

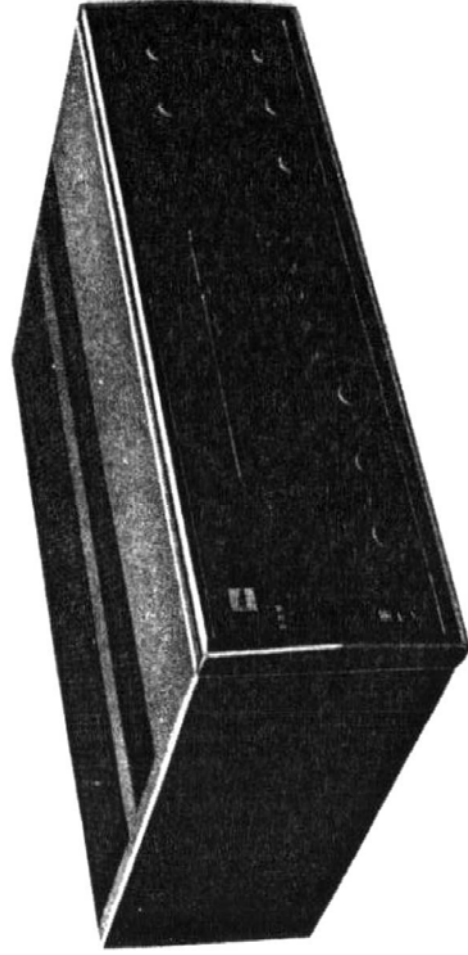


TOSHIBA AM/FM STEREO RECEIVER

SERVICE DATA

MODEL SA-15Y

High Power Output
Low Distortion
All-Silicon Transistors
FET Front End
Attractive Black Dial



TOKYO SHIBAURA ELECTRIC CO., LTD.

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Cable : TOSHIBAGNZ TOKYO, Telex NO.: TK4681,4682,4683

I. SPECIFICATIONS

Type: 2-band, 1 channel superheterodyne radio fitted. All silicon transistorized stereo amplifier.

Signal frequency: AM; 530 ~ 1605 KHz

Range: FM; 88 ~ 108 MHz

Sensitivity: AM; 90 μ V/m

FM 2 μ V (IHF)

S/N Ratio: 50 dB

Selectivity: 30 dB

Output: Music power 150W max. (8 Ω)
Music power (IHF 0.4%); 70W (8 Ω)
Music power (IHF 0.4%); 100W (4 Ω)
Continuous output; 30W/30W at 0.4% (8 Ω)

Frequency characteristics: 20Hz ~ 60 KHz (-3 dB)

Power band ways: 20Hz ~ 40 KHz (-3 dB)

Distortion: 30W/30W at 0.4%
10W/10W at 0.1%
1W/1W at 0.1%

Sensitivity and input impedance:

PHONO 3mV 100K
TAPE HEAD; 2mV 100K Ω
AUX 1; 200mV 100K Ω
AUX 2; 200mV 1M Ω

SN ratio: PHONO; 75 dB
AUX; 80 dB

TAPE HEAD; 75 dB

Residual reverberation: 2mV

Damping factor: 100 (8 Ω), 1:01 (IHF)

Terminal: Speaker impedance 4 ~ 16 Ω

Record reproduction
(DIN standard)

Headphone

Pre-amp output terminal

Main-amp input terminal

Distant (remote) speaker terminal

Antenna: AM; Ferrite antenna

FM; T-shape simple antenna

Semi conductors: 47 silicon transistors,
2 FET's silicon,
4 diodes

Power supply: 120V, 50 Hz, 60Hz

Power consumption: 350W Max.

35W no-signal

External dimensions:

Manufactured unit: 19 1/2 ins., (width),
15 1/4 ins., (depth),
6 1/3 ins., (height)

Packing: 21 ins., (width), 16 1/2 ins.,
(Depth), 7 1/10 ins., (height)

Weight: Unit; 29 lbs.

Packing; 33 1/2 lbs.

Accessories: FM T-shape antenna; 1
Short pin plug; 2
Connection pin plug; 2
Pin plug; 6
Speaker pin plug; 2
Fuse (3A); 2
Instruction Manual 1
Cabinet: Walnut cabinet

II. TECHNICAL POINTS

1. All-Silicon Transistors

(Same as the "BOSTON")

2. High Output Low Distortion Ratio Amplifier

A regular amplifier which employs high reliance silicon transistors. 3-stage direct coupling circuits are used together with the pre-amp, control amp, and driver amp, the output stage is an acknowledged semi complementary design of low distortion. The output is maximum music power at 150W (8 Ω) and IHF music power at 70W (0.4%) therefore, marginal sound can be enjoyed according to one's choice.

3. High Performance FM Tuner

High performance silicon FET (field effect transistors) are employed therefore distortion (spurious characteristic, cross modulation characteristic) due to excessive input, which was the defect of solid state tuner of the past, has been greatly modified. Also by using FET's the sensitivity and selectivity are also improved.

4. FM-STEREO Automatic Changeover System

The FM multi-unit employs an automatic changeover system which changes the FM mono and FM stereo broadcasting electronically according to the content of the broadcast. Mono broadcasting distortion which was a defect in automatic changeover systems of the past, has been rectified due to the application of this new circuit system (PATENT PENDING).

5. Muting Circuit

When selecting a FM station the discordant noise received within the broadcasting station can be completely eliminated by inserting a muting switch into the circuit.

6. Protection Device (Protector)

In the case of an abnormal input signal (e.g. a tertiary voltage power supply, or abnormal voltage due to lightening) or an output terminal short the protector operates automatically and safeguards the output transistors from being damaged. When the protector operates the red indicator lamp lights. Handling is simple and there is no faulty operation due to external conditions, it can be instantly reset by pushing the PROTECTOR RESET BUTTON.

7. Latest Style

The well established black dial is also used with the "BOSTON" series. The external appearance is of a black and silver contrast and has excellent functions with easy to operate knobs mounted on a de luxe walnut cabinet.

8. Perfect Auxiliary (Accessory) Circuit

A. Mode Switch

The pre amp input side can be changed over to MONO and REVERSE STEREO depending on the program. Correct recording, reproduction and performance is possible even if the left hand side input and output is mistakenly connected to those on the right hand side. This is most convenient as both mono and stereo can be heard through one speaker.

B. Tape Monitor Switch

The condition of the recording is immediately made clear since the sound being recorded can be monitored at the same time as the recording when utilizing a tape recorder which has a built in monitoring head. Stereo reproduction and monitoring is possible in the "TAPE STEREO" position, and right hand side sound reproduction and/or monitoring is possible in the "TAPE R" position, also left hand side sound reproduction and/or monitoring in the "TAPE L" position is possible.

C. Pre and Main Split Circuits

The pre amp output and main amp input can be split by unplugging the connector. This circuit is convenient as multi-channel amp connections and other pre amp and main amp connections are possible.

D. Miscellaneous

AFC switch, roundness switch, distance speaker terminal, low-cut and high-cut switch and head phone terminals are provided.

III. STAGE DIRECT COUPLED CIRCUIT

1. Outline of the New Circuit System

The transistor connections from the input to the output are all connected directly to all the transistor poles as indicated by the diagram shown on the right. This is the same as for vacuum tubes, however when a condenser or transformer is inserted in the coupled circuit, the condenser reactance $\tan \delta$ due to the effect of the impedance of the circuit (and) the phase and frequency characteristics due to the reactance, winding capacity and winding resistance of the transformers, deteriorate.

In the SA-15Y., three stage direct coupled circuits are used in 10 places throughout the circuit. This circuit is not influenced due to the coupled elements as indicated above, therefore the phase characteristics are good and it can be said that the features are that the frequency and distortion characteristics due to sufficient application of negative feedback are extremely good.

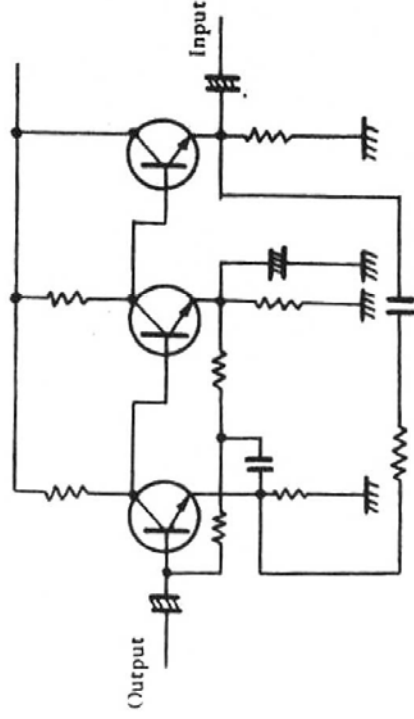


Fig. 1

The total gain of the 3-transistors is 28 dB, therefore this is equal to the gain obtained by one transistor in a conventional amplifier. Namely it can be said that this is a regular circuit where performance and stability have been very carefully considered in the design.

2. Complementary Circuit

The complementary circuit is also of the direct coupled type. It can be said that this is the only circuit which modifies the frequency, phase and distortion characteristics which were inferior in the input transistorized systems of the past.

The features of this circuit are it's two types of transistors, that is the PNP and NPN qualities are effectively utilized for phase conversion and are often employed in top class stereo amplifiers. There are no elements which are affected by the frequency and phase characteristics in the amplifier connections as was explained in the 3-stage direct coupled circuit, therefore, as the negative feedback is quite adequate this is a wide frequency, distortionless amplifier with a high output.

The output impedance can be vastly reduced, therefore the magnitude of the damping factor is one of it's main features.

3. Protection Indicator Circuit

When the protectors CB 801 and CB 802 are operating in an open condition, the circuit is indicated by the indicator lamps.

The operating principle when either of the CB's are open, switches the TR 801 by constituting a bias circuit and when both CB's are working again the bias deepens and switching occurs. In either case indication is possible as the current flows in the indicator lamp.

Indicators in the various systems used in the past had an unduly complex construction, moreover there were defects due to the occurrence of faults and slow response speed caused by the mechanical construction of employing relays in these circuits. Now, the faults are instantaneously investigated and indicated as this circuit is of a pure electronic type.

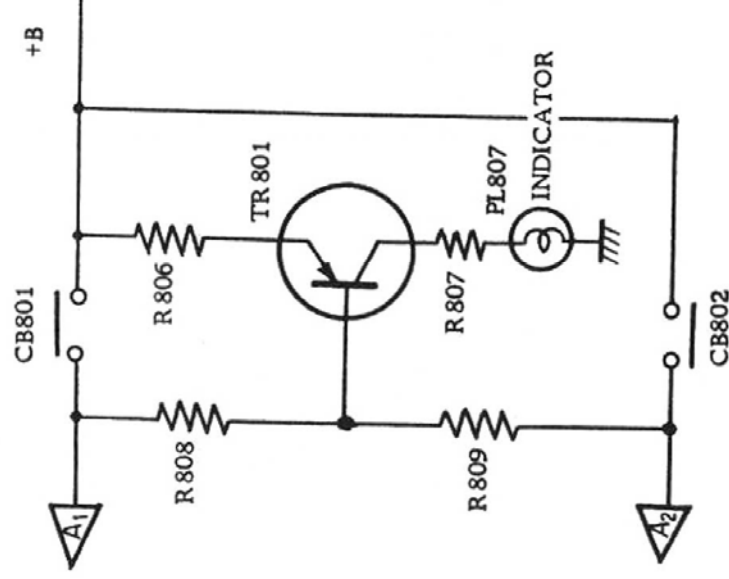
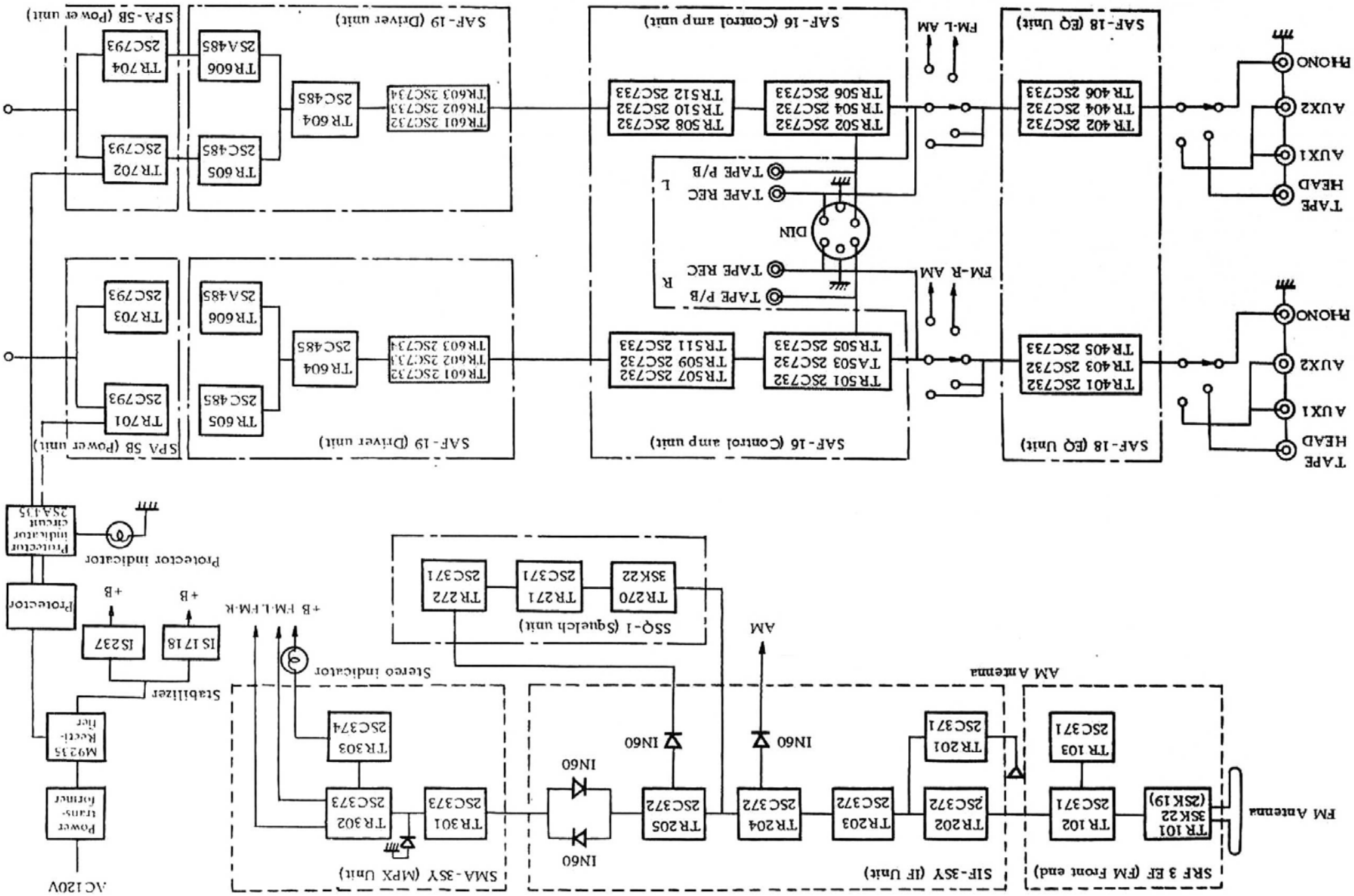
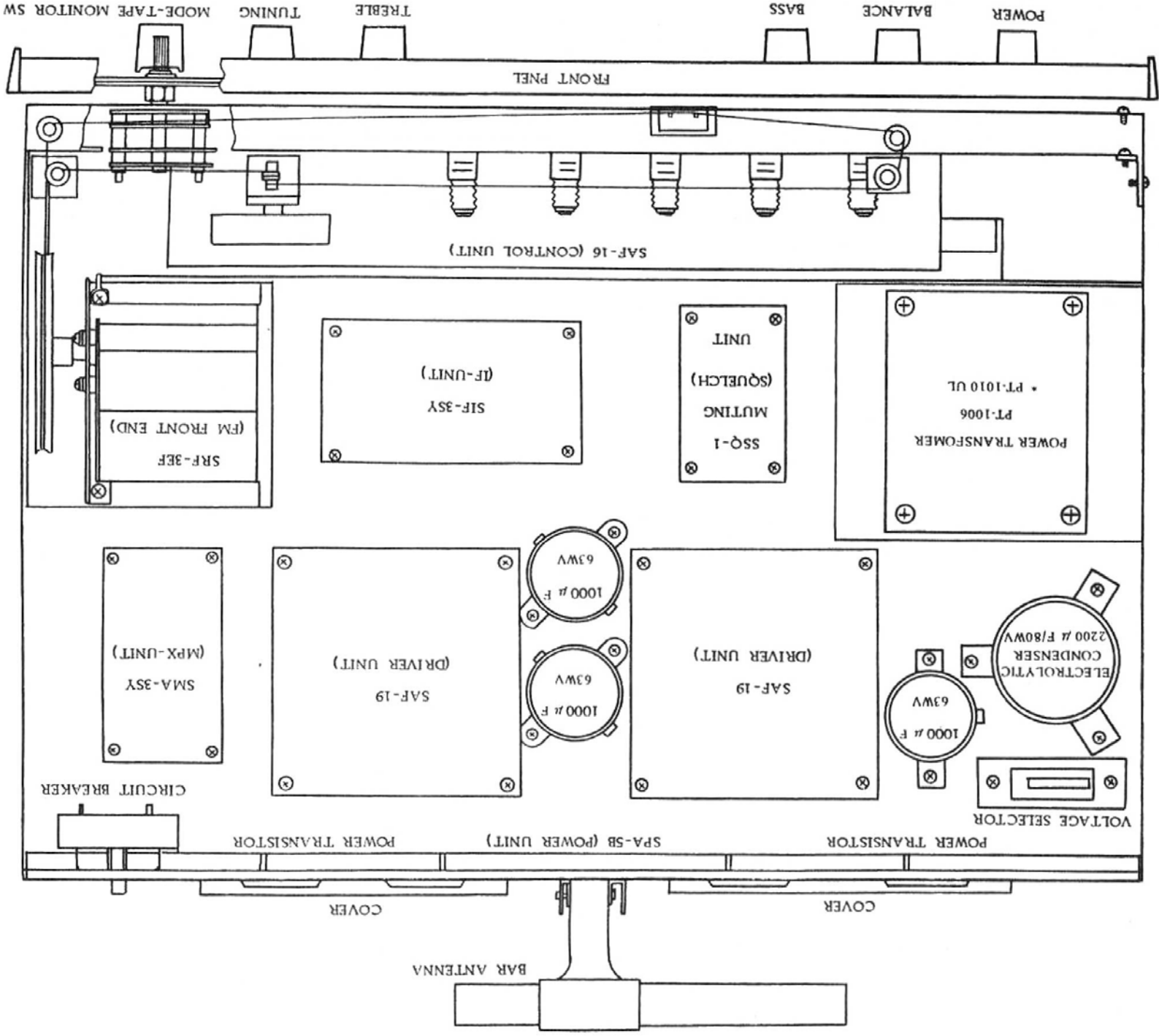


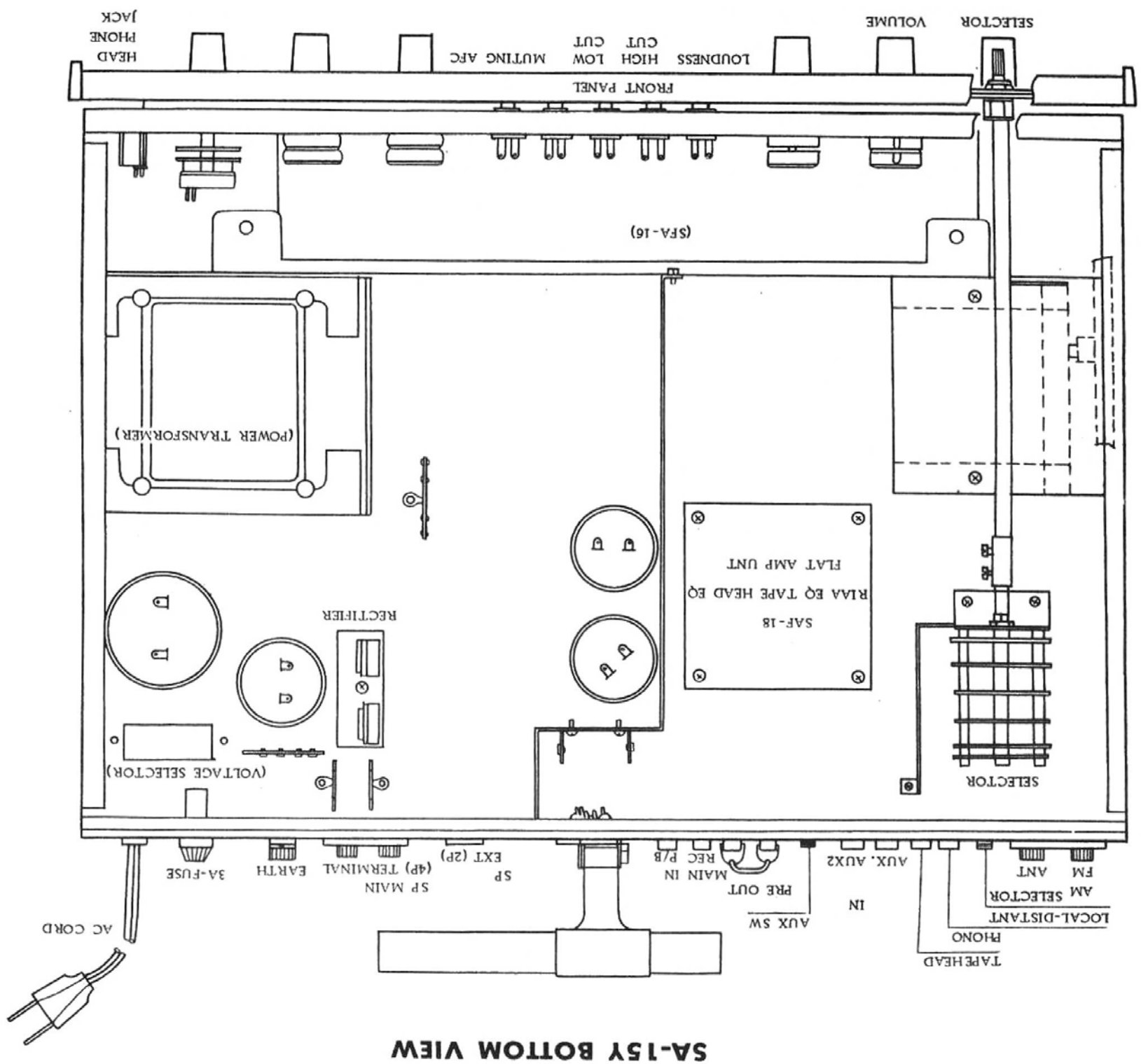
Fig. 2

SA-15Y BLOCK DIAGRAM

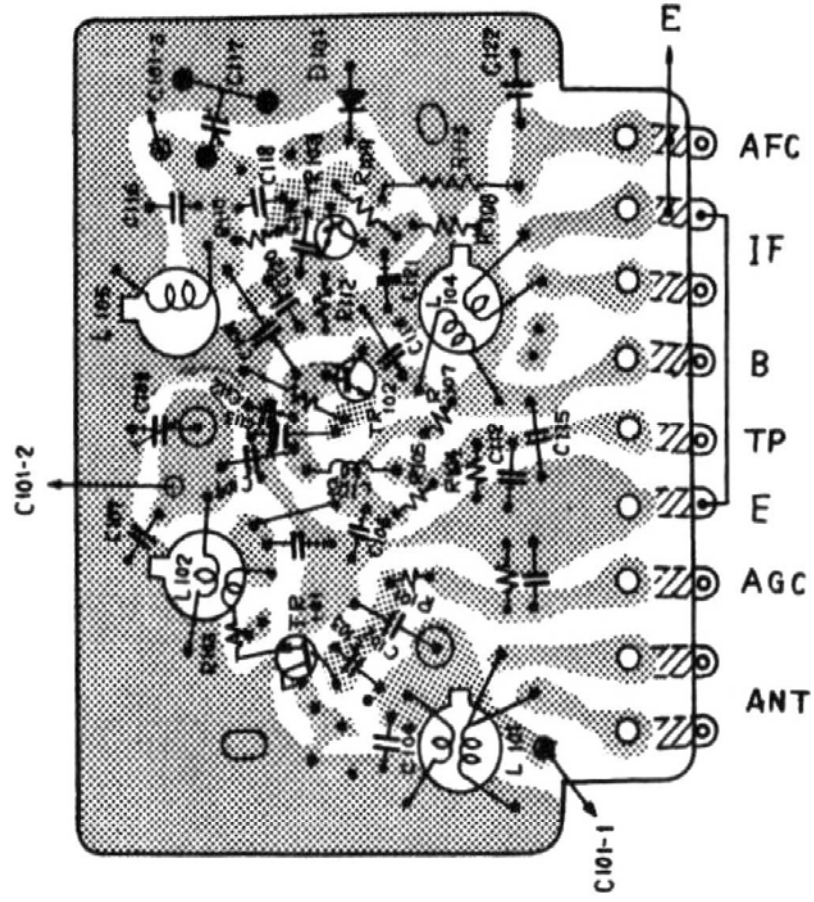


SA-15Y TOP VIEW

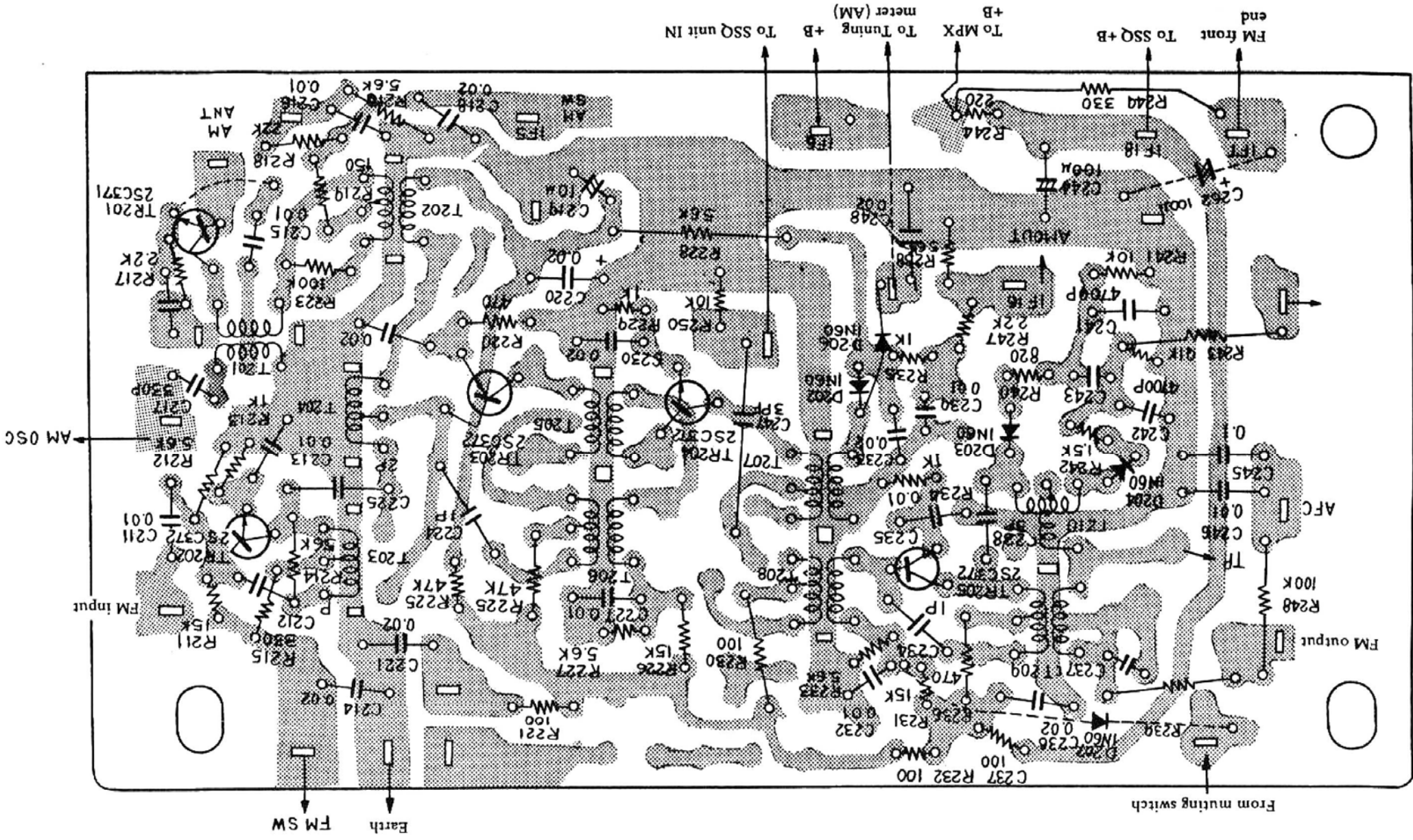




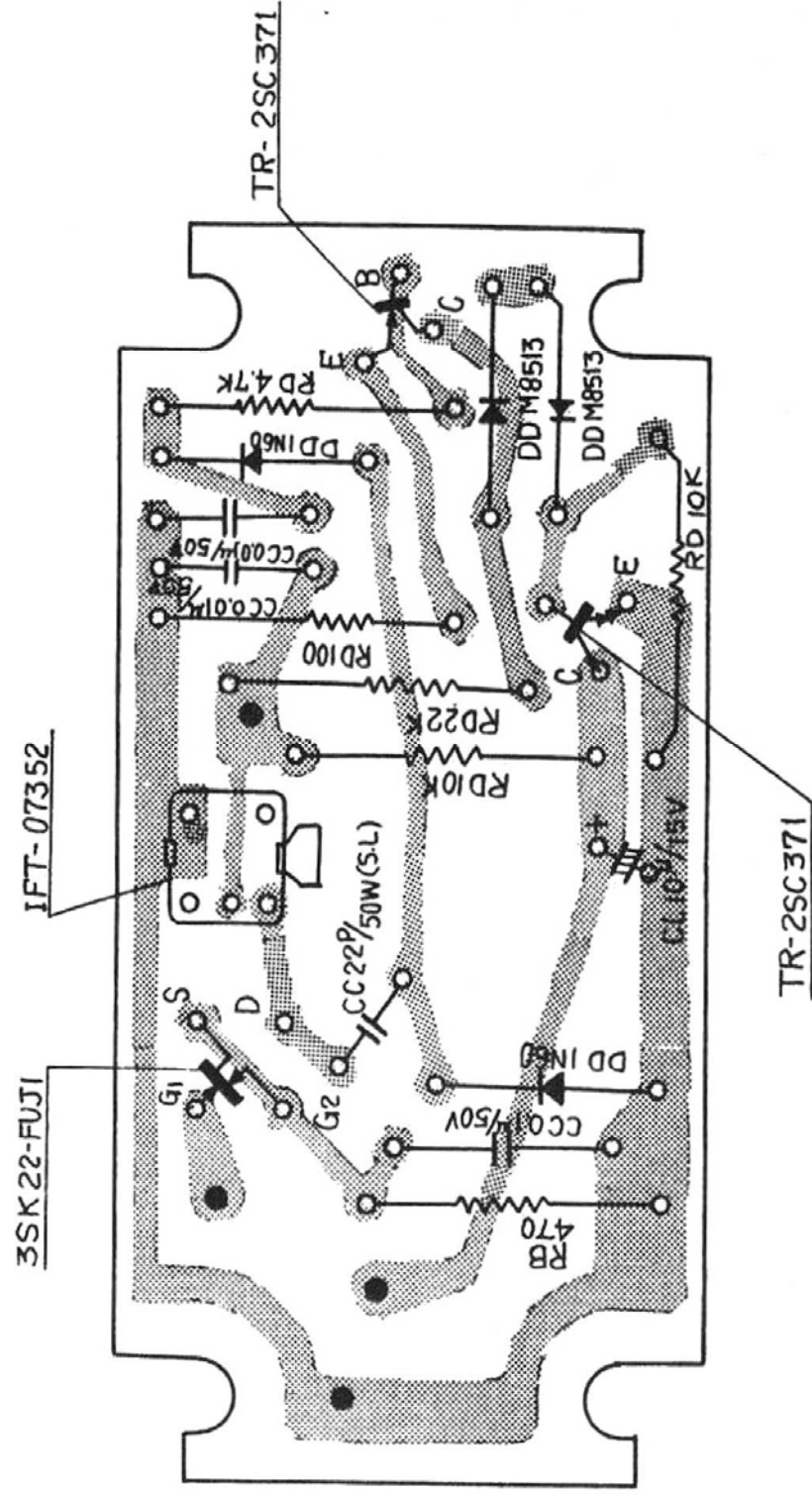
CIRCUIT BOARD DIAGRAM SRF-3EF



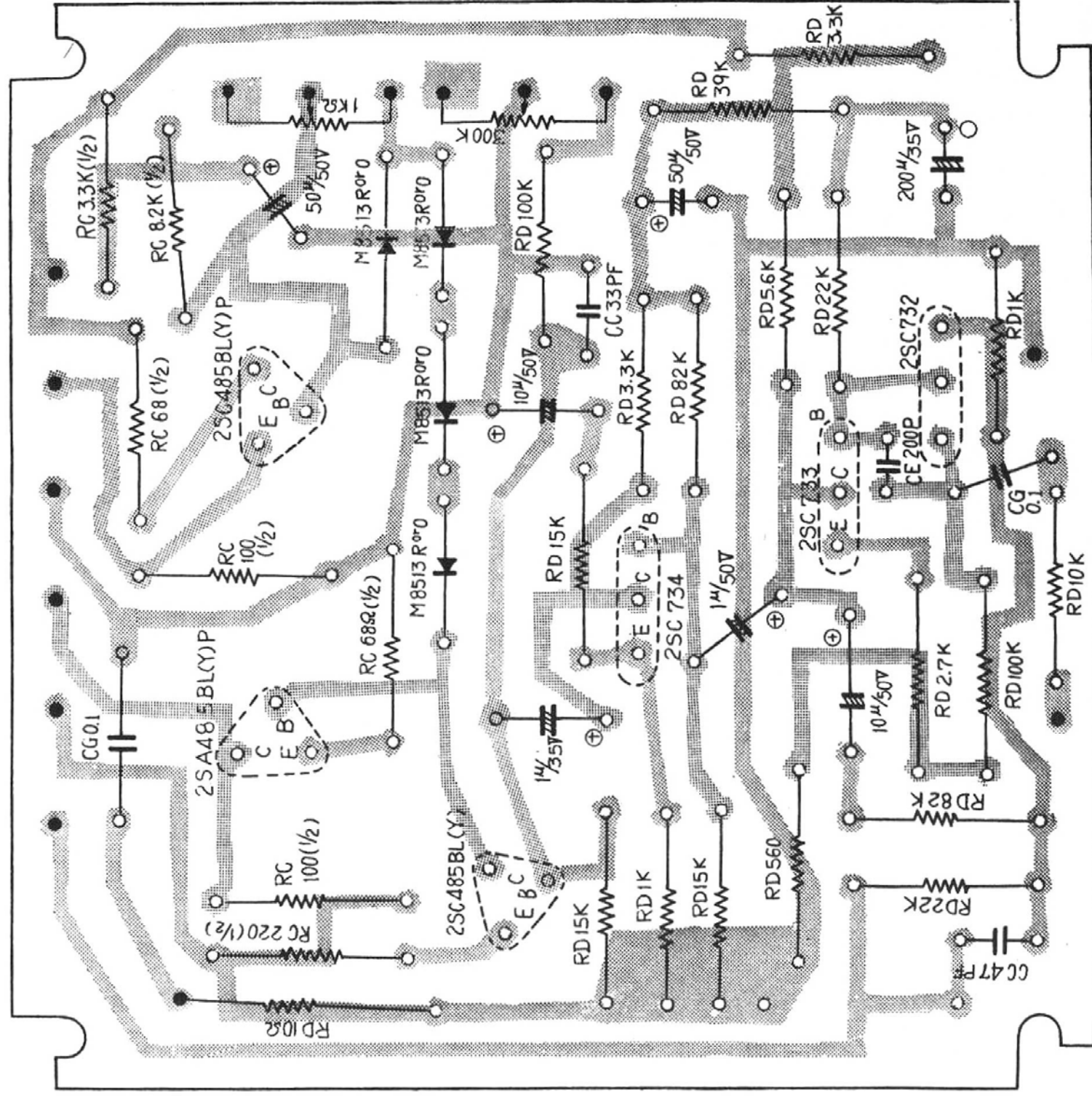
CIRCUIT BOARD DIAGRAM SIF-35Y



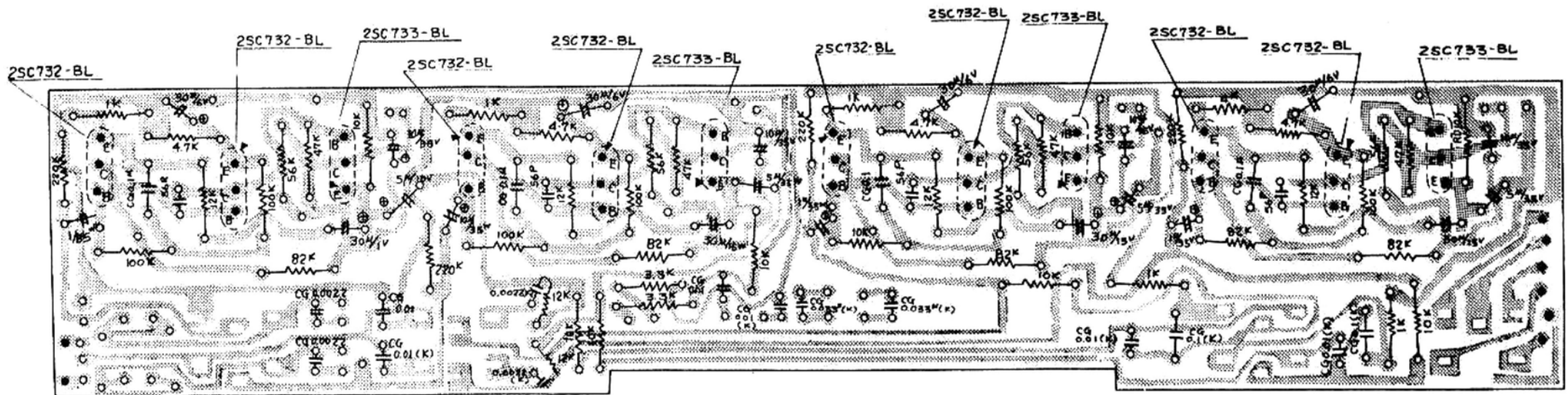
CIRCUIT BOARD DIAGRAM 55Q-1



CIRCUIT BOARD VIEW SAF-19



CIRCUIT BOARD VIEW SAF-16



SA-15Y SERVICE PARTS LIST

SYMBOL NO.	STOCK NO.	DESCRIPTION
UNIT		
SRF-3EF	20141152	FM Frontend Unit
SIF-3SY	20141157	IF Unit
SMA-3SY	20141162	MPX Unit
SSQ-1	20141075	Muting (Squelch) Unit
SAF-18	20141116	RIAA EQ Tape Head EQ Flat AMP Unit
SAF-16	20141104	Control Unit
SAF-19	20141117	Driver Unit
SPA-5B	20141153	Power Unit
TRANSISTOR & DIODE		
TR401-4	0036733200	2SC732-BL-FJ
TR501-4	0036733300	2SC783-BL-FJ
TR405-6	0036715565	2SC485-BL (Y) P
TR505-6	(0036715540)	
TR605	003670132	2SA485 BL (Y) P
TR605	(003670370)	
TR1101-4	0036738840	2SC793 BL (Y) FJ (P)
TR604	0036715565	2SC485 BL (Y)
TR801	0036501320	2SA485 BL (Y)
TR507-10	0036733200	2SC732
TR601	0036733300	2SC733
TR602	0036733300	2SC733
TR603	0036733400	2SC734
TR201	0036707100	2SC371
TR202-5	0036707200	2SC372

SYMBOL NO.	STOCK NO.	DESCRIPTION
TR301-2	0036707300	2SC373
TR270	0036050200	3SK22
D801-4	0037920900	M9235-FJ Rectifier
D805	0037256700	1S1718 Zener Diode
D601-4 D273-4	0037316162	M8513-R
D806	0037000900	IN60 Diode
	0037207900	IS 237 Diode
COIL AND TRANSFORMER		
T201	20245013	RT-7103B Oscillator AM
T203, 270	20258004	IT-07352 IF Transformer
T204	20258005	IT-07353 IF Transformer
T206, 9	20259002	IT-07351 IF Transformer
T208	20258003	IT-07350 IF Transformer
T210	20259003	IT-07355 IF Transformer
T202	20267002	IT-07336 IF Transformer
T205	20268002	IT-07347 IF Transformer
T207	20269002	IT-07337 IF Transformer
T301	20277003	ST-1002DA MPX Transformer
T302	20277004	ST-1002DB MPX Transformer
T303	20278003	ST-3002 MPX Transformer
L301	20261002	VLB-103 MPX Transformer
L302, 3	20241393	Ferrite Choke Coil, 39 mH
T200	20247008	Ferrite ANT FA-1005
T801	20213040	Power Transformer, PT-1006
T801	20213047	Power Transformer, PT-1010 UL
CAPACITOR		
C805	20420027	Electric Condenser 2200 μ F 80WV

SYMBOL NO.	STOCK NO.	DESCRIPTION
C806	20420028	Electric Condenser 1000 μ F 63WV
C801-4	20310001	Electric Condenser 0.047 μ F 450WV
C245	20362150-1	Ceramic Cond. 15PF \pm 10% UT
C241-2, 239	20362271	Ceramic Cond. 270PF 50WV SL
C247, 238	20361309	Ceramic Cond. 3PF 50WV SL
C212, 224, 225, 234	20305109	Gimmick Cond. 1PF \pm 10P
C304, 306 310	20392472	Polythylne, 4700PF \pm 10%
C308, 312-3	20392471	Polyethylene, 4700PF \pm 10%
RESISTOR		
R801	20685065	Coil Resistor, 200 Ω 4W
R561-2	20620008	Volume (Tone), 50K Ω A Curve
R560	20620009	Volume (Sound), 50K Ω B Curve
R563	20620010	Volume (Balance), 50K Ω MN
R615	20682011	Half Vol. 300K Ω 1/10W
R619	20682010	Half Vol. 1K Ω 1/10W
MISCELLANEOUS		
	47-040137	Needle Assembly
	47-040138- 005	Panel Assembly
	47-040172	Leg
	20124017	Bar Antenna
	20816135	Knob A
	20816136	Knob B
	20816137	Knob C
	20113011	Pilot Lamp B
	20113015	Indicator Lamp R (Red)
	20113014	Indicator Lamp C (Green)

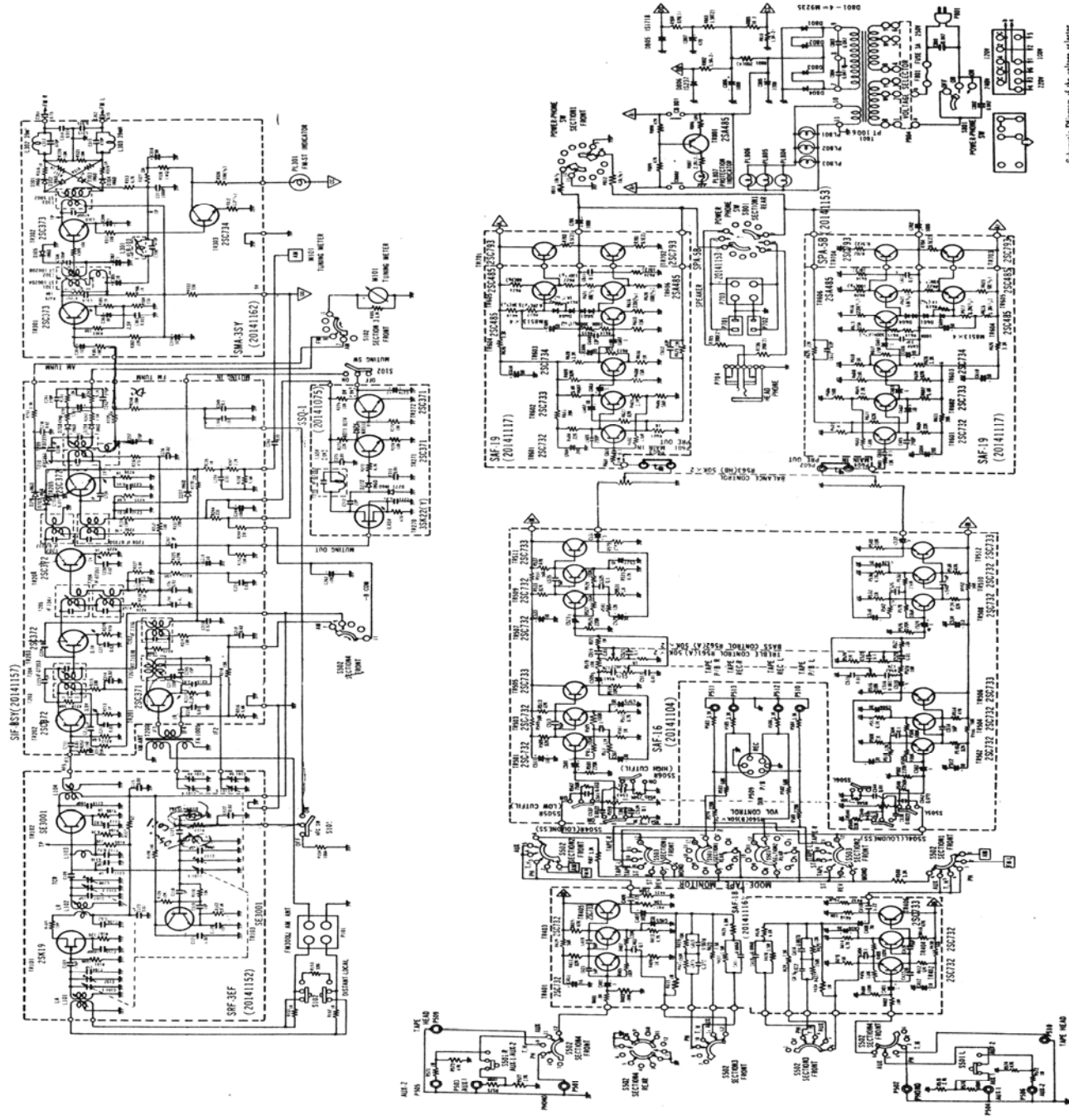
SYMBOL NO.	STOCK NO.	DESCRIPTION
	20004219	3A Fuse
	20004228	3A Fuse
	20162007	4P Terminal
	20104009	Tuning Indicator
	20145096	Power Switch
	20145101	Rotary Switch A
	20145098	Rotary Switch B
	20145099	Seesaw Switch A

SA-15Y

SCHEMATIC DIAGRAM



SOLID STATE AM/FM STEREO RECEIVER SA-15Y



Schematic Diagram of the voltage detector.