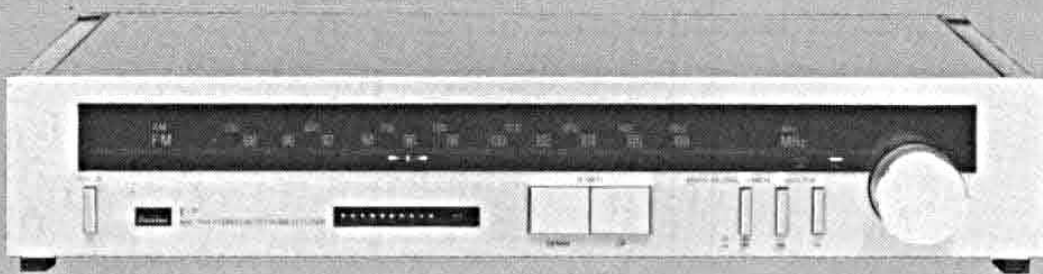


# SERVICE MANUAL

AM/FM STEREO TUNER

## SANSUI T-7/5



### • SPECIFICATIONS

#### FM Section

Tuning range . . . . . 88 to 108 MHz

#### Usable sensitivity

Mono IHF . . . . . 10.5 dBf (1.8  $\mu$ V: T100)

DIN . . . . . 0.9  $\mu$ V

#### 50 dB quieting sensitivity

Mono . . . . . 17.0 dBf

Stereo . . . . . 37.0 dBf

#### Signal to noise ratio at 65 dBf

Mono . . . . . 75 dB

Stereo . . . . . 72 dB

#### Distortion at 65 dBf

Mono . . . . . less than 0.1 % at 1,000 Hz

Stereo . . . . . less than 0.15 % at 1,000 Hz

#### Alternate channel selectivity (at 400 kHz)

. . . . . 60 dB

#### Stereo separation . . . . . 40 dB at 1,000 Hz

#### Frequency response . . . . . 30 to 15,000 Hz

+1.0 dB, -1.5 dB

#### Antenna input impedance

. . . . . 300 ohms balanced

75 ohms unbalanced

#### AM Section

Tuning range . . . . . 530 to 1,600 kHz

#### Usable sensitivity (Bar antenna)

. . . . . 50 dB/m (300  $\mu$ V/m)

#### Signal to noise ratio . . . . . 48 dB

#### Image response ratio . . . . . 45 dB at 1,000 Hz

#### Others

#### Output voltage and impedance

. . . . . 550 mV/2.2 kilohms

#### Power requirements . . . . . 120, 220 ~ 240 V

50/60 Hz

#### For U.S.A. and Canada

. . . . . 120 V (60 Hz)

#### Power consumption . . . . . 13 W <T-7>

10 W <T-5>

#### Dimensions . . . . . 430 mm (16-15/16") W

87 mm (3-7/16") H

260 mm (10-1/4") D

#### Weight . . . . . 3.4 kg (7.5 lbs) net <T-7>

4.0 kg (8.8 lbs) packed <T-7>

3.2 kg (7.1 lbs) net <T-5>

3.8 kg (8.4 lbs) packed <T-5>

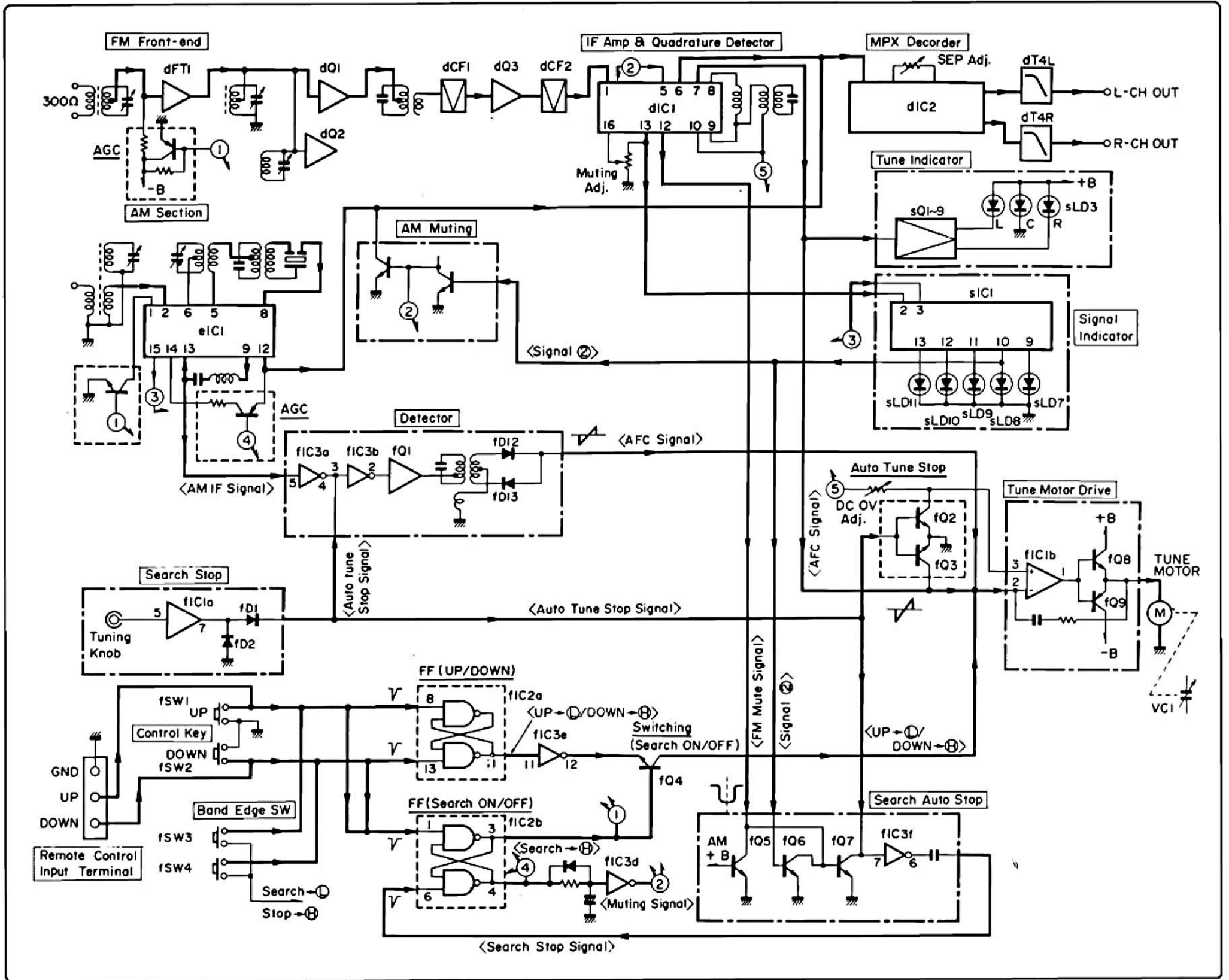
\* Design and specifications subject to changes without notice for improvements.

**Sansui**

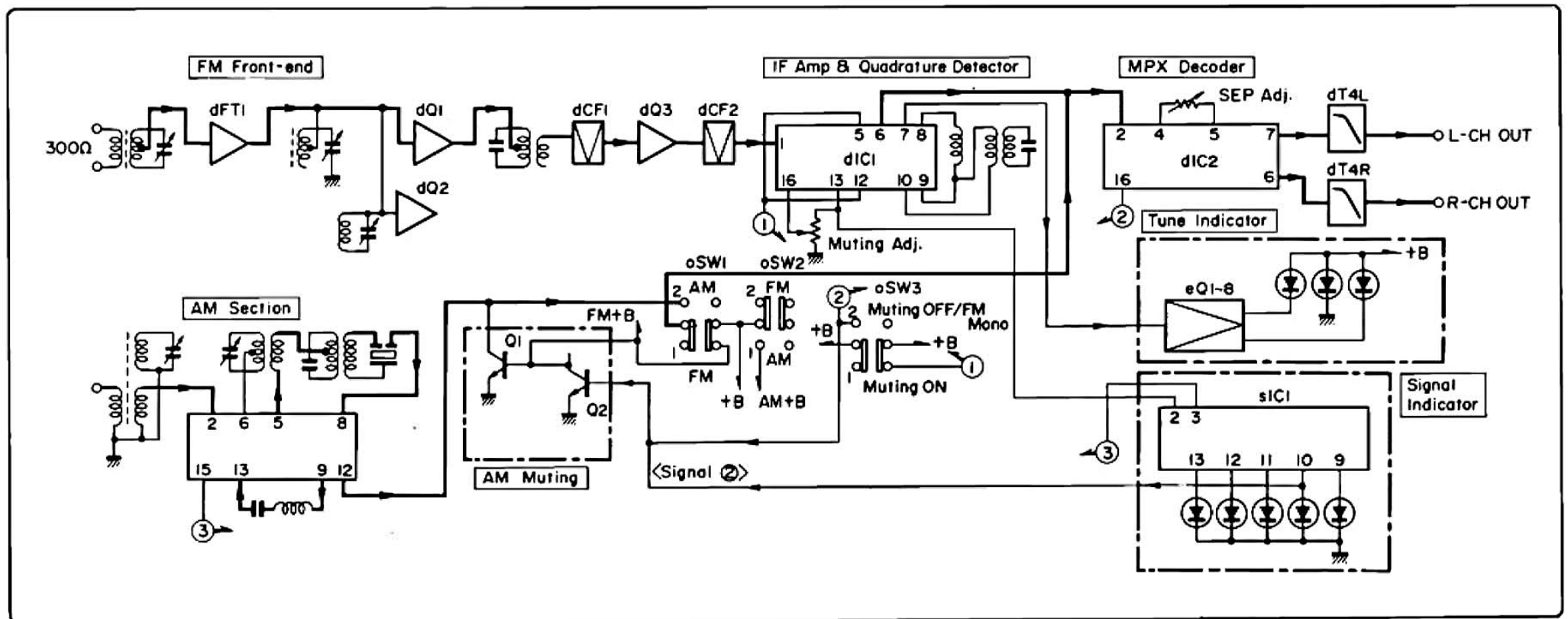
SANSUI ELECTRIC CO., LTD.

# 1. BLOCK DIAGRAM

## 1-1. T-7



## 1-2. T-5





## 2. OPERATIONS OF MOTOR DRIVE SERVO LOCK SYSTEM

(T-7 See Block Diagram)

The tuner T-7 adopts a motor drive servo lock system. Therefore, it is possible to perform a stable tuning operation based on automatic follow-up control, even when the tuned frequency fluctuates for some reason or other.

The operations of the automatic search tuning by the motor drive servo lock system will be described below simply.

### ◇ Automatic search operation

When depressing once the up-search key fsw 1 and down-search key fsw 2, the servo motor begins to rotate and therefore the dial tuning mechanism operates to move the variable tuning condenser.

### ◇ Automatic search stop operation

When the tuner is set to a desired broadcasting station, the search circuit changes to a cut-off state by the IF signal and therefore the servo motor stops rotating, so that the operation of the dial tuning mechanism stops temporarily.

### ◇ Servo lock operation

When the tuner has been set to a desired broadcasting station, the servo motor actuates the dial tuning mechanism so that the optimum tuning point can be obtained by using the AFC voltage generated by detecting the IF signal.

### 2-1. Automatic search tuning operation in FM receiving

- When depressing once the up-search key fsw1, a minus trigger pulse signal is inputted to the terminal No. 13 of the flip-flop circuit (up/down) f1C2a.

Accordingly, the terminal No. 11 of the flip-flop circuit f1C2a changes to H level in potential. After having been inverted through the inverter f1C3 to L level in potential, the pulse signal is applied to the level comparator f1C1b through the transistor fQ4.

(Since a minus trigger pulse signal is also applied to the flip-flop circuit (search on/off) f1C2b, the terminal No. 3 of the flip-flop f1C2b changes to H level in potential to turn on the transistor fQ4.)

As a result, the output terminal No. 1 of the level comparator f1C1b changes to a plus voltage.

Therefore, a plus voltage +B is supplied to the servo motor to rotate it counterclockwise, so that the variable tuning condenser is rotated.

- When the tuner is set to a desired broadcasting station by the operation of the dial tuning mechanism by the servo motor, the FM muting signal from the terminal No. 12 of the IF amplifier/quadrature detector d1C1 changes from H level to L level in potential.

In addition, the signal 2 from the terminal No. 10 of the signal indicator driver s1C1, changes to H level in potential.

When the above-mentioned FM muting signal and signal 2 are inputted to the search stop section made up of the transistors fQ5, fQ6, fQ7 and the inverter f1C3f, the transistor fQ7 is turned off, and the terminal No. 6 of the inverter f1C3f changes from H level to L level in potential.

As a result, a minus trigger pulse is inputted to the terminal No. 6 of the flip-flop circuit (search on/off) f1C2b, and therefore the terminal No. 3 of the flip-flop circuit f1C2b changes to L level in potential to turn off the transistor fQ4.

Accordingly, no servo motor control voltage is inputted from the flip-flop circuit (up/down) f1C2a to the level comparator f1C1b, so that the search operation of the dial tuning mechanism is stopped.

- After the tuner has been set to a desired broadcasting station, the AFC voltage from the terminal No. 7 of the IF amplifier/quadrature detector d1C1 is inputted to the level comparator f1C1b.

This AFC voltage becomes higher than the reference AFC voltage when the tuner is set to a frequency higher than a desired tuning point, and lower than the reference AFC voltage when set to a frequency lower than a desired tuning point. Therefore, the relationship between AFC voltage and received frequency has characteristics shown by a S-curve graphical representation. Whenever the tuner is set to a frequency apart from a desired tuning point, a plus voltage +B or a minus voltage -B is necessarily applied to the servo motor to rotate it clockwise or counterclockwise.

When the tuner is set correctly to the optimum tuning point, since the AFC voltage coincides with the reference voltage, the voltage between the two input terminals of the level comparator f1C1b becomes zero and therefore the servo motor stops rotating.

### 2-2. Automatic search tuning operation in AM receiving

Almost the same automatic search tuning operation is carried out in AM receiving or in FM receiving. In AM receiving, however, the search stop operation is carried out by using only the signal 2.

After the tuner has been set to a desired AM broadcasting station, the IF signal from the terminal No. 9 of the AM-IF amplifier e1C1 is FM-detected by the detector made up of the transistor fQ1, transformer coils fT1 and fT2 and diodes fD12 and fD13 and next inputted to the level comparator f1C1b.

This AFC voltage actuates the servo motor for dial tuning operation, so that the received frequency can be set to the optimum tuning point in the same way as in FM receiving.

### 2-3. Search operation by touch sensor and stop of servo lock operation

When touching the tuning knob with the hand, hum noise is produced from the knob. By utilizing this hum noise, the search operation and the servo lock operation can be stopped. After having been amplified by the amplifier f1C1a, the hum noise is detected by the detectors fD1 and fD2 into a H-level voltage. This H-level signal is passed through the diode fD14 and applied to the terminal No. 7 of the automatic search stop circuit f1C3f to stop the search operation. Also, since this H-level signal is applied to the bases of the transistors fQ2 and fQ3 to turn them on, no AFC signal is inputted to the level comparator f1C1b, and therefore the servo lock operation stops.

(In the case of AM receiving, this H-level signal changes the AM-IF waveform shaper f1C3b into a cut-off state to prevent the AFC voltage from being generated.)

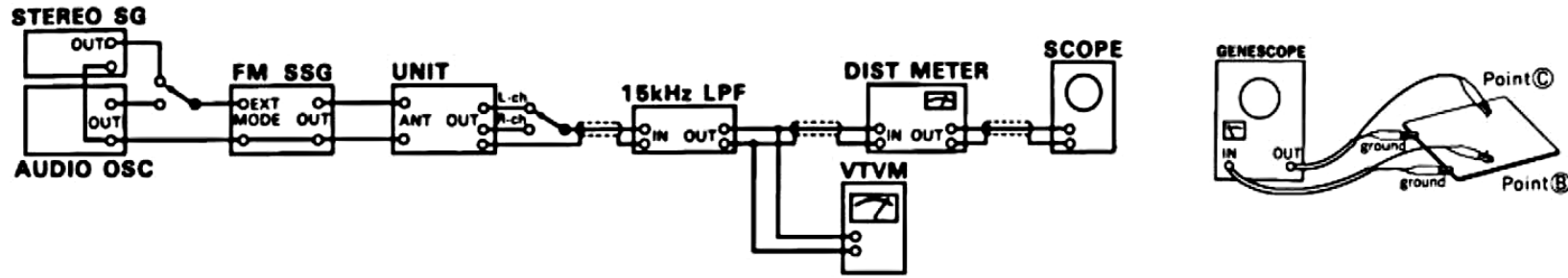
Therefore, the automatic tuning operation changes to the manual tuning operation whenever the hand is brought into contact with the tuning knob.

# 3. ADJUSTMENTS

## 3-1. FM Adjustment (See Top View on Page 10 & 11)

### (1) FM IF, RF Adjustment and Dial Calibration

- Note: 1. Selector . . . . . FM  
 2. AM/FM muting switch . . . . . OFF



STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS	
		FROM	TO					
1.	IF Coil Adj.	98MHz ANT Input 20dBf (14.8dB), 1kHz (100% MOD.), FM SSG	ANT terminal 300Ω	Between Point A & Earth DC Volt Meter	dT1	Max. DC Volt		
2.	Discriminator Coil Adj. In case of using Genescope	1	No Input	Between dTP1 & dTP2 DC Volt Meter	dT2	DC 0V ±0.1V		
		2	Output 80dB, Genescope	Point C	Between Point B & Earth	dT3, dT2		Steep linearity of S curve. Make symmetrical S curve.
	Discriminator Coil Adj. In case of using Dist meter	1	98MHz ANT Input 65dBf (59.8dB), 1kHz (100% MOD.), FM SSG	ANT terminal 300Ω	Between dTP1 & dTP2 DC Volt Meter	dT1	● Repeat procedures as stated in 1 and 2. ● Since the dT1 has already adjusted, perform only a fine adjustment in this procedure.	
		2	Same as above	Same as above	OUTPUT L-CH or R-CH, Dist Meter	dT3, dT2 dT1		Min. THD
3.	88MHz Dial Calibration	88MHz ANT Input 65dBf (59.8dB), 1kHz (100% MOD.), FM SSG	Same as above	OUTPUT L-CH or R-CH, VTVM & SCOPE	dL3	Max. Output	● Repeat procedures as stated in 3 and 4.	
4.	108MHz Dial Calibration	108MHz ANT Input 65dBf (59.8dB), 1kHz (100% MOD.), FM SSG	Same as above	Same as above	dTC3	Same as above		
5.	88MHz RF Adj.	88MHz ANT Input Minimum value with sine wave 1000Hz (100% MOD.), FM SSG	Same as above	Same as above	dL1, dL2	Same as above		
6.	108MHz RF Adj.	108MHz ANT Input Minimum value with sine wave, 1000Hz (100% MOD.), FM SSG	Same as above	Same as above	dTC1, dTC2	Same as above		
7. *	FM DC 0V Adj. (T-7)	1	98MHz ANT Input 65dBf (59.8dB), 1kHz (100% MOD.), FM SSG	Same as above	Between dTP1 & dTP2 DC Volt Meter	Tuning Knob	DC 0V (Just Tune)	● Remove the lead wires from the motor connected to the connector terminals 10 and 11. ● Short between the point F (fD1) and the ground. ● AM/FM muting switch . . . ON.
		2	Same as above	Same as above	Between TP5 & Earth DC Volt Meter	fVR1	DC 0V	

\* Check that the tuning operation is achieved correctly and the three indicator lamps stay on, by turning on or off the AM/FM muting switch.

•Abbreviations		
Equipment		Others
AM FM Generator Oscilloscope	Genescope	ANT.
AM Standard Signal Generator	AM SSG	MOD.
FM Standard Signal Generator	FM SSG	Total Harmonic Distortion
FM Stereo Generator	Stereo SG	T.H.D.
Oscilloscope	Scope	
Audio Oscillator	Audio Osc.	
Distortion Meter	Dist. Meter	



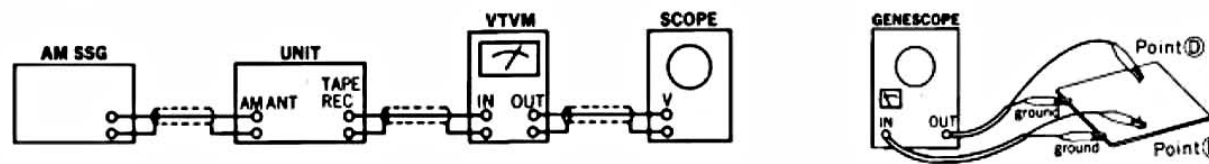
## (2) FM STEREO Adjustment

- Note: 1. Selector . . . . . FM  
 2. AM/FM muting switch . . . . . ON

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
		FROM	TO				
1.	PLL VCO Adj.	98MHz ANT Input 65dBf (59.8dB), FM SSG, Pilot 19kHz (9% MOD.), R or L MODE 1kHz + Pilot (100% MOD.), STEREO SG	ANT terminal 300Ω	Stereo indicator	dVR3 (T-5) dVR2 (T-7)	Light indicator	Adjust the VR within center of lighting level
	PLL VCO Adj. In case of using Freq.	98MHz ANT Input 65dBf (59.8dB), FM SSG, No MOD.	Same as above	Between TP3 & Earth Freq. counter	dVR3 (T-5) dVR2 (T-7)	19kHz ± 50Hz	
2.	Separation Adj.	98MHz ANT Input 65dBf (59.8dB), FM SSG, Pilot 19kHz (9% MOD.), L MODE 1kHz + Pilot (100% MOD.), STEREO SG.	Same as above	OUTPUT L-CH VTVM & SCOPE	—	Read this indication on VTVM	Confirm R → L-CH
				OUTPUT R-CH VTVM & SCOPE	dVR2 (T-5) dVR3 (T-7)	– 40dB from the indication above.	
3.	Muting level Adj.	98MHz ANT Input 30dBf (24.8dB), FM SSG, Pilot 19kHz (9% MOD.), L or R MODE 1kHz + Pilot (100% MOD.), STEREO SG.	Same as above	Stereo indicator or OUTPUT L-CH or R-CH VTVM & SCOPE	dVR1	Stereo indicator turns ON or Output Signal comes out	

## 3-2. AM Adjustment (See Top View on Page 10 & 11)

- Note: 1. Selector . . . . . AM  
 2. AM, FM muting switch . . . . . OFF



STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
		FROM	TO				
1.	IF Coil Adj.	Output 60dB, Genescope	Point D	Between Point E & Earth	eCF1, eT2	Max. Waveform	
2.	600kHz Dial Calibration	600kHz ANT Input 60dB, 400Hz (30% MOD.), AM SSG	ANT terminal	OUTPUT L-CH or R-CH VTVM & SCOPE	eT1	Max. Output	● Repeat procedures as stated in 2 and 3.
3.	1400kHz Dial Calibration	1400kHz ANT Input 60dB, 400Hz (30% MOD.), AM SSG	Same as above	Same as above	eTC2	Same as above	
4.	600kHz RF Adj.	600kHz ANT Input 30dB, 400 Hz (30% MOD.), AM SSG	Same as above	Same as above	Bar Antenna (eL1)	Same as above	
5.	1400kHz RF Adj.	1400kHz ANT Input 30dB, 400Hz (30% MOD.), AM SSG	Same as above	Same as above	eTC1	Same as above	
6.	AM DC 0V Adj. (T-7)	1	1000kHz, ANT Input 60dB, 400Hz (30% MOD.), AM SSG	Same as above	Same as above	Tuning Knob	● Remove the lead wires from the motor connected to the connector terminals 10 and 11. ● Short between the point F (fD1) and the ground. ● Repeat procedures as stated in 6 and 7. ● AM/FM muting switch . . . ON
		2	Same as above	Same as above	Between TP4 & Earth DC Volt Meter	fT2	
7.	Discriminator Coil Adj. (T-7)	1	Same as above	Same as above	Same as above	Tuning Knob	● Max. DC Volt
		2	Same as above	Same as above	Same as above	fT1	

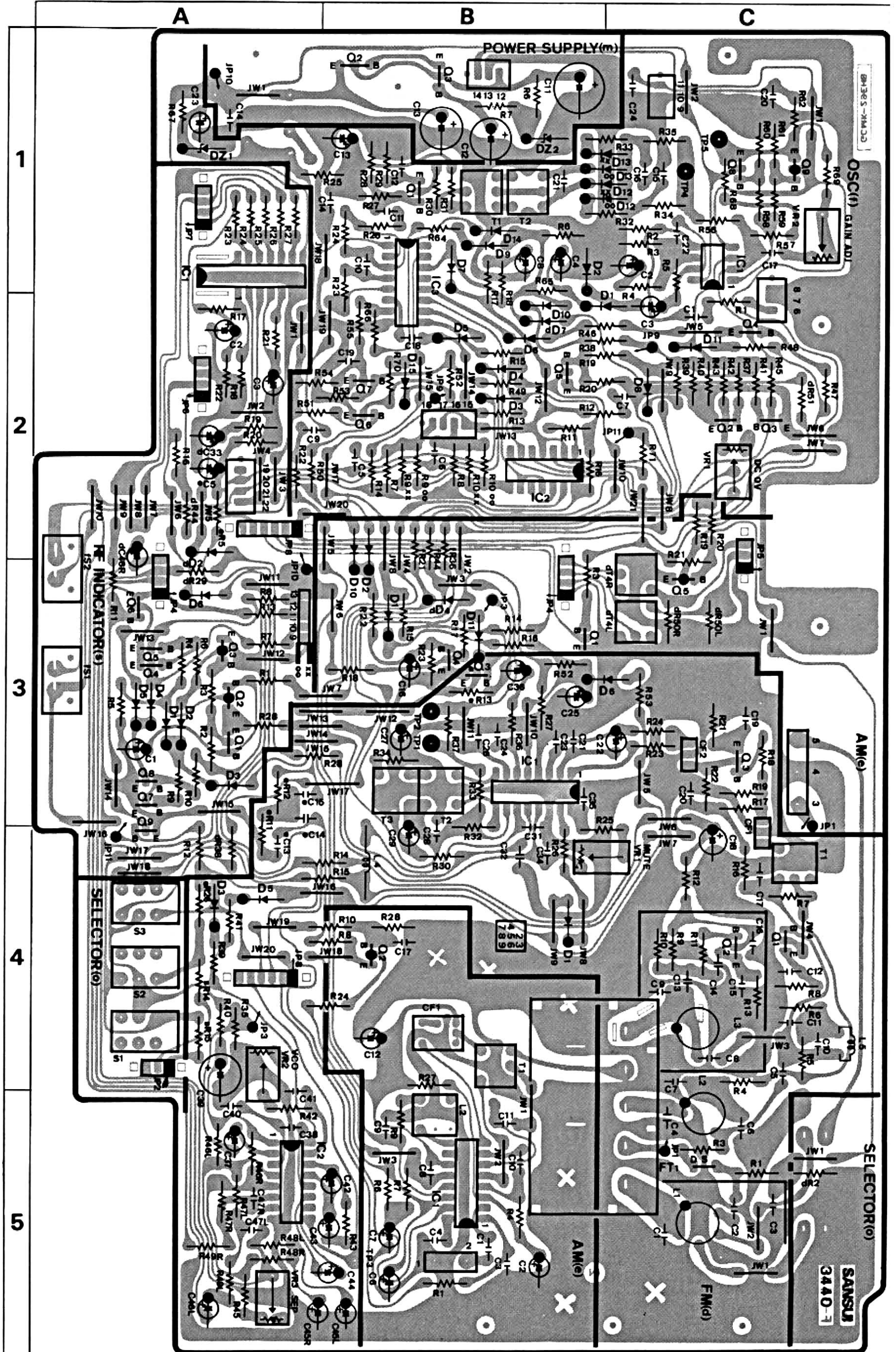






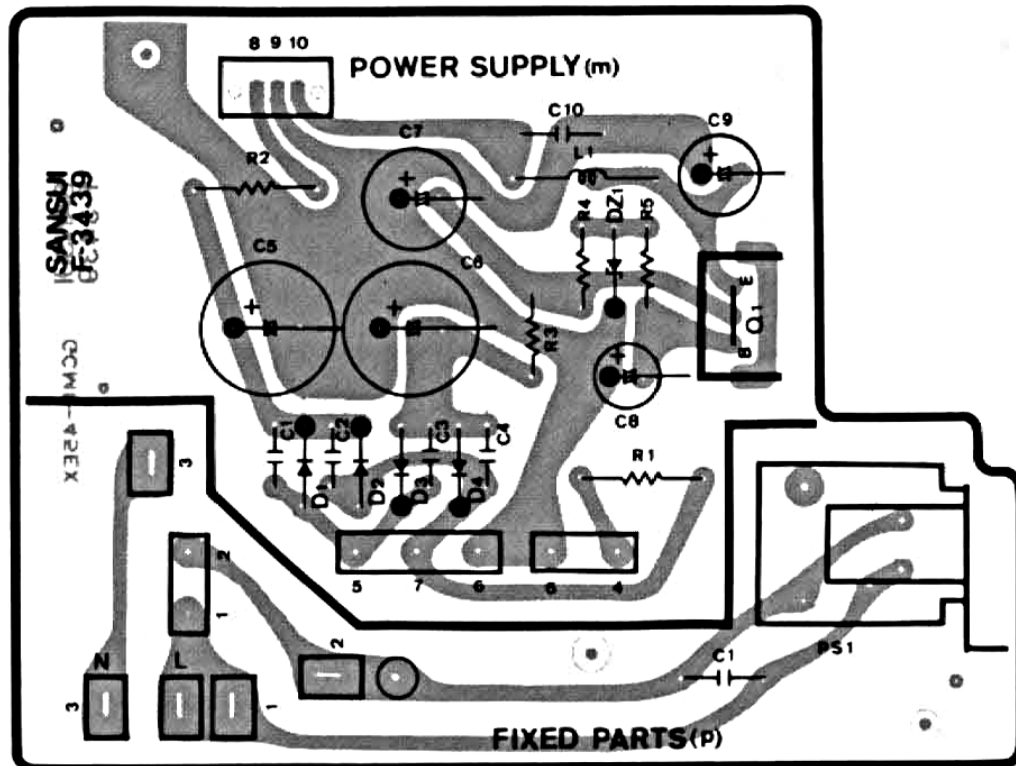
4-2. F-3440 AM, FM, RF, IF Circuit Board (Stock No. 00625301 = T-7)

Component Side



### 4-3. F-3439 Power Supply Circuit Board (Stock No. 00625901 = T-7/00626401 = T-5)

Component Side



#### Parts List

Parts No.	Stock No.	Description
●Diode		
mD1	03117700	10E-2
mD2	03117700	10E-2
pS1	07261300	Push Switch

Parts No.	Stock No.	Description
<T-7 Only>		
●Transistor		
mQ1	03034401, 2	2SB527D, E
●Diode		
mD3	03117700	10E-2
mD4	03117700	10E-2
●Zener Diode		
mDZ1	03159800	EQA01-14R
mR1	00184300	68Ω 1W N.I.R.
mR2	00179000	10Ω 1W N.I.R.
mR3	00179000	10Ω 1W N.I.R.
mL1	42904600	Peaking Coil 3.5μH
pC1	08302100	4700 pF 125 V C.C.
<T-5 Only>		
mR1	00184300	68Ω 1W N.I.R.
mR2	00181600	27Ω 1W N.I.R.
pC1	00386100	4700 pF 150 V C.C.

● Note: The circuit board, F-3411, F-3412, F-3413, F-3414, F-3415, F-3416, F-3441 & F-3442 are not supplied as the assembled. However, the individual parts on the circuit board are provided by orders.

### 4-4. F-3411 Output Terminal Circuit Board (T-5)

#### Parts List

Parts No.	Stock No.	Description
	07249000	2P Input Terminal

### 4-5. F-3412 AM, FM Indicator LED Circuit Board (T-5)

#### Parts List

Parts No.	Stock No.	Description
	07581900	1P LED Holder
	07581600	5P LED Holder
sLD7	07243200	Light Emitting Diode GL-5HD5
sLD8	07246200	Light Emitting Diode SEL1710K

### 4-6. F-3413 RF Indicator Circuit Board (T-5)

#### Parts List

Parts No.	Stock No.	Description
	07581900	1P Led Holder
sLD1 ~ 5	07246200	Light Emitting Diode SEL1710K
sLD6	07243200	Light Emitting Diode 5HD5

### 4-7. F-3414 Output Terminal Circuit Board (T-7)

#### Parts List

Parts No.	Stock No.	Description
	07249000	2P Terminal Board

### 4-8. F-3415 AM/FM Indicator LED Circuit Board (T-7)

#### Parts List

Parts No.	Stock No.	Description
	07581900	LED Holder
sLD1	07243200	Light Emitting Diode GL-5HD5
sLD2	07246200	Light Emitting Diode SEL1710K

### 4-9. F-3416 RF Signal Indicator LED Circuit Board (T-7)

#### Parts List

Parts No.	Stock No.	Description
	07581900	LED Holder
	07581600	5P LED Holder
sLD6	07243200	Light Emitting Diode 5HD5
sLD7 ~ 10	07246200	Light Emitting Diode SEL1710K

### 4-10. F-3441 Tuning Switch Circuit Board <UP> (T-7)

#### Parts List

Parts No.	Stock No.	Description
fs3	07259300	Push Switch

### 4-11. F-3442 Tuning Switch Circuit Board <DOWN> (T-7)

#### Parts List

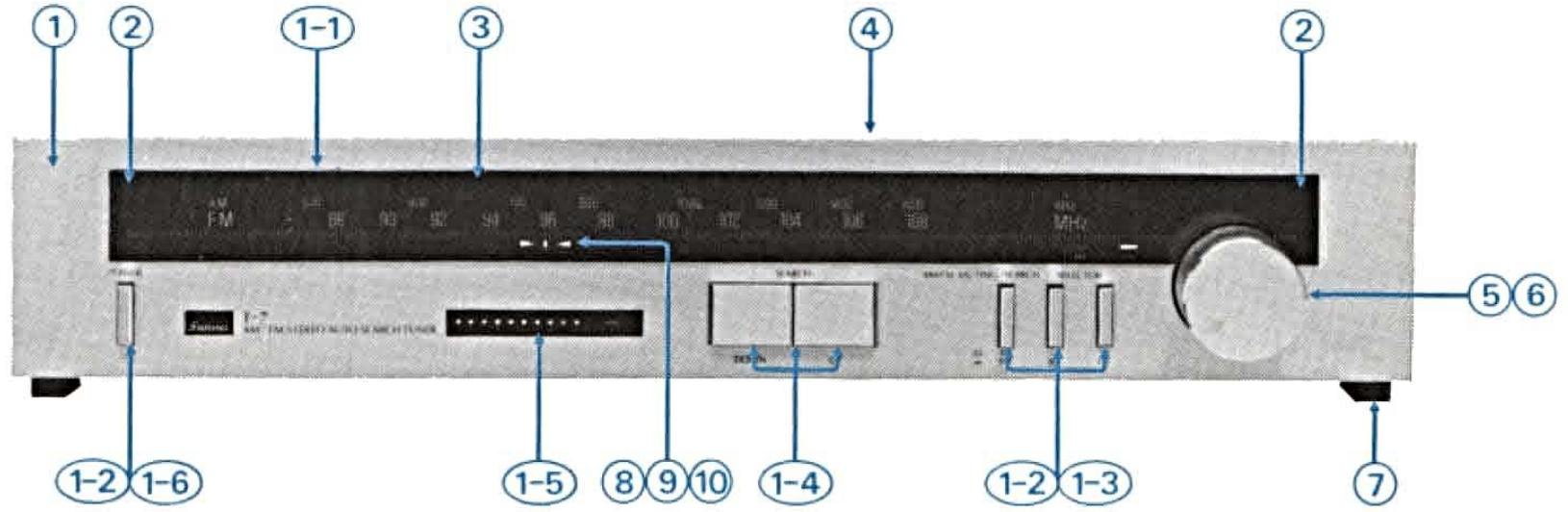
Parts No.	Stock No.	Description
fs4	07259300	Push Switch



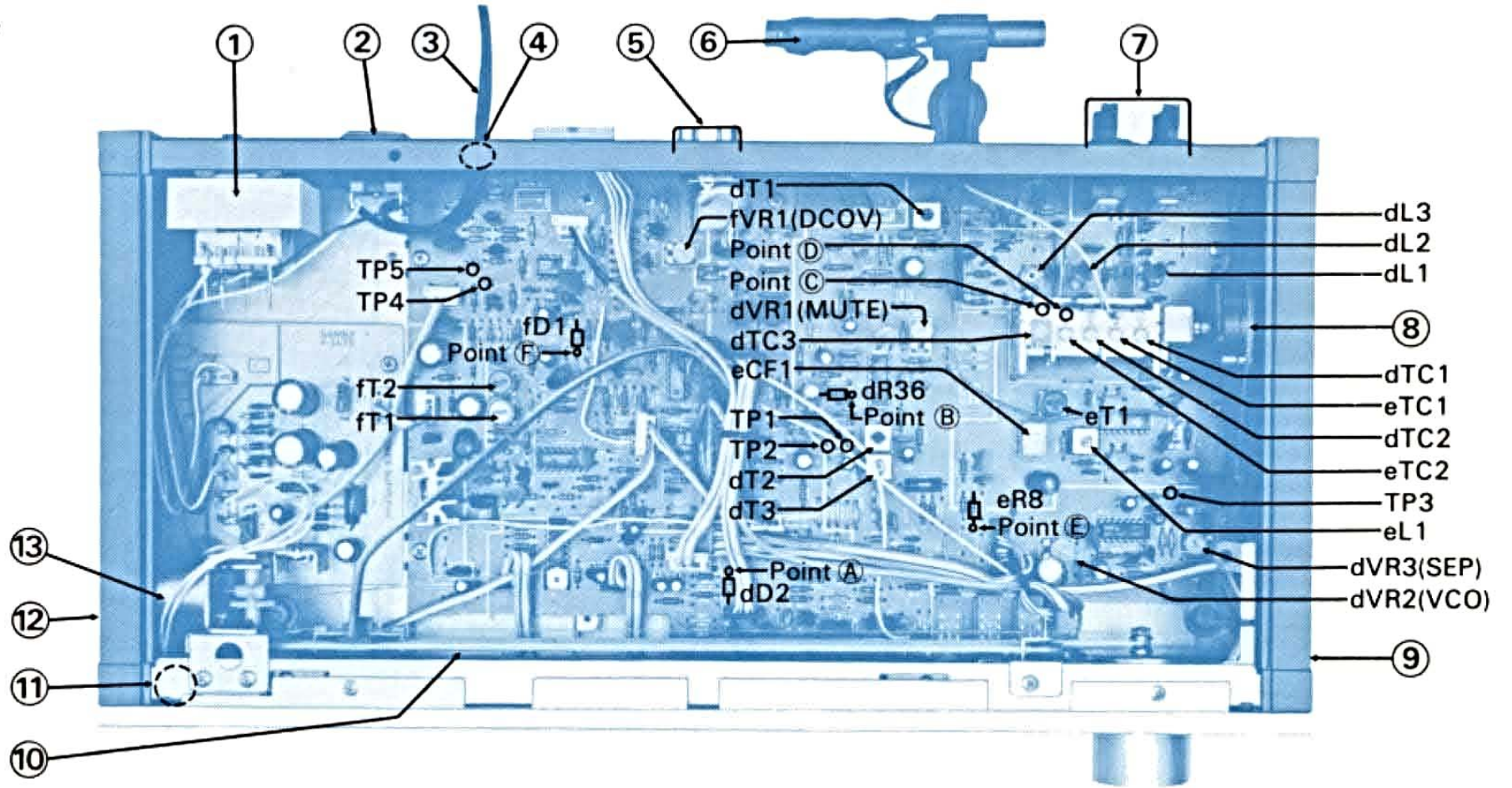
# 5. OTHER PARTS

## 5-1. T-7

### A) Front View



### B) Top View



#### Parts List <Front View>

Parts No.	Stock No.	Description
2	07679000	Dial Scale Holder
3	07703000	Dial Scale
4	07601400	Bonnet
6	07262900	Tuning Unit
7	07601200	Leg
8	07654810	Dial Pointer Holder
9	07647810	Dial Pointer Cap
10	07264700	LED Ass'y

Parts No.	Stock No.	Description
1-2	07580000	Push Knob
1-3	07581400	Push Knob Guide
1-4	07663100	Push Knob Ass'y, search
1-5	07705000	Indicator Window
1-6	07595600	Push Knob Guide
5	07738400	Knob, tuning

#### <Silver Model>

1	07704330	Front Panel Ass'y <XX>
	07782300	Front Panel Ass'y <UL>
1-1	07738610	Panel Window <XX>
	07781700	Panel Window <UL>
1-2	07579800	Push Knob
1-3	07581500	Push Knob Guide
1-4	07652200	Push Knob Ass'y, search
1-5	07705000	Indicator Window
1-6	07628100	Push Knob Guide
5	07738300	Knob, tuning

#### <Black Model>

1	07704420	Front Panel Ass'y <XX>
	07782400	Front Panel Ass'y <UL>
1-1	07691310	Panel Window <XX>
	07781800	Panel Window <UL>

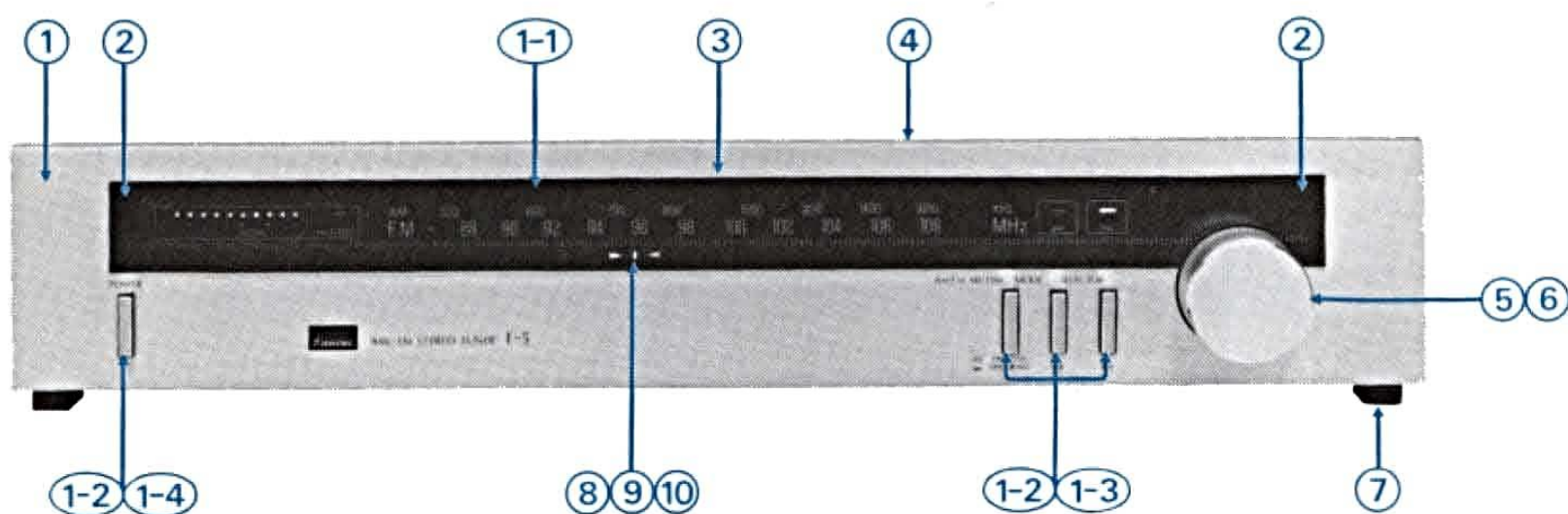
#### Parts List <Top View>

Parts No.	Stock No.	Description
1	15002701	Power Transformer
2	07189600	AC Outlet
3	38005400	Power Supply Cord
4	39106000	Strain Relief
5	07249000	2P Output Terminal Board
6	07258000	AM Bar Antenna
7	22902600	Terminal Board 4P, antenna
8	07732400	Pulley
9	07601810	Side Panel (R)
10	07257000	Belt
11	07267600	Pilot Lamp, 14V 80mA
12	07601710	Side Panel (L)
13	07234200	Motor Unit

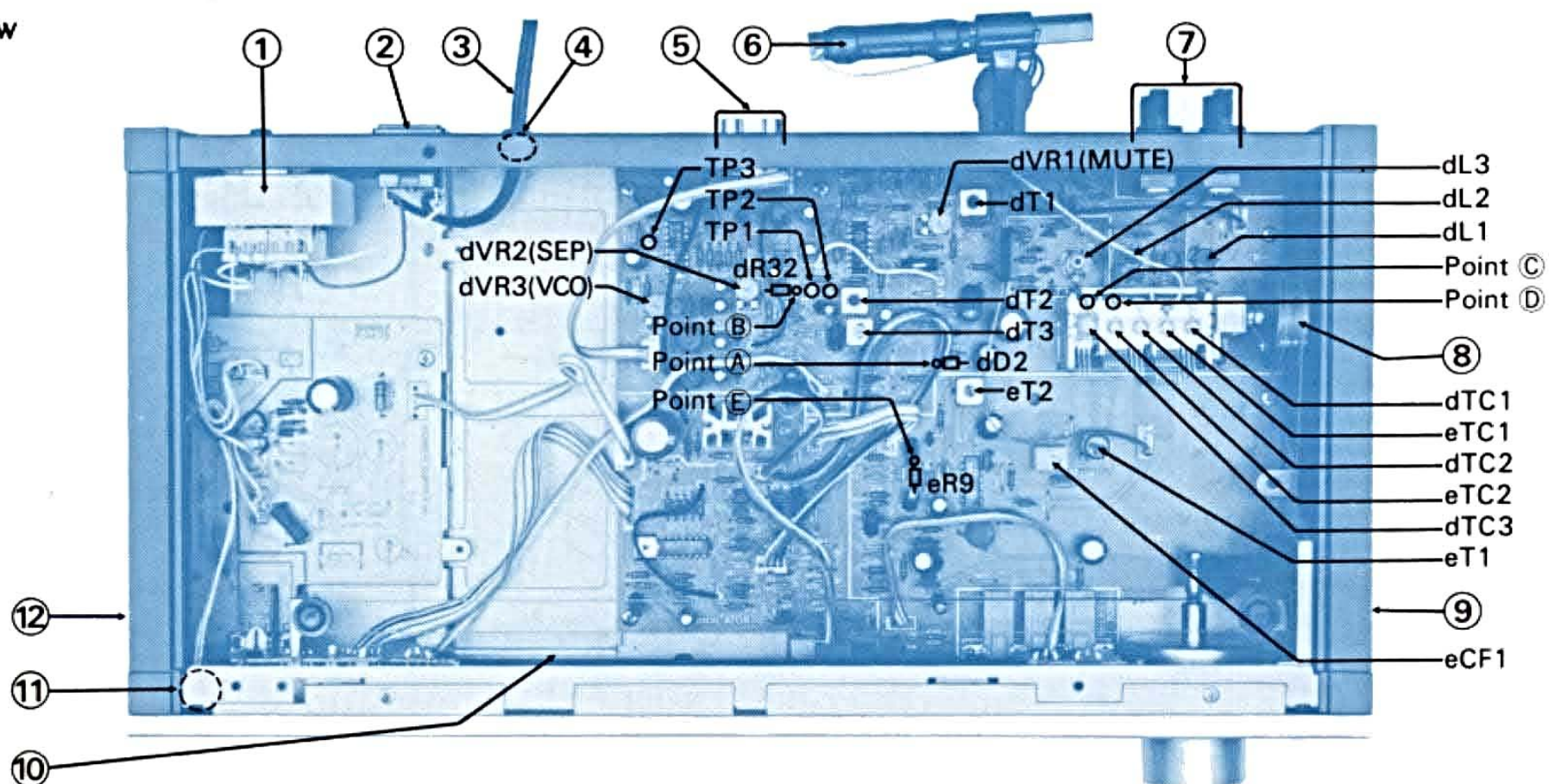


## 5-2. T-5

### A) Front View



### B) Top View



#### Parts List <Front View>

Parts No.	Stock No.	Description
2	07679000	Dial Scale Holder
3	07703300	Dial Scale
4	07601400	Bonnet
6	07263000	Tuning Unit
7	07601200	Leg
8	07654810	Dial Pointer Holder
9	07647810	Dial Pointer Cap
10	07264700	LED Ass'y
<b>&lt;Silver Model&gt;</b>		
1	07704730	Front Panel Ass'y <XX>
	07782100	Front Panel Ass'y <UL>
1-1	07738610	Panel Window <XX>
	07781700	Panel Window <UL>
1-2	07579800	Push Knob
1-3	07581500	Push Knob Guide
1-4	07628100	Push Knob Guide
5	07738100	Knob, tuning
<b>&lt;Black Model&gt;</b>		
1	07704820	Front Panel Ass'y <XX>
	07782200	Front Panel Ass'y <UL>
1-1	07691310	Panel Window <XX>
	07781800	Panel Window <UL>
1-2	07580000	Push Knob
1-3	07581400	Push Knob Guide
1-4	07595600	Push Knob Guide
5	07624500	Knob, tuning

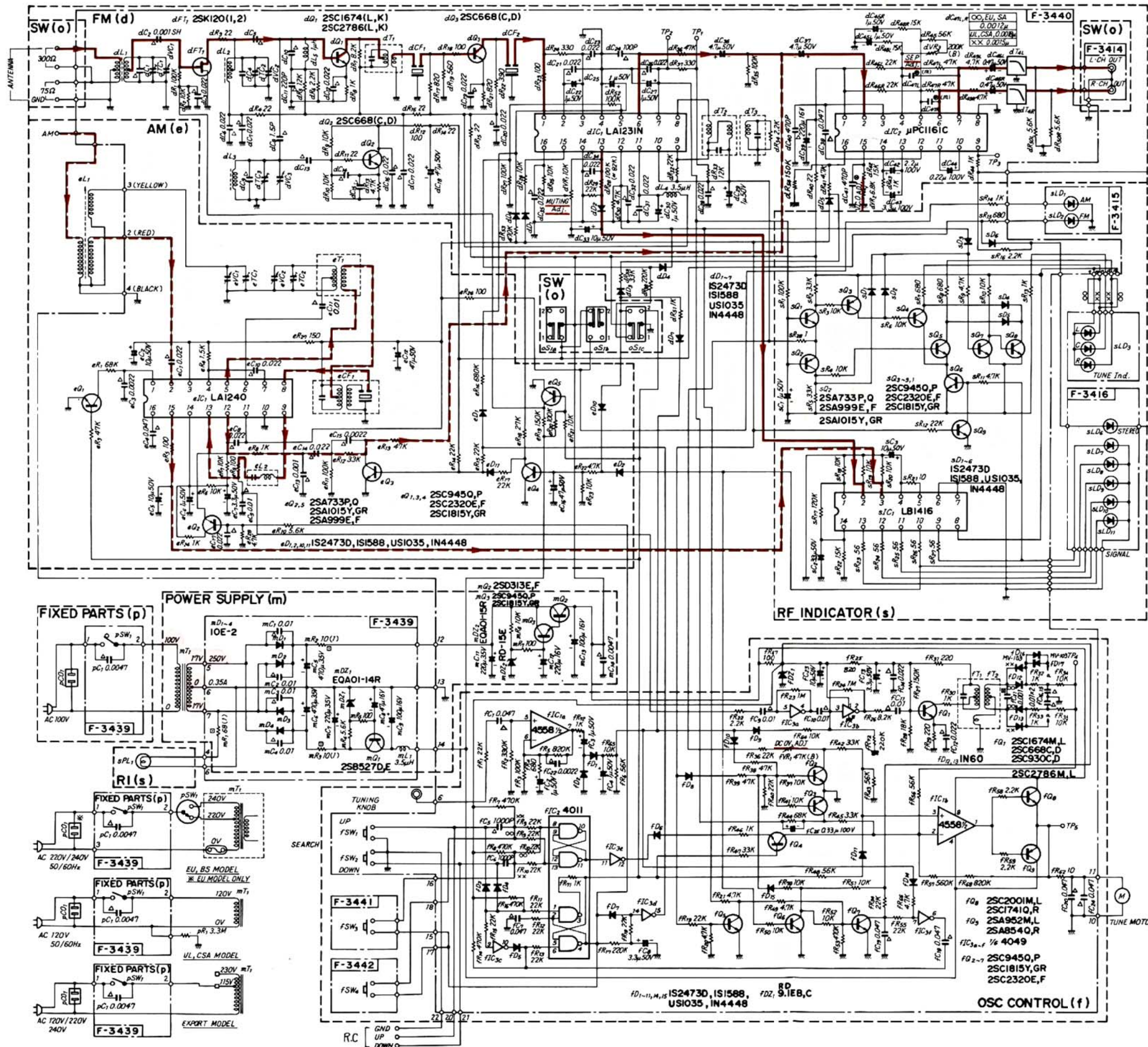
#### Parts List <Top View>

Parts No.	Stock No.	Description
1	15002701	Power Transformer
2	07189600	AC Outlet
3	38005400	Power Supply Cord
4	39106000	Strain Relief
5	07249000	2P Input Terminal
6	07258000	AM Bar Antenna
7	22902600	Terminal Board 4P, antenna
8	61466630	Pulley
9	07601810	Side Panel (R)
10	07691400	Dial Pointer Guide
11	07267600	Pilot Lamp, 14V 80mA
12	07601710	Side Panel (L)



6. SCHEMATIC DIAGRAM 6-1. T-7

• La présentation et les spécifications sont susceptibles d'être modifiées sans préavis par suites d'améliorations éventuelles.  
 • Änderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.  
 • Design and specifications subject to change without notice for improvement.



規格設定

J	U	SA	SH
C <sub>1</sub>	15P	12P	15P
C <sub>3</sub>	BP	9P	BP
C <sub>4</sub>	27P	15P	15P
C <sub>10</sub>	BP	-	18P
C <sub>9</sub>	SH	RH	RH
C <sub>15</sub>	SH	RH	11P
C <sub>16</sub>	SH	RH	10P
C <sub>18</sub>	10P	10P	10P
C <sub>19</sub>	27P	27P	27P

	1	2
oS <sub>1a</sub> FM	ON	OFF
oS <sub>1b</sub> AM	ON	OFF
oS <sub>1c</sub> AM, FM MUTING/SEARCH	ON	OFF
FSW <sub>1</sub> UP	ON	OFF
FSW <sub>2</sub> DOWN	ON	OFF
FSW <sub>3</sub> Leaf, SW	ON	OFF

SYMBOL OF FUNCTION  
 (d) FM  
 (e) AM  
 (f) OSC CONTROL  
 (m) POWER SUPPLY  
 (o) SW  
 (p) FIXED PARTS  
 (s) RF INDICATOR

SYMBOL OF C.R.  
 Δ Ceramic Capacitor  
 ● Polystyrene Capacitor  
 ○ Mylar  
 □ Non-Inflammable Resistor

FM  
 AM

- 25A733
- 25A854
- 25A952
- 25A999
- 25C945
- 25A1015
- 25C930
- 25C1674
- 25C1741
- 25C1815
- 25C2001
- 25C2320
- NJM4558D
- TC4011P
- MSM4011
- HA1197
- LA1231
- LA1240
- μPC1161C
- MSM4049RS
- 25B527
- LB1416
- 25D313AL
- IN60
- IS2473D
- 10E 2
- 25C668
- EQA01-14R
- RD 9,1E
- RD-13E
- RD-15
- 25K120

1  
2  
3  
4  
5

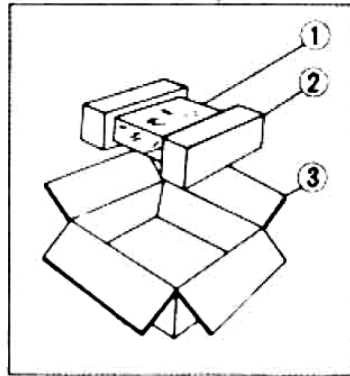






## 8. PACKING LIST

Parts No.	Stock No.	Description
1	07599500	Vinyl Cover
2	07661900	Styrofoam Packing
3	07699000	Carton Case (T-7, Silver)
	07699100	Carton Case (T-7, Black)
	07699200	Carton Case (T-5, Silver)
	07699400	Carton Case (T-5, Black)



## 9. ACCESSORY LIST

Stock No.	Description
07669200	Operating Instruction (T-7)
07669400	Operating Instruction (T-5)
38103200	PJP Cord
46051700	FM Antenna

**Sansui**

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