank of the ceramic filters.

Color marking (Red or Black)



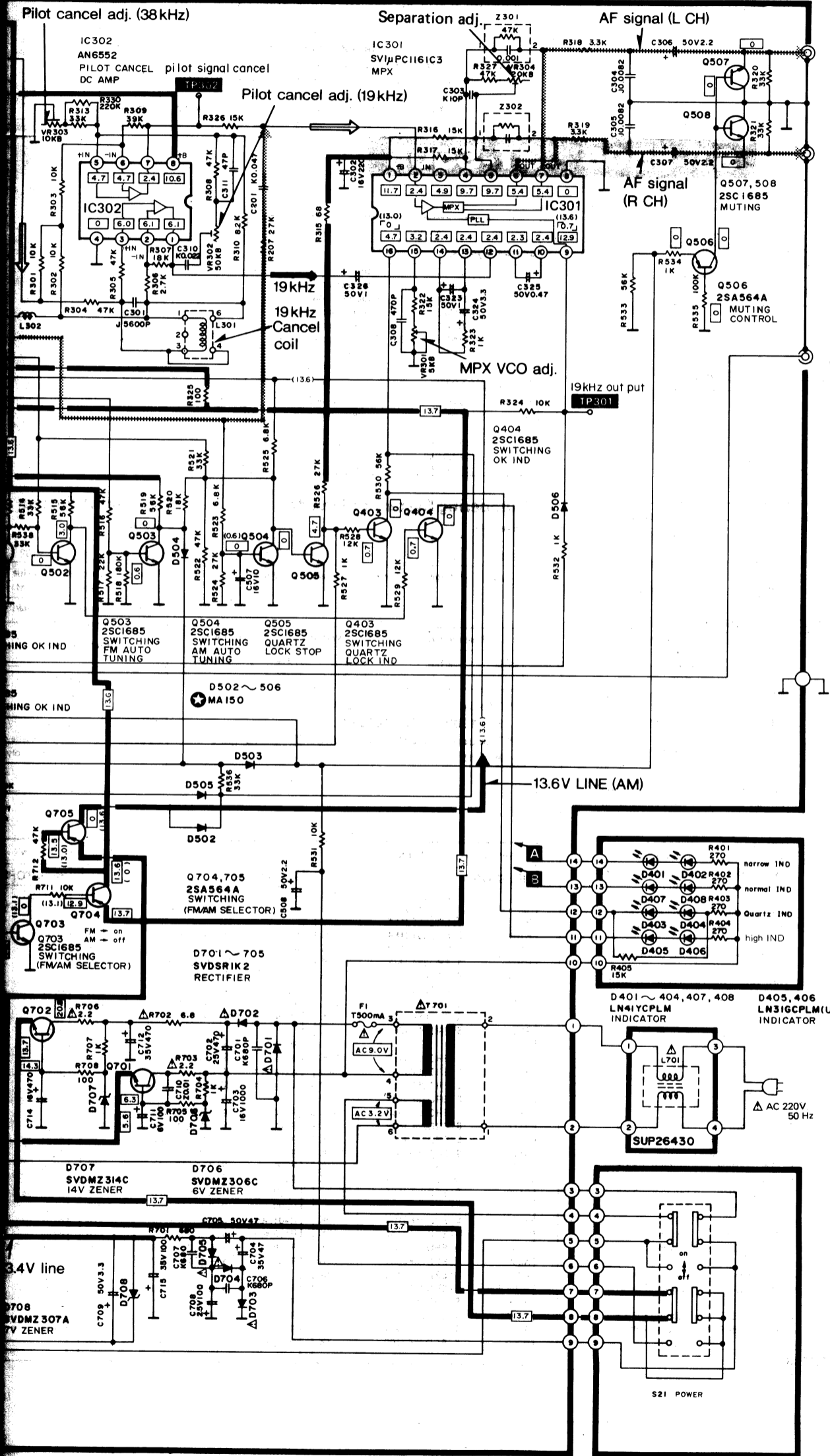
RANK (Color)	D902	CENTER FREQUENCY
Black	○	10.65 MHz
Red	X	10.70 MHz

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

• Terminal guide of transistors, IC's and diodes

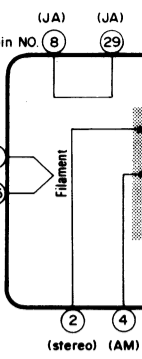
	SVIUPC1018C SVIUPC1167C2 SVIUPC1161C3 SVIM74LS42P AN6873N SVITC4013BP	16 pin		
AN6552, SVIμPB553AC	2SC1675, 2SC1685, 2SA564, 2SC1815, 2SC945	2SD882	MA150, OA90	
SVDKV1236Z	MA27W-A	SVDSR1K2	SVDMZ □□□□	
	Red mark			

AF signal lines
FM OSC
AM OSC
mark have special characteristics important for components, use only manufacturer's specified

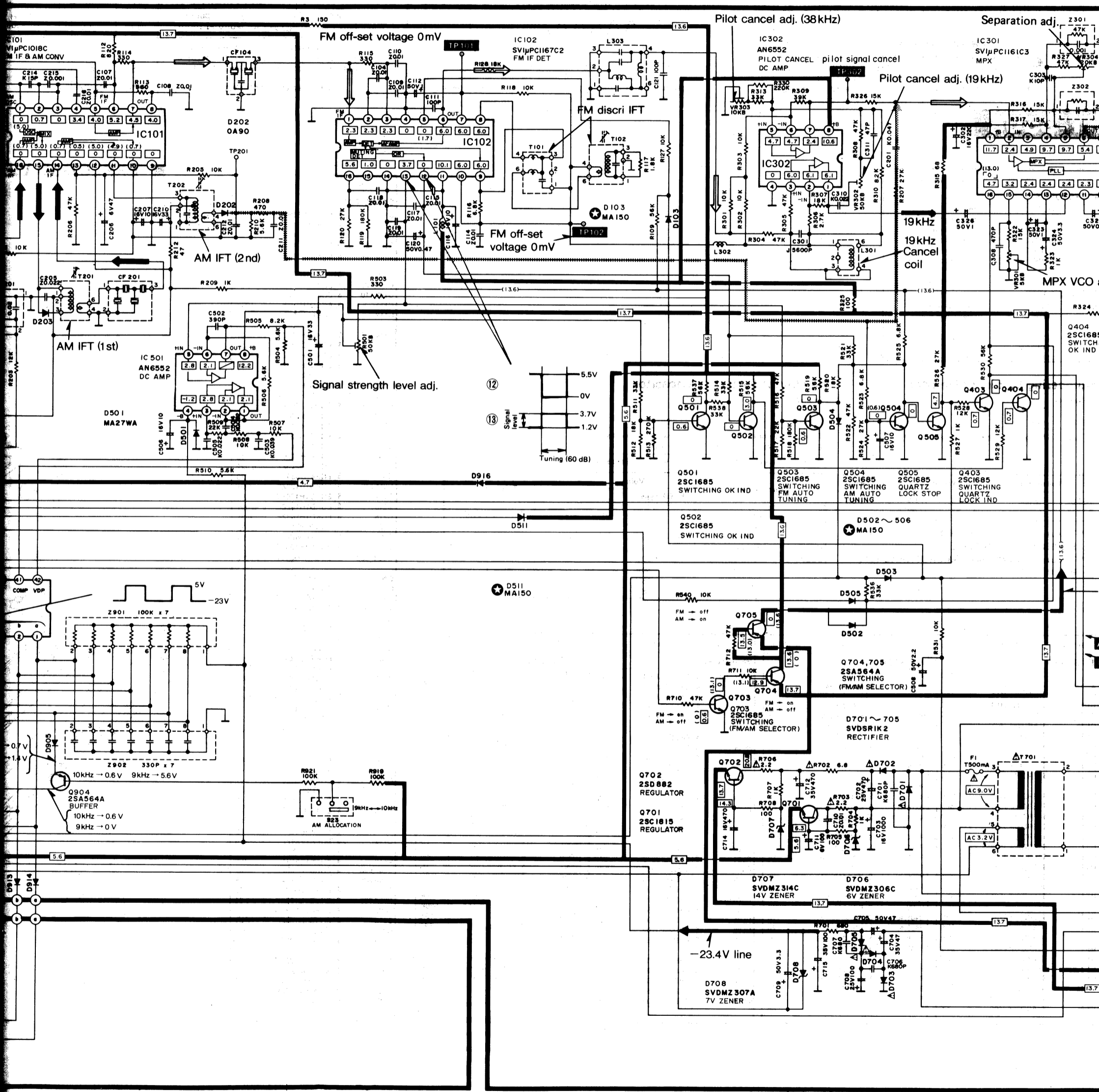


13. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
- * Figures in \square stand for DC voltage in FM signal (monaural) reception mode.
 - * Figures in \square stand for DC voltage in FM stereo signal reception mode.
 - * Figures in $()$ stand for DC voltage in AM signal reception mode.
 - * Figures in $< >$ stand for DC voltage in super narrow condition mode

14. Positive voltage lines. FM signal FM OSC
AM signal AM OSC
15. 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.



8 9 10 11 12 13 14



EXPLODED VIEWS

Ref. No.	Part No.	Value
CAPACITORS		
C1	§ ECEA1HS3R3	3.3
C2	§ ECEA1HS101	100
C3	§ ECKD1H103ZF	0.01
C101,102	§ ECKD1H103ZF	0.01
C103,104	§ ECKD1H103ZF	0.01
C105	§ ECKD1H103ZF	0.01
C106	§ ECCD1H120KC	12p
C107,108	§ ECKD1H103ZF	0.01
C109,110	§ ECKD1H103ZF	0.01
C111	§ ECCD1H101K	100p
C112	§ ECEA50Z1	1
C114,115	§ ECKD1H103ZF	0.01
C116	§ ECEA1CS100	10
C117,118	§ ECKD1H103ZF	0.01
C119	§ ECKD1H103ZF	0.01
C120	§ ECEA50ZR47	0.47
C121	§ ECCD1H101KC	100P
C122	§ ECKD1H103ZF	0.01
C201,202	§ ECQM1H473JZ	0.047
C203	§ ECCD1H120KC	12p
C204	§ ECQP1471JZ	470p
C205	§ ECKD1H223ZF	0.022
C206	§ ECEA1AS470	47
C207	§ ECEA1HS100	10
C208,209	§ ECKD1H223ZF	0.022
C210	§ ECEA1CS330	33
C211,212	§ ECKD1H103ZF	0.01
C214	§ ECCD1H150KC	15p
C215	§ ECKD1H102ZF	0.001
C216	§ ECKD1H103ZF	0.01
C301	§ ECQP1562JZ	5600p
C302	§ ECEA1CS221	220
C303	§ ECCD1H100KC	10p
C304,305	§ ECQM1H822JZ	0.0082
C306,307	§ ECEA50Z2R2	2.2
C308	§ ECQP1471JZ	470p
C310	§ ECQM1H223JZ	0.022
C311	§ ECCD1H470K	47p
C323	§ ECEA50Z1	1
C324	§ ECEA50Z3R3	3.3
C325	§ ECEA50ZR47	0.47
C326	§ ECEA50Z1	1
C501	§ ECEA1CS330	33
C502	§ ECKD1H391KB	390p
C503	§ ECQM1H393JZ	0.039
C504	§ ECQM1H823JZ	0.082
C505	§ ECQM1H223JZ	0.022
C506,507	§ ECEA1HS100	10
C508	§ ECEA50Z2R2	2.2
C701	§ ECKD2H681KB	680p
C702	§ ECEA1ES471	470
C703	§ ECEA1S102	1000
C704	§ ECEA1HS470	47
C705	§ ECEA1HS470	47
C706,707	§ ECKD2H681KB	680p
C708	§ ECEA1ES101	100
C709	§ ECEA50Z3R3	3.3
C710	§ ECKD1H103ZF	0.01
C711	§ ECEA1AS101	100
C712	§ ECEA1VS471	470
C714	§ ECEA1CS471	470
C715	§ ECEA1VS101	100
C902,903	§ ECKD1H103ZF	0.01
C904,905	§ EECW2R3A3R3E	3.3F
C906	§ ECEA0JS222	2200
C907,908	§ ECKD1H103ZF	0.01
C909	§ ECEA50M4R7R	4.7
C910	§ ECKD1H103ZF	0.01
C911	§ ECKD1H223ZF	0.022
C912	§ ECCD1H180KC	18p
C913	§ ECCD1H070CC	7p
C914	§ ECEA1AS221	220
C918	§ ECEA50Z3R3	3.3
C919	§ ECKD1H102ZF	0.001
C950	§ ECEA1ES101	100

Tolerance	
C	: ± 0.25pF
J	: ± 5%
K	: ± 10%
Z	: +80%, -20%

Part No.	Value
RES	
§ ERD25FJ103	10K
§ ERD25FJ681	680
△ ERD25FJ6R8	6.8
△ ERD25FJ2R2	2.2
§ ERD25FJ102	1K
§ ERD25FJ101	100
△ ERD25FJ2R2	2.2
△ ERD25FJ102	1K
§ ERD25FJ101	100
§ ERD25TJ473	47K
§ ERD25FJ103	10K
§ ERD25TJ473	47K
§ ERD25FJ822	8.2K
§ ERD25FJ102	1K
§ ERD25FJ103	10K
§ ERD25FJ102	1K
§ ERD25FJ561	560
§ ERD25FJ102	1K
§ ERD25FJ682	6.8K
§ ERD25TJ123	12K
§ ERD25FJ682	6.8K
§ ERD25TJ684	680K
§ ERD25FJ103	10K
§ ERD25FJ681	680
§ ERD25FJ103	10K
§ ERD25TJ104	100K
§ ERD25TJ104	100K
§ ERD25FJ101	100

