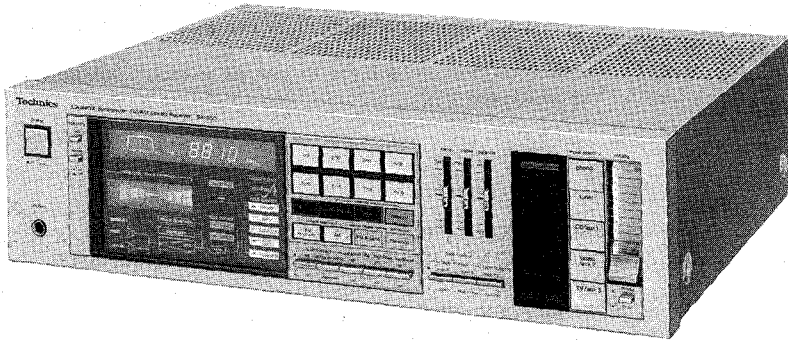


Service Manual

QUARTZ Synthesizer
FM/AM Stereo Receiver

Receiver
SA-850



Color

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

Color	Area
(S)	[PA]...Far East PX.
(S)	[PE]...European Military.
(K) (S)	[PC]...European Audio Club.

SPECIFICATIONS

(IHF '78)

■ AMPLIFIER SECTION

Rated minimum sine wave RMS power output
20 Hz~20 kHz both channels driven
0.005% total harmonic distortion
100W per channel (8 ohms)

1 kHz continuous power output
both channels driven
0.005% total harmonic distortion
105W per channel (8 ohms)

Dynamic headroom 1.8 dB (8 ohms)

Total harmonic distortion
rated power at 20 Hz~20 kHz 0.005% (8 ohms)
half power at 20 Hz~20 kHz 0.005% (8 ohms)
half power at 1 kHz 0.001% (8 ohms)

SMPT E intermodulation distortion 0.01% (8 ohms)

Frequency response
PHONO RIAA standard curve ± 0.8 dB
CD/AUX 1, VIDEO/AUX 2, TV/AUX 3,
TAPE 1, TAPE 2/EXT 5 Hz~100 kHz -3 dB

Input sensitivity
PHONO 0.25 mV (2.5 mV, IHF '66)
CD/AUX 1, VIDEO/AUX 2, TV/AUX 3,
TAPE 1, TAPE 2/EXT 15 mV (150 mV, IHF '66)

S/N (IHF, A)
PHONO 74 dB (81 dB, IHF '66)
CD/AUX 1, VIDEO/AUX 2, TV/AUX 3,
TAPE 1, TAPE 2/EXT 77 dB (95 dB, IHF '66)

Maximum input voltage
PHONO 170 mV (170 mV, 1 kHz)

Input impedance
PHONO 47 kilohms
CD/AUX 1, VIDEO/AUX 2, TV/AUX 3,
TAPE 1, TAPE 2/EXT 22 kilohms

Tone controls
BASS 50 Hz, +10 dB~ -10 dB
TREBLE 20 kHz, +10 dB~ -10 dB

Subsonic filter 30 Hz, -6 dB/oct.
High filter 7 kHz, -6 dB/oct.

05100238 91004988 16
SM-SA850MM 1 ST
SVC MNL ... PX/MM/AC ...

Loudness control (volume at -30 dB) 50 Hz, +9 dB
Low frequency damping factor 40 (8 ohms)
20 (4 ohms)

Load impedance
MAIN or REMOTE 4~16 ohms
MAIN and REMOTE 8~16 ohms

■ FM TUNER SECTION

Frequency range 87.9~107.9 (87.50~108.00) MHz
Sensitivity 10.8 dBf (1.9 μ V, IHF '58)

50 dB quieting sensitivity
MONO 16.1 dBf (3.5 μ V IHF '58)
STEREO 38.3 dBf (45 μ V IHF '58)

Total harmonic distortion
100 Hz 0.05% (MONO), 0.07% (STEREO)
1 kHz 0.04% (MONO), 0.06% (STEREO)
6 kHz 0.1% (MONO), 0.20% (STEREO)

S/N
MONO 78 dB
STEREO 72 dB

Frequency response 20 Hz~15 kHz, +1 dB, -2 dB

Alternate channel selectivity
normal ± 400 kHz 55 dB
 ± 300 kHz 25 dB
 ± 200 kHz 25 dB
super narrow 1 dB

Capture ratio 75 dB

Image rejection at 98 MHz 100 dB

IF rejection at 98 MHz 100 dB

Spurious response rejection at 98 MHz 55 dB

AM suppression 45 dB

Stereo separation 35 dB

1 kHz 45 dB

10 kHz 35 dB

Carrier leak -40 dB

19 kHz -55 dB

38 kHz -55 dB

Antenna terminals 300 ohms (balanced)
75 ohms (unbalanced)

Technics

Panasonic Tokyo
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shibakoen, Minato-ku, Tokyo 105 Japan

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

■ AM TUNER SECTION

Frequency range	530~1620 (522~1611) kHz
Sensitivity	20 μ V, 300 μ V/m
Selectivity	55 dB
Image rejection at 1000 kHz	40 dB
IF rejection at 1000 kHz	40 dB

■ GENERAL

Power consumption	500W
Power supply	AC 110V/120V/220V/240V, 50/60 Hz
Dimensions (W×H×D)	430 × 120 × 353 mm (16-15/16" × 4-23/32" × 13-29/32")

Weight

10.4 kg
(22.9 lb.)

Notes:

- 1) Total harmonic distortion is measured by the digital spectrum analyzer (HP. 3045 system).
- 2) This unit is equipped with an FM/AM allocation selector on the rear panel. The specifications shown above are correct with this selector set to the "FM 0.2 MHz/AM 10 kHz" position. If it is set to the "FM 0.05 MHz/AM 9 kHz" position, however, the FM frequency range becomes 87.50~108.00 MHz, and the AM frequency becomes 522~1611 kHz.

(Specifications are subject to change without notice for further improvement.)

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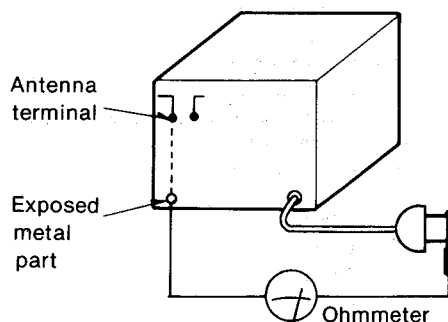
■ SAFETY PRECAUTION

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

● INSULATION RESISTANCE TEST

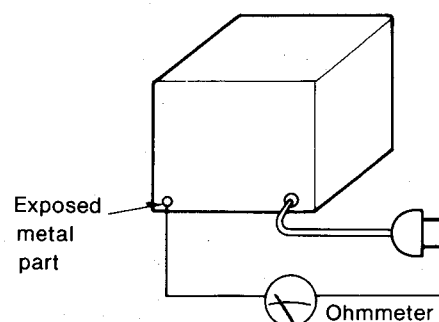
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between $3M\Omega$ and $5.2M\Omega$ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = $3M\Omega$ — $5.2M\Omega$



(Fig. B)

Resistance = Approx ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

HOW TO PRESET RADIO BROADCAST FREQUENCIES

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.

1. Automatic 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.

● **Automatic memory presetting**

1 • To preset an FM station: press the "FM" button.

Note: If the button is pressed slightly longer, the frequency now tuned is shifted +25 kHz (allocation switch setting : FM 0.05 MHz/AM 9 kHz).

• To preset an AM station: press the "AM" button.

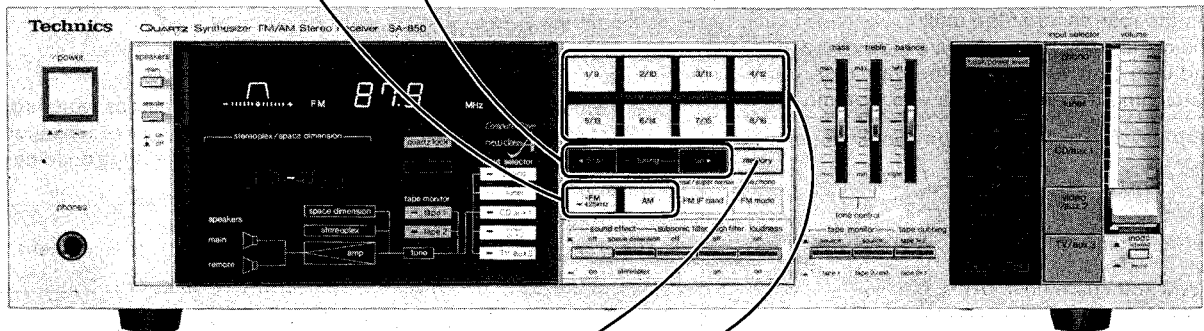
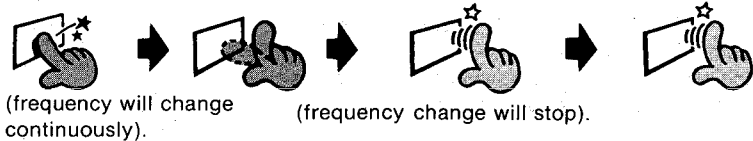
2 • To preset FM broadcasting stations: Set to 87.9 MHz (or 87.50 MHz).

• To preset AM broadcasting stations: Set to 530 kHz (or 522 kHz).

① Press the button and hold slightly (frequency will change continuously).

② Release it at 87.9 MHz (or 87.50 MHz) for FM or 530 kHz (or 522 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.



3 Press. When the frequency indication begins to change, release.

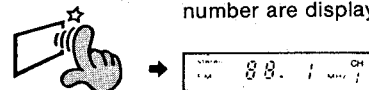
(The frequency will change upward, and the automatic presetting will begin with the broadcasting station of the lowest frequency and will continue in order.)



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

To check the front channels (CH 1~8):

Press momentarily. Frequency stored in the memory and channel number are displayed.



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

Press slightly longer. Frequency stored in the memory and channel number are displayed.



Notes:

1. In areas where there are less than 8 FM stations, the remaining channels (through channel 8) 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.

Important!

AM loop antenna

This antenna must be installed to receive AM broadcasts.

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

2. Manual presetting:

Stations can be freely preset to any desired channel.

Before memory presetting

Each button is used to preset two stations.

Presetting front channels (CH 1~8)

Press momentarily.

Presetting back channels (CH 9~16)

Press slightly longer.

● Manual memory presetting

1 To preset an FM station: press the "FM" button.

Note: If the button is pressed slightly longer, the frequency now tuned is shifted +25 kHz (allocation switch setting : FM 0.05 MHz/AM 9 kHz).

To preset an AM station: press the "AM" button.

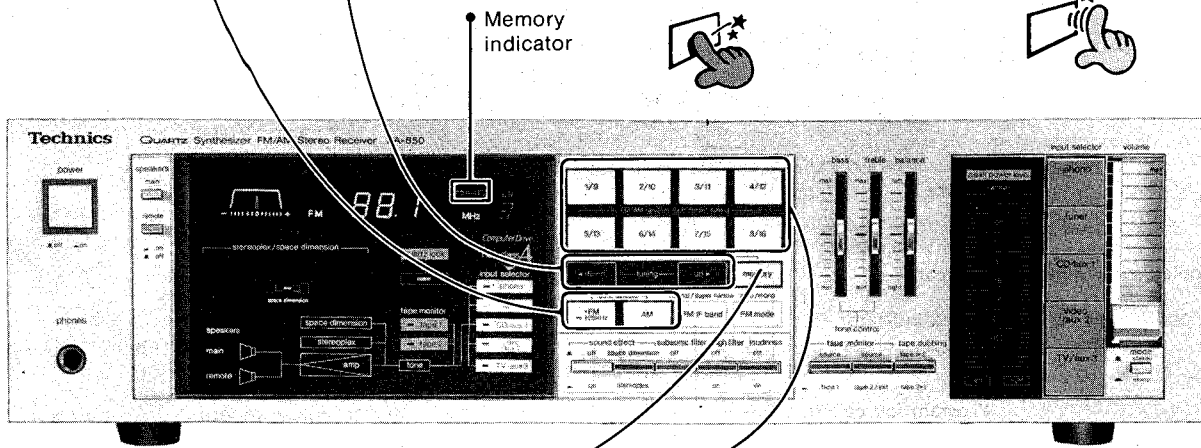
2 Press the appropriate tuning button to tune to the desired broadcast.

● 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 and tune to the desired station (the frequency will change each time the button is pressed). broadcasting station whose frequency is located on a 0.025 MHz step.



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

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

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).

4 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.

Note:

1. If the memory indication illumination stops before you press the button, once again repeat step (5) and then step (6).
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.

■ PROTECTION CIRCUITRY

The protection circuitry may have operated if either of the following conditions is noticed.

- No sound is heard when the power is turned on.
- Sound stops during a performance.

The function of this circuitry is to prevent circuitry damage if, for example, the positive and negative speaker connection wires are "shorted". The protection circuitry may also function if a speaker system with an impedance much below the rated impedance of this unit is connected.

If this occurs, follow the procedure outlined below:

1. Turn off the power.
2. Determine the cause of the problem and correct it.
3. Turn on the power once again after one minute.

Note

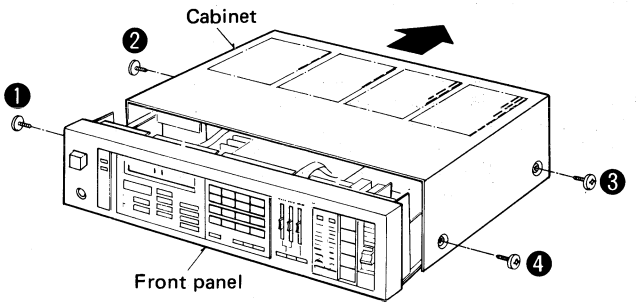
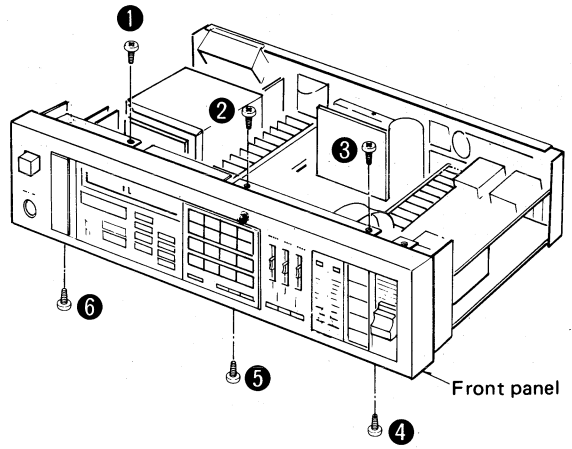
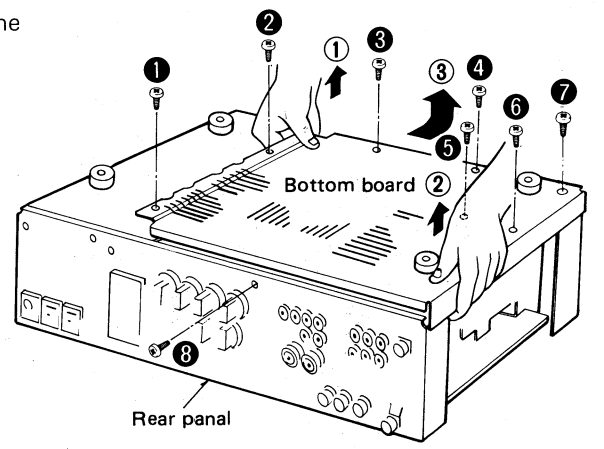
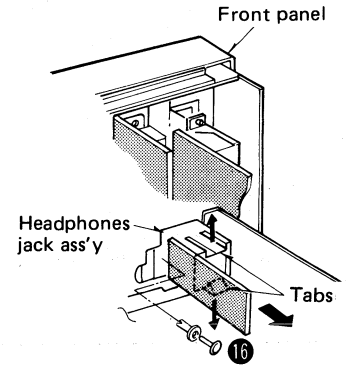
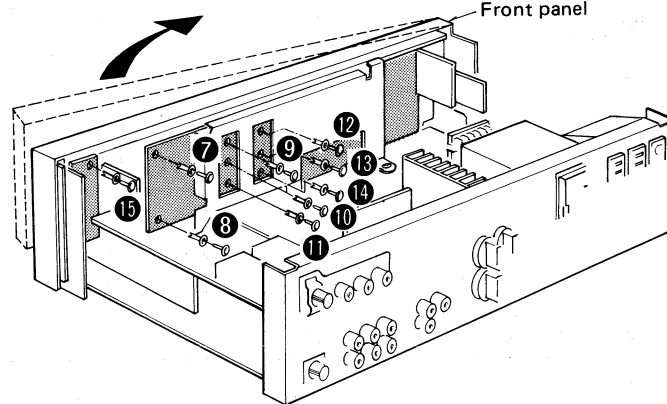
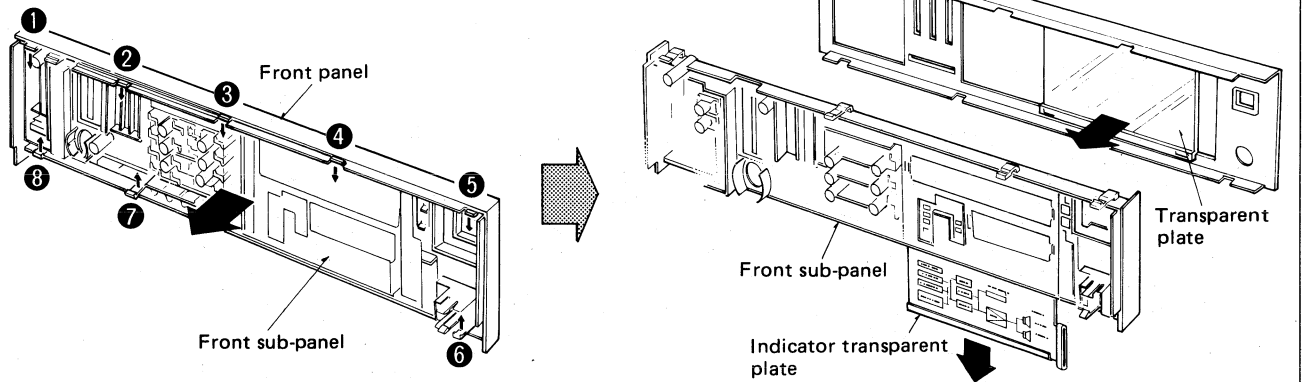
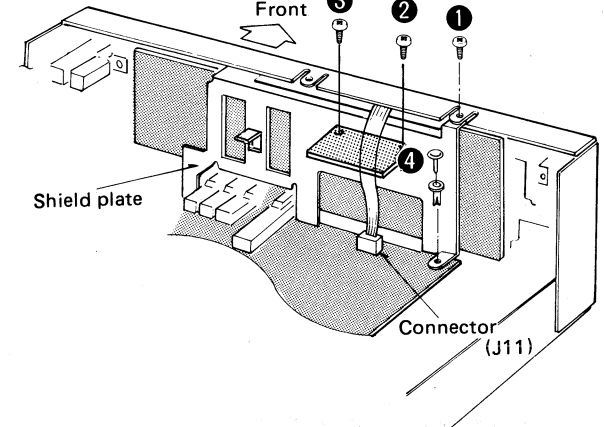
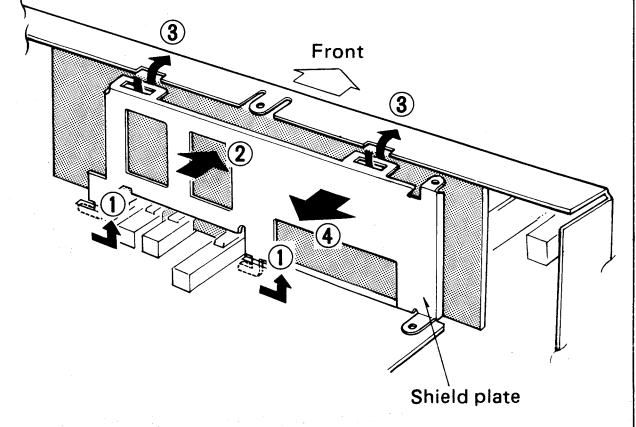
When the protection circuitry functions the unit will not operate unless the power is first turned off and then on again.

BEFORE REPAIR AND ADJUSTMENT

1. Turn off the power, Discharge both power supply capacitors (C702, C703, 12000 μ F) through a 10 ohm, 5W resistor to ground. Do not short between C702 and C703. It may damage the capacitors.
2. After completion of repair, slowly apply the primary voltage by using a variac to avoid over current. Current consumption at 60Hz/50Hz in no signal mode should be shown below with respect to supply voltage 110V/120V/220V/240V.

Power supply voltage		AC110V	AC120V	AC220V	AC240V
Consumed current	50Hz	320~570mA	270~520mA	120~370mA	100~350mA
	60Hz	300~550mA	250~500mA	100~350mA	80~330mA

DISASSEMBLY INSTRUCTIONS

<p>Ref. No. 1 How to remove the cabinet</p> <p>Procedure 1</p> <ul style="list-style-type: none"> Remove the 4 setscrews. (1 ~ 4) 	<p>Ref. No. 2 How to remove the front panel</p> <p>Procedure 1 → 2</p> <ul style="list-style-type: none"> Remove the 6 setscrews. (1 ~ 6) 	<p>Ref. No. 3 How to remove the bottom board</p> <p>Procedure 3</p> <ul style="list-style-type: none"> Remove the 8 setscrews. (1 ~ 8) Remove the bottom board in the direction of the arrow 1 → 2 → 3. 
<p>Procedure 1</p> <ol style="list-style-type: none"> 1. Remove the 1 rivet pin. (16) 2. Release the 2 tabs aside. 	<p>Procedure 1 → 2</p> <ul style="list-style-type: none"> Remove the 9 rivets. (7 ~ 15) 	<p>Ref. No. 4 How to remove transparent plate</p> <p>Procedure 1 → 2 → 4</p> <ul style="list-style-type: none"> Release the 8 tabs. (1 ~ 8) 
<p>Ref. No. 5 How to remove the shield plate</p> <p>Procedure 1 → 2 → 5</p> <ol style="list-style-type: none"> 1. Remove the 3 setscrews and rivet. (1 ~ 4) 2. Remove the connector. (J11) 		<ul style="list-style-type: none"> Remove the shield plate in the direction of the arrow 1 → 2 → 3 → 4. 

Ref. No. 6 **How to remove the tuning P.C.B.**

Procedure 1 → 6

1. Remove the 2 setscrews. (1, 2)
2. Cut off the 1 lead clamer by nippers.

- Remove the 3 setscrews. (3, 4, 5)

Ref. No. 7 **How to remove the power amp. transistors**

Procedure 1 → 3 → 7

1. Remove the 2 setscrews. (1, 2)
2. Unsolder the power transistors.

- Remove the 3 setscrews. (3 ~ 5)

• Remove the 2 setscrews. (6, 7)

* When fitting it, apply silicone compound (SZZ0L15) to both sides of mica plate.

MEASUREMENTS AND ADJUSTMENTS
[TUNER SECTION]

Note: AM OSC coil (L204) have been already adjusted, and require no adjustment.

AM ADJUSTMENT

- * Setting and Equipment used**
1. DC and AC electronic voltmeters (EVM)
 2. AM signal generator (AM-SG)
 3. Set Band selector to "AM" position.
 4. Maintain line voltage at rated voltage.

5. Set FM/AM allocation selector to "FM 0.2 MHz/AM 10 kHz" position.
6. Output of signal generator should be no higher than necessary to obtain an output reading.
7. Use a non-metal screwdriver for the adjustment.

Step No.	AM SIGNAL GENERATOR		DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	CONNECTION	FREQUENCY				
AM-IF ADJUSTMENT						
1	Connect AM-SG to AM antenna terminal through 200pF capacitor. Common to chassis. (Powerful input) (Refer to Fig. 1)	450 kHz (30% Mod. with 400 Hz)	Frequency of non-interference	Connect AC EVM or scope to "speaker" terminal.	T201 (ANT 1st IFT) T202 (AM 2nd IFT)	* Adjust the input frequency and adjustment points so that the output becomes maximum.
AM-RF ADJUSTMENT						
2	Connect AM-SG to AM antenna terminal through 200pF capacitor. Common to chassis. (Weak input) (Refer to Fig. 1)	610 kHz (30% Mod. with 400 Hz)	610 kHz	Connect AC EVM or scope to "speaker" terminal.	L203 (ANT Coil)	1. Adjust for maximum output. 2. Adjust core of L203 by screwdriver.
3		1500 kHz (30% Mod. with 400 Hz)	1500 kHz			CT201 (ANT Trimmer)

FM ADJUSTMENT

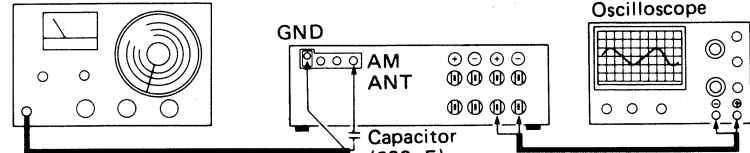
- * Setting and Equipment used**
1. FM signal generator (FM-SG).
 2. Distortion analyser
 3. Oscilloscope
 4. DC electronic voltmeters (EVM).
 5. Frequency counter (19 kHz and 108 MHz measurable).
 6. Set band selector to "FM" position.
 7. Set FM mode selector to "mono" position.
 8. Set FM IF band selector to "normal" position.
 9. Set FM/AM allocation selector to "FM 0.2 MHz/AM 10 kHz" position.
 10. Maintain line voltage at rated voltage.

- * Preparation of FM signal generator (FM-SG)**
1. The standard input of the set is 60 dB (1 mV), 400 Hz, 100% modulation (Because of attenuation, using coaxial cables, SG output must be 6 dB plus. That is, when input 60 dB, SG output is to be 66 dB.)

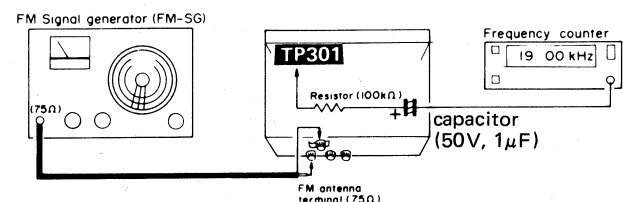
Step No.	FM SIGNAL GENERATOR		DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	CONNECTION	FREQUENCY				
FM MONO DISTORTION ADJUSTMENT						
4	Connect FM-SG to FM antenna terminal referring to Fig. 2. (Apply 60 dB to antenna terminal.)	100.1 MHz (100% Mod. with 400 Hz)	100.1 MHz	Connect DC EVM between TP103 (-) and TP104 (+) through choke coil. (Refer to Fig. 2)	T101 (Discri. IFT)	1. Adjust T101 core so that voltage measured in signal mode is 0 mV in 300 mV range. 2. Adjust T102 core so that distortion of right and left channels are minimized.
5				Connect distortion analyser to "speaker" terminal.		
FM MPX V.C.O. ADJUSTMENT						
USING A FREQUENCY COUNTER			USING ALTERNATE SYSTEM			
6	1. 100.1 MHz, 60 dB non-modulated mono signal applied to set. 2. FM mode switch to "auto" position. 3. Connect frequency counter to TP301 through capacitor (50V, 1μF) and resistor (100kΩ) referring to Fig. 3. 4. Adjust VR301 to 19 kHz ± 30 Hz.			1. Apply stereo signal from generator or stereo station to tuner. 2. Adjust VR301 until stereo indicator lights up. Cement arm of VR301 as shown in Fig. 4.		

FM SIGNAL GENERATOR		DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
CONNECTION	FREQUENCY				
MUTING ON LEVEL ADJUSTMENT					
7	Connect FM-SG to FM antenna terminal referring to Fig. 5. (Apply 20 dB to antenna terminal.)	100.1 MHz (100% Mod. with 1 kHz)	100.1 MHz	Connect oscilloscope to "speaker" terminal.	VR201 (Muting on level)
SEPARATION ADJUSTMENT					
8	Connect FM-SG to FM antenna terminal referring to Fig. 5. (Apply 60 dB to antenna terminal.) (Pilot 10% Mod. stereo signal.)	100.1 MHz (100% Mod. with 1 kHz) (L or R mode)	100.1 MHz	Connect AC EVM or oscilloscope to "speaker" terminal.	VR302 (Separation)

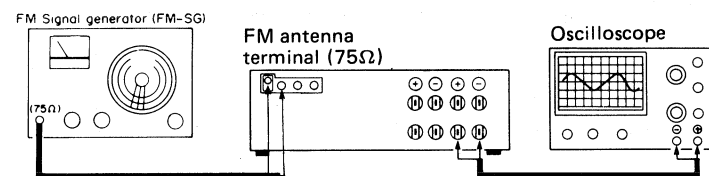
AM Signal generator (AM-SG)



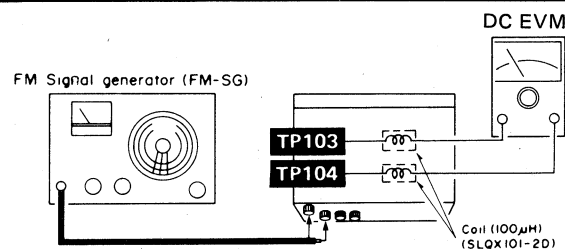
[Fig. 1]



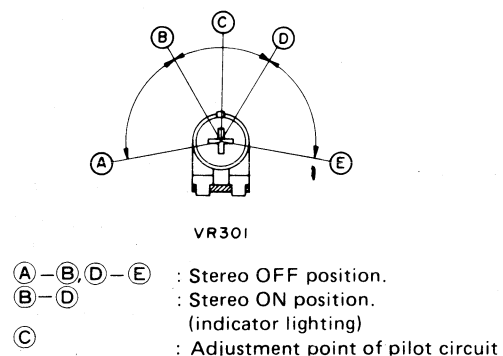
[Fig. 3]



[Fig. 5]

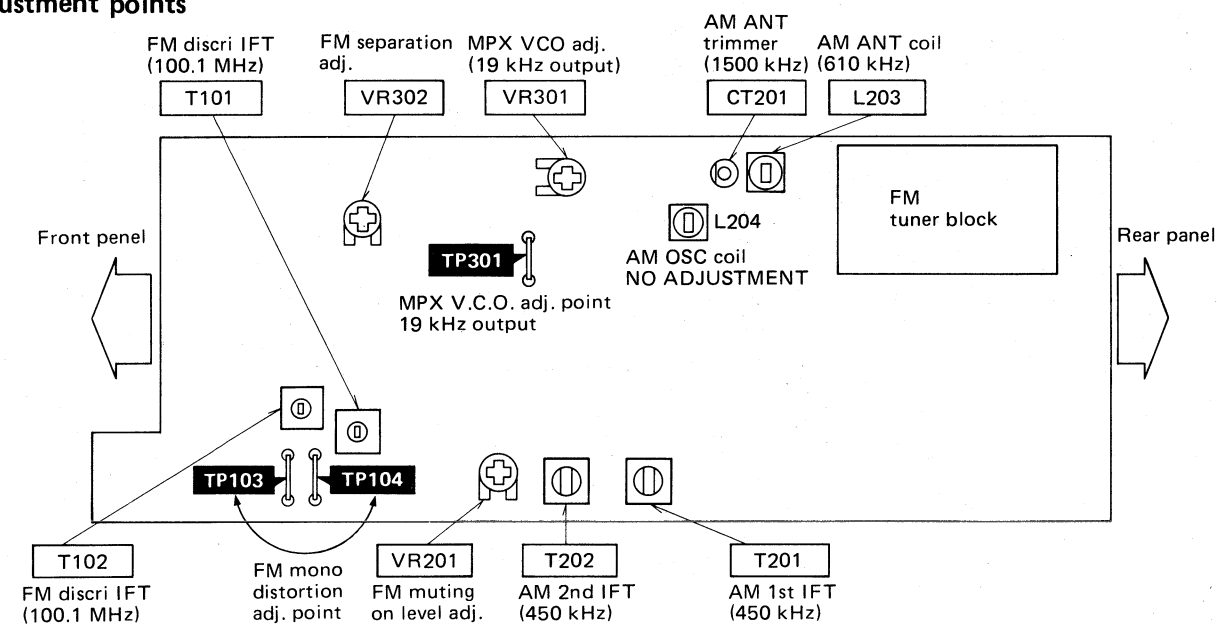


[Fig. 2]



[Fig. 4]

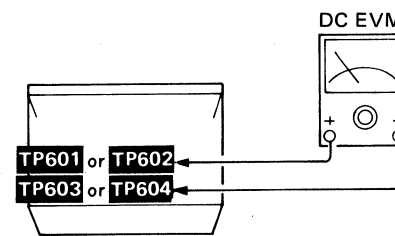
• Adjustment points



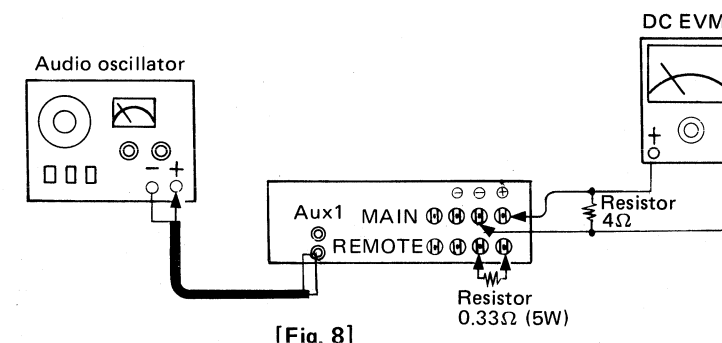
[AMPLIFIER SECTION]

Idling (IcQ) Adjustment (after repairing the main amp.) [Fig. 6]

- After the repair, set the sound volume to minimum before turning on the power switch, and connect nothing to the speaker terminal.
- Completely turn IcQ control (VR601, VR602) counter-clockwise.
- Increase the voltage applied to the amplifier gradually from 0V by means of a power supply voltage controller, and make sure of the value in the Figure on page 7 before starting the adjustment.
- Connect the DC electronic voltmeter to TP601 (+) and TP603 (-) (L ch.) or TP602 (+) and TP604 (-) (R ch.).
- Adjust VR601 (L ch.) or VR602 (R ch.) so that the voltage is 4 ~ 5 mV about 1 min. after power switch "on".

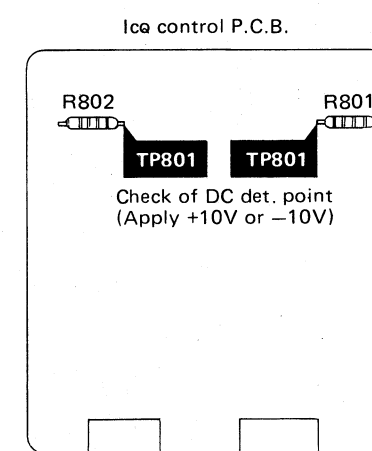


[Fig. 6]



[Fig. 8]

• Adjustment points



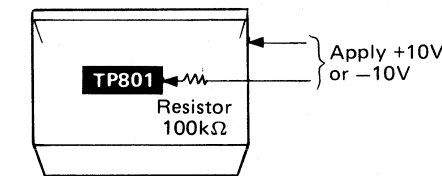
Check of DC detection Circuit [Fig. 7]

- Apply DC voltage +10V or -10V to TP801 (R801 or R802) through 100kΩ resistor.
- Make sure, relay is off.

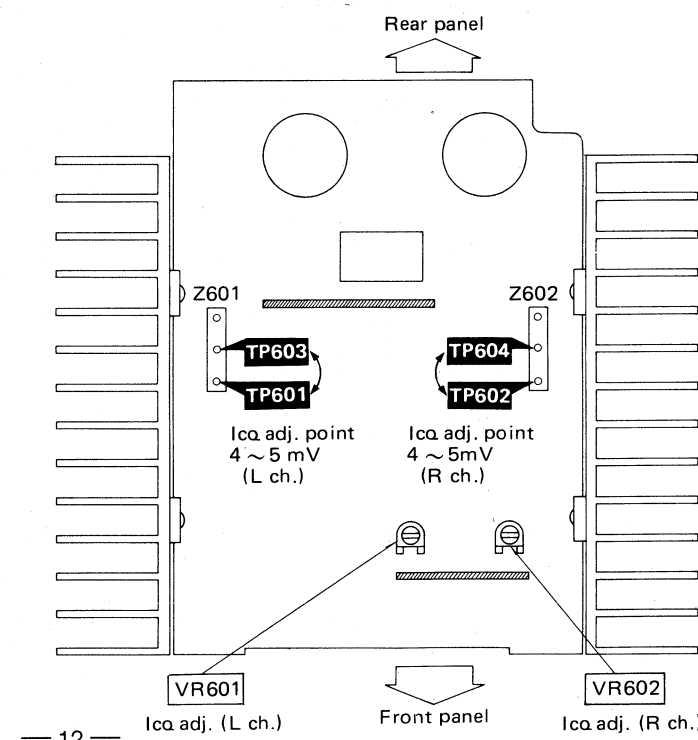
Check of Overload Detection and Protection Circuit [Fig. 8]

- Connect 4Ω (resistor or speaker) and AC voltmeter to the main speaker terminal.
- Main speaker selector is "on" position.
- Connect the audio oscillator to the CD/aux 1 terminal and apply the input signal of 1 kHz to the terminal. Then adjust the output level of the audio oscillator so that the output level of the speaker terminals becomes 5V.
- Connect 0.33Ω (5W) resistor to the remote speaker terminal.
- Remove speaker selector is "on" position.
- Make sure that no output is delivered when main speaker switch is set to "on".

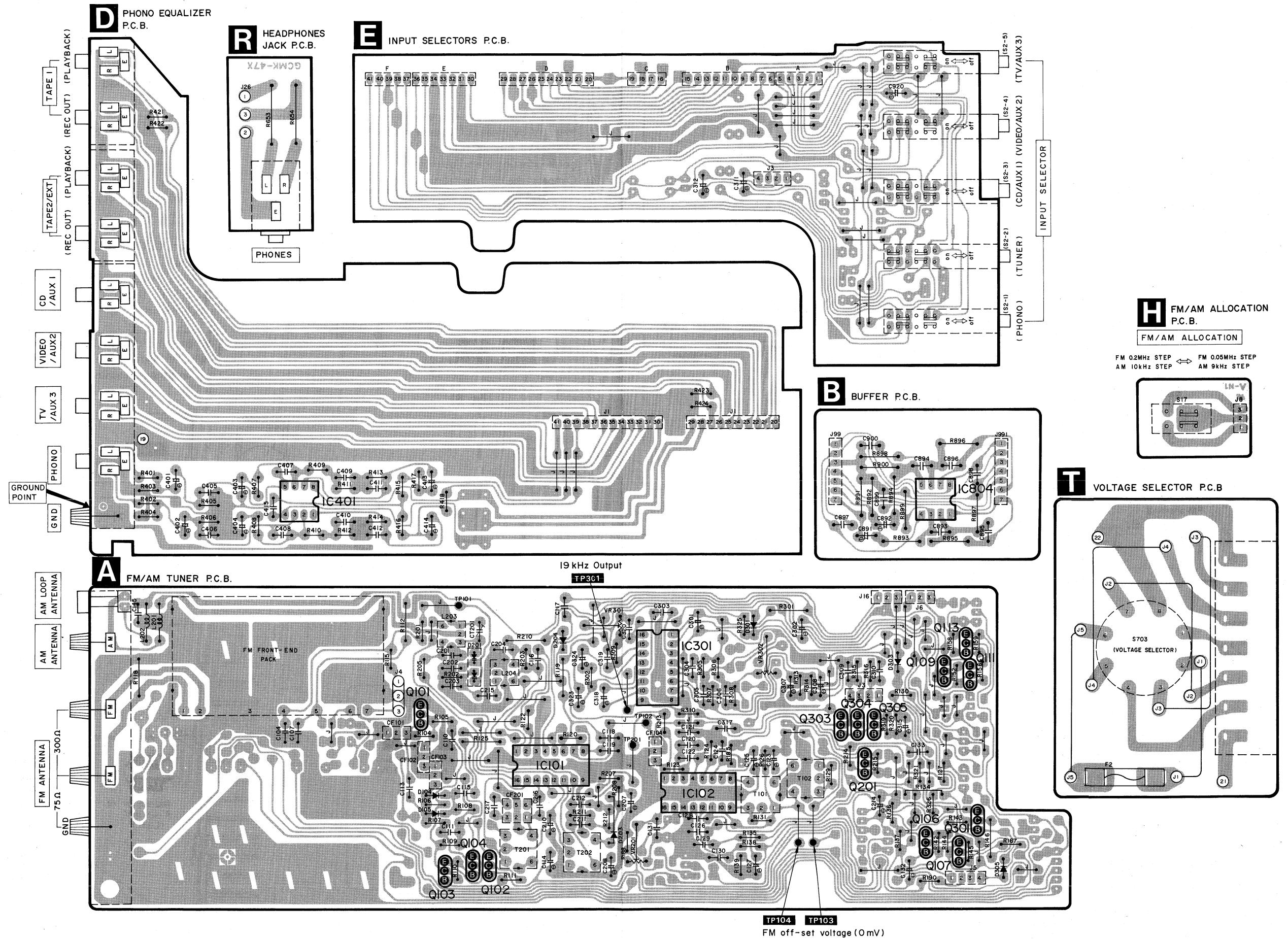
When the protection circuit functions, the unit will not operate unless the power is first turned off and then on again.



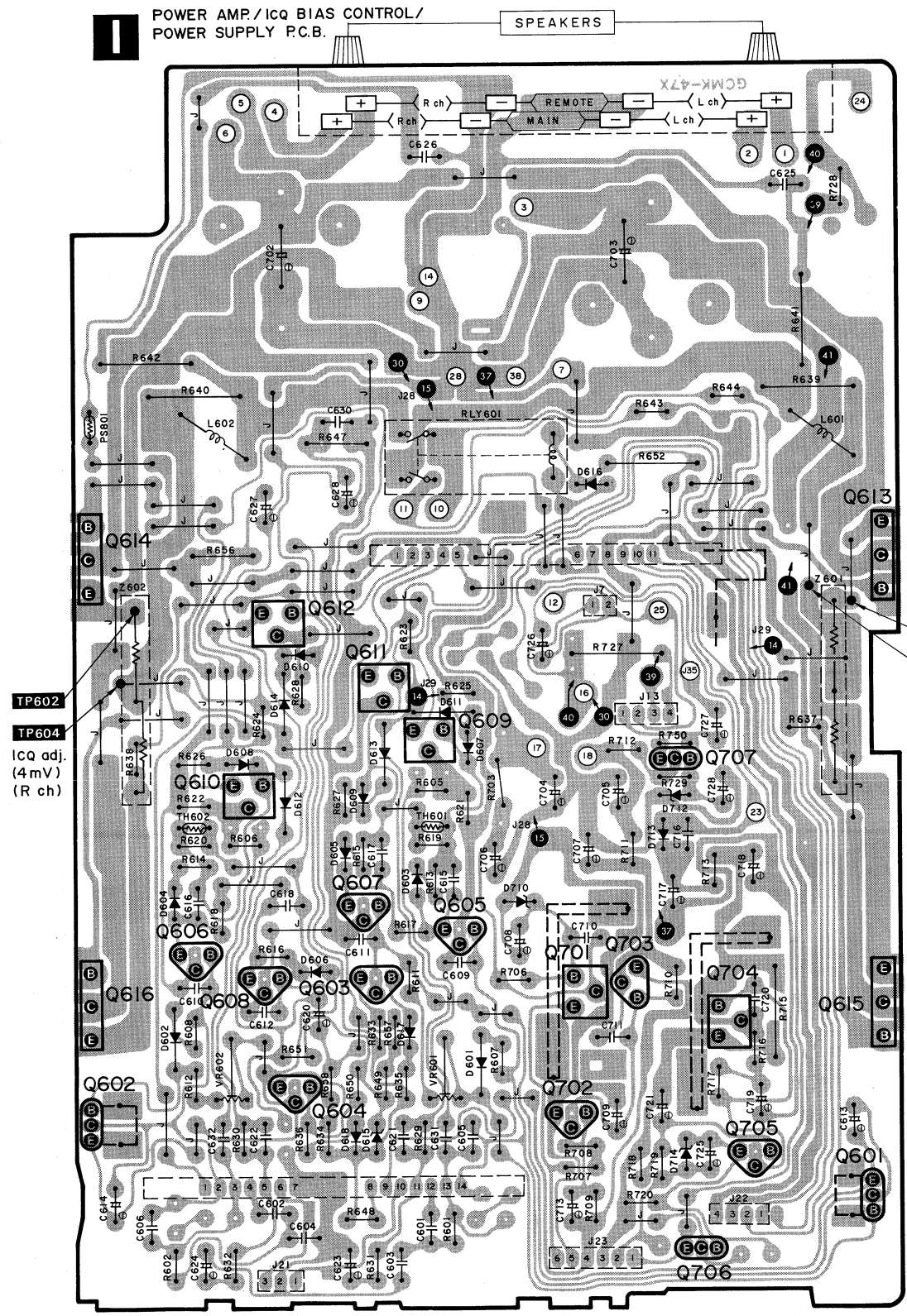
[Fig. 7]



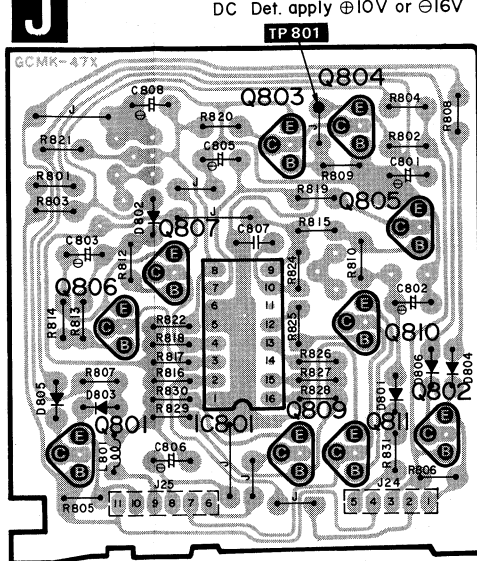
PRINTED CIRCUIT BOARDS



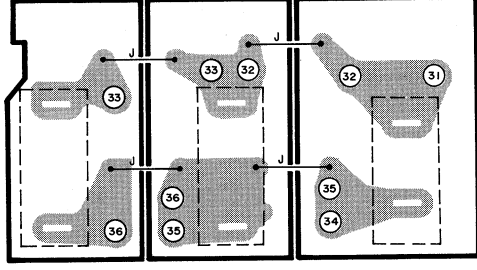
SA-850 SA-850



J ICQ CONTROL/DC DETECTION/OVERLOAD DETECTION/RELAY DRIVE P.C.B.

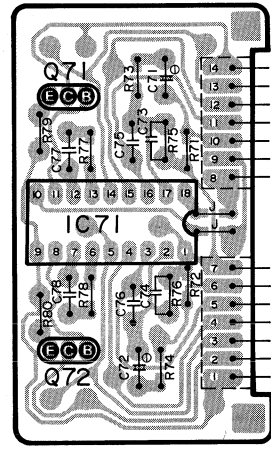


P AC OUTLET
(UNSWITCHED)

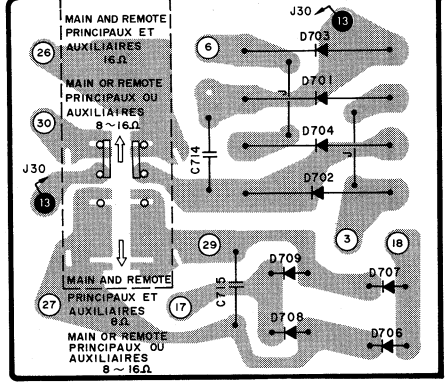


P (POWER INDICATOR)

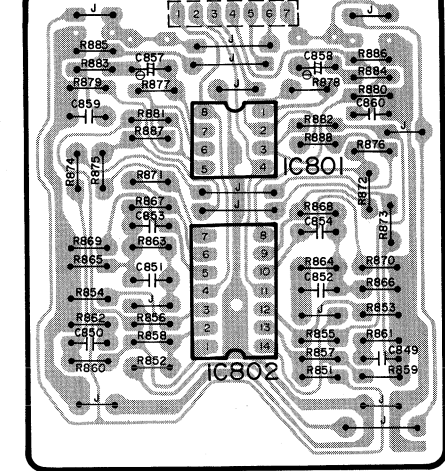
N VOLTAGE AMP. P.C.B.



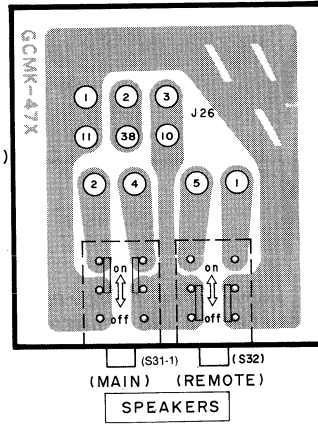
O SPEAKER IMP.
SELECTOR/
RECTIFIER P.C.B.



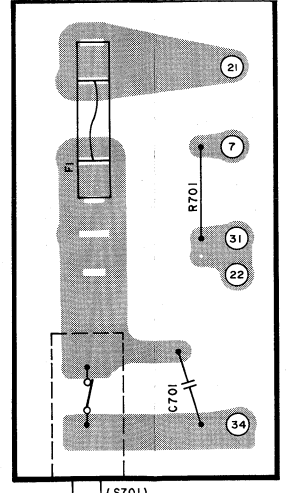
C OPERATION AMP./MIXING AMP. P.C.B.



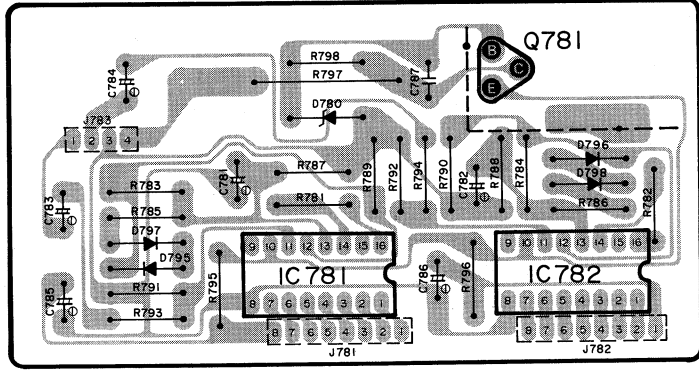
Q SPEAKER SELECTOR P.C.B.



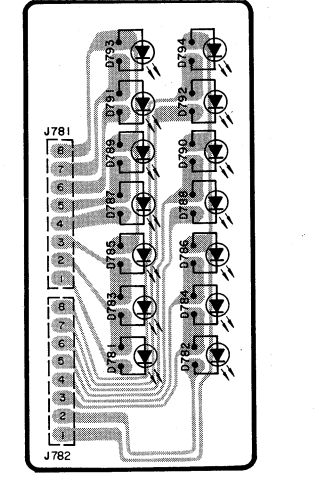
S



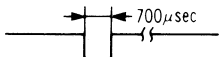
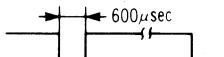
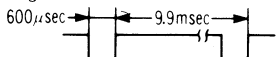
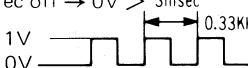
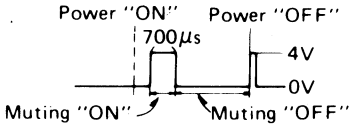
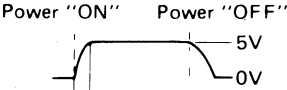
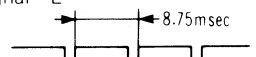

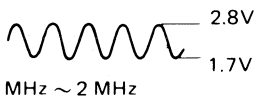

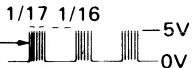
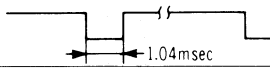
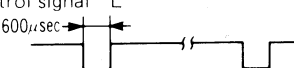
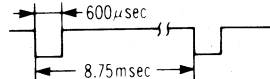
L PEAK POWER LEVEL METER P.C.B.



M PEAK POWER LEVEL METER P.C.B.

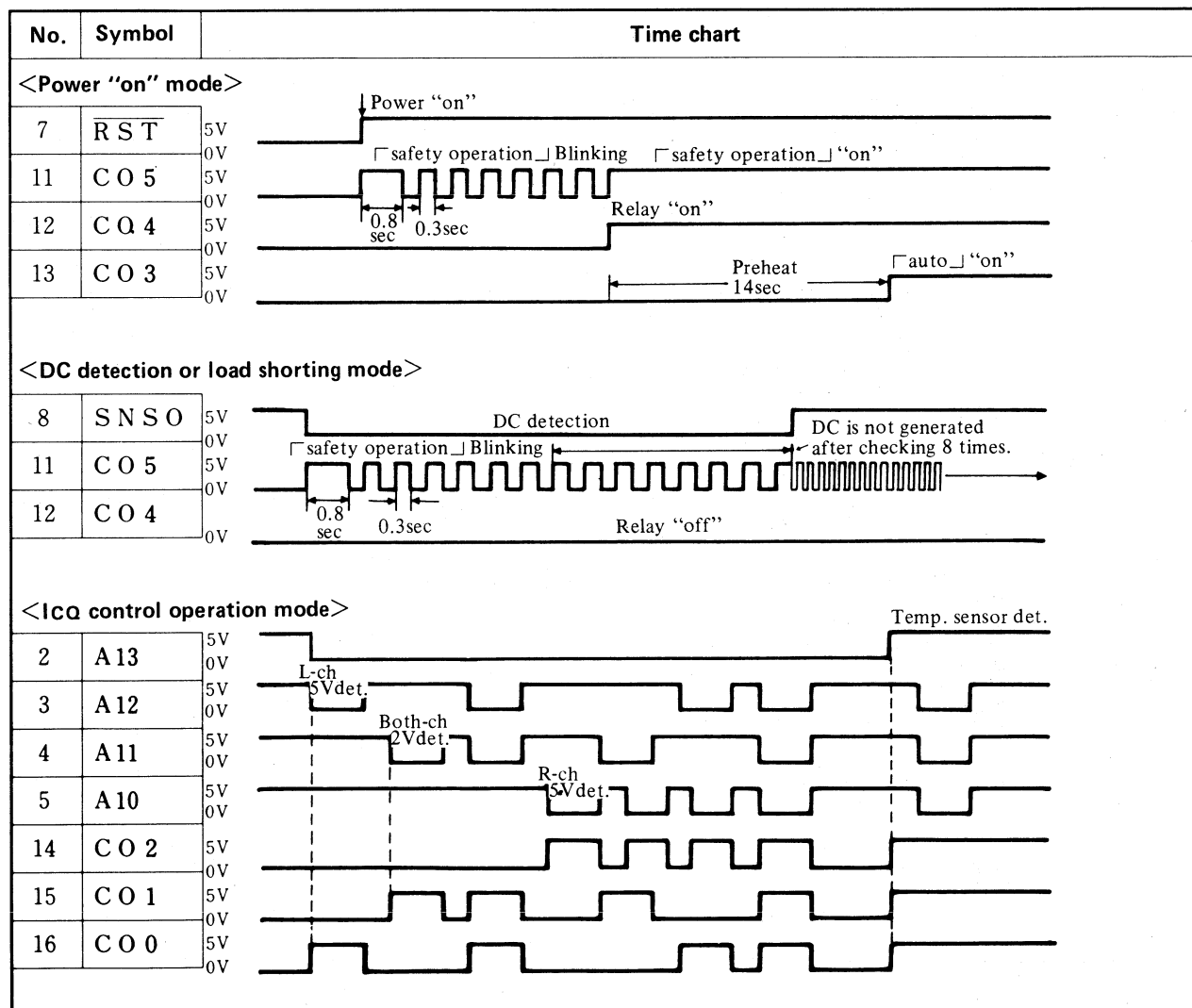


FUNCTION OF TERMINAL (PLL control IC901: SVID1707G517)

PIN No.	I/O	Mark	Description of terminal	PIN No.	I/O	Mark	Description of terminal
1	OUTPUT	D3	Grid 5 control signal "L" 	21	-	GND	Ground for CPU
2	OUTPUT	D2	Grid 4 control signal "L" 	22	OUTPUT	PC3	Not used in this unit
3	OUTPUT	D1	Grid 3 control signal "L" 	23	OUTPUT	PC2	Not used in this unit
4	OUTPUT	CGP	Clock generator port (For recording-check level) < rec on → 1V rec off → 0V > 3msec 	24	OUTPUT	RF SW	Not used in this unit.
5	INPUT	X1	Connecting terminal for crystal oscillator.	25	OUTPUT	PC1	Not used in this unit
6	INPUT	X2	The crystal connected is at 4.5MHz.	26	INPUT	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.
7	-	VDD1	Power supply terminal of the device	27	OUTPUT	FM/AM	FM/AM switching signal (AM → 5V, FM → 0V)
8	-	VDD2	VDD for internal A-D converter	28	OUTPUT	LW/MONO	Stereo/Monaural switching signal. (Monaural → 5V, Stereo → 0V)
9	INPUT	AD2	Not used in this unit	29	OUTPUT	REC	Not used in this unit.
10	INPUT	SD	This input terminal detects the reception of a broadcasting station. The voltage is 5V during reception, and otherwise 0V.	30	OUTPUT	i	Diode matrix scan pulse
11	INPUT	SL	Signal strength level (0 ~ 2.3V DC)	31	OUTPUT	j	Not used in this unit
12	-	GND3	Ground for internal A-D converter	32	OUTPUT	PA2/Sl	Not used in this unit
13	-	GND2	Ground for internal PLL stage	33	-	VDD1	This terminal is connected to Pin 7 at inside stage.
14	-	NC	Not used in this unit.	34	OUTPUT	PA1	Not used in this unit
15	OUTPUT	EO2	Not used in this unit.	35	OUTPUT	IF SW	Normal/super narrow select for, FM IF signal flow (output "L" - FM IF band is normal output "H" - FM IF band is super narrow)
16	OUTPUT	EO1	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.	36	OUTPUT	MUTE	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. 
17	INPUT	CE	Chip enable and reset. 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 ~ D7) terminals are off, but the memory is held.  The device does not operate during this period.	37	OUTPUT	D7	Grid 1 control signal "L" 
18	INPUT	FM IN	Input terminal for FM OSC output frequency-divided to 1/16 or 1/17 by prescaler.	38	OUTPUT	h	Diode matrix scan pulse 
19	INPUT	AM IN	AM OSC input from IC101. Input terminal for AM OSC output. 	39	INPUT	K3	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. 
20	OUTPUT	PSC	Reference signal for pre-scaler. 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 (18) 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. Pulse two times larger than the value that cannot be divided by VCO/16. 	40	INPUT	K2	
				41	INPUT	K1	
				42	INPUT	K0	
				43	OUTPUT	g	
				44	OUTPUT	f	Segment signal output terminal for display.
				45	OUTPUT	e	
				46	OUTPUT	d	
				47	OUTPUT	c	
				48	OUTPUT	b	
				49	OUTPUT	a	
				50	OUTPUT	D6	Grid 8 control signal "L" 
				51	OUTPUT	D5	Grid 7 control signal "L" 
				52	OUTPUT	D4	Grid 6 control signal "L" 

FUNCTION OF TERMINAL (IcQ CONTROL IC801: MN1404STE)

No.	Symbol	Name of block	Description of terminal
1	VSS	Power supply input terminal	Grounded. (0V)
2	A13	Input port A	Temperature detection circuit. When 60°C (140°F) sensor of power amplifier operates, "H" is put in causing the outputs of terminals 14 ~ 16 to go "H".
3	A12		When effective output 5V signal sensor of L-ch power amplifier operates, "L" is put in causing the output of terminal 14 to go "H".
4	A11		When effective output 2V signal sensors of both-ch power amplifiers operate, "L" is put in causing the output of terminal 15 to go "H".
5	A10		Not used in this unit.
6	TST		Test input terminal
7	RST	Reset input terminal	All outputs are cleared or reset with input at "L". (It is connected to power supply circuit)
8	SNSO	Sensor input terminal	When overload detection circuit of power amplifier output operates, "L" is put in causing the output of terminal 12 to go "L".
9	VDD	Power supply input terminal	Apply 5V.
10	OSC	OSC input terminal	Clock signal (about 415kHz) can be obtained by internal oscillation circuit.
11	CO5	Output port C	When protection circuit operates, "H" and "L" outputs are repeated and "safety operation" indicator blinks.
12	CO4		Output relay and meter relay turn ON with "H" output.
13	CO3		Indicator "auto" lights up at "H".
14	CO2		IcQ control signal is emitted from A input port (temp. sensor, signal sensor). ("H" output)
15	CO1		
16	CO0		



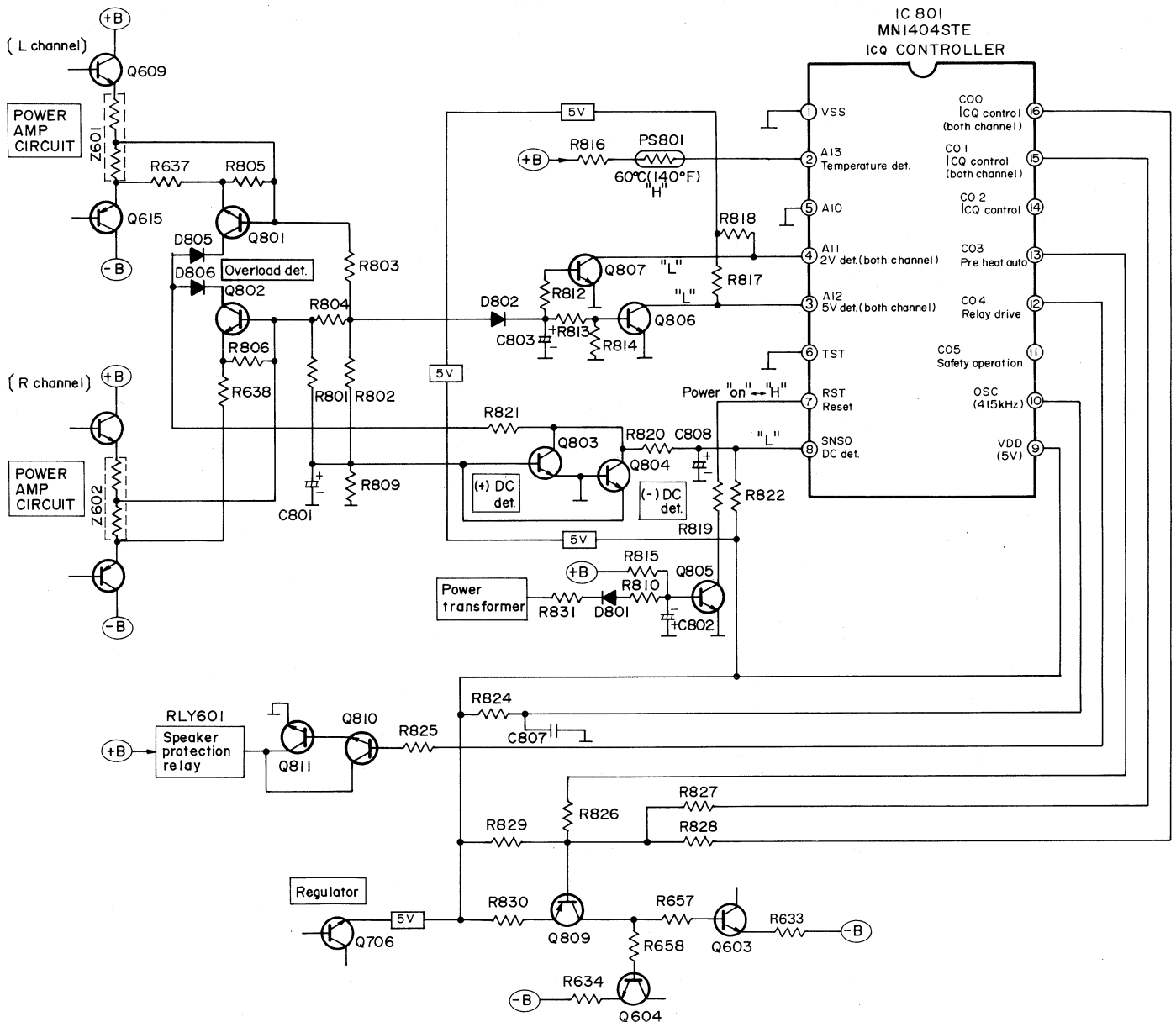
DESCRIPTION OF ICQ CONTROL CIRCUIT

Signal and temperature detection

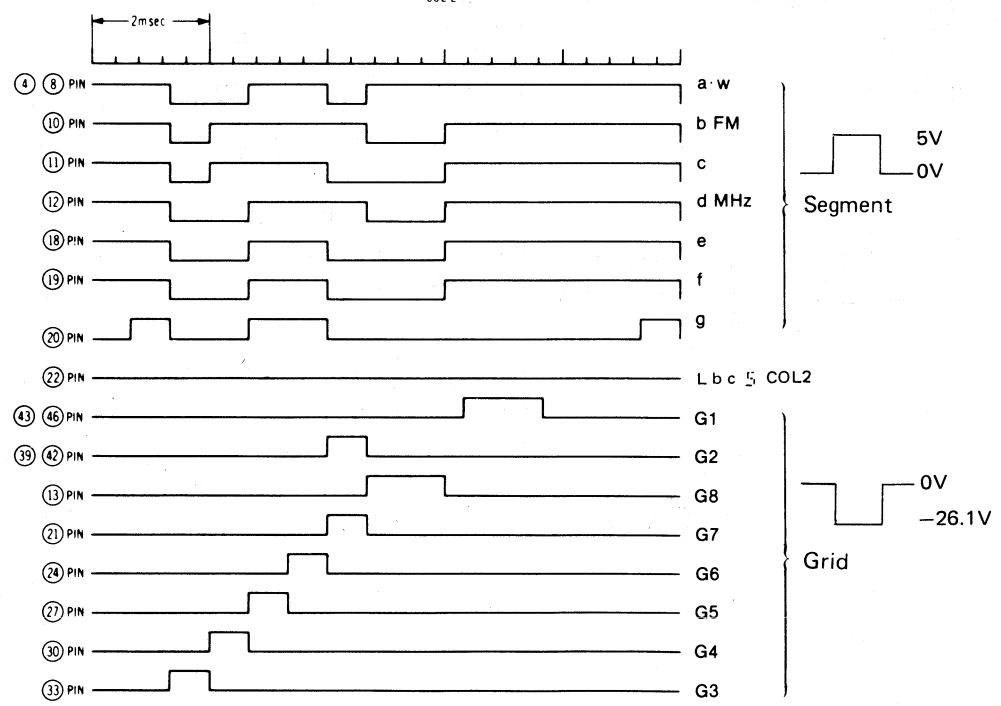
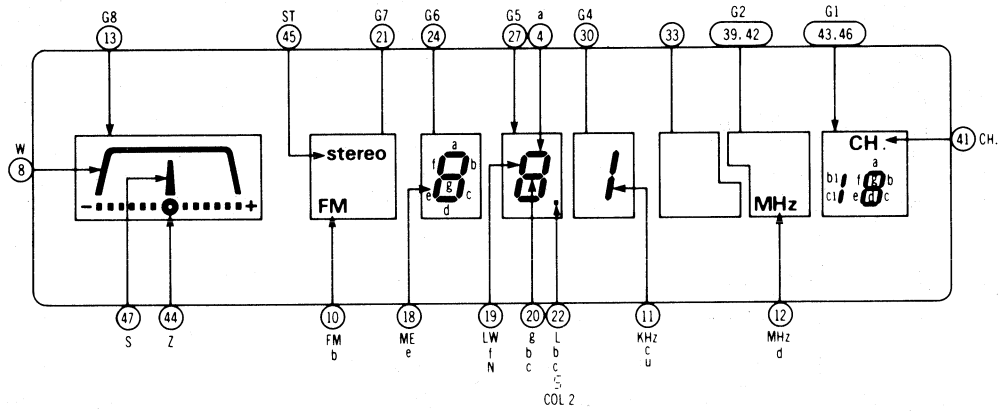
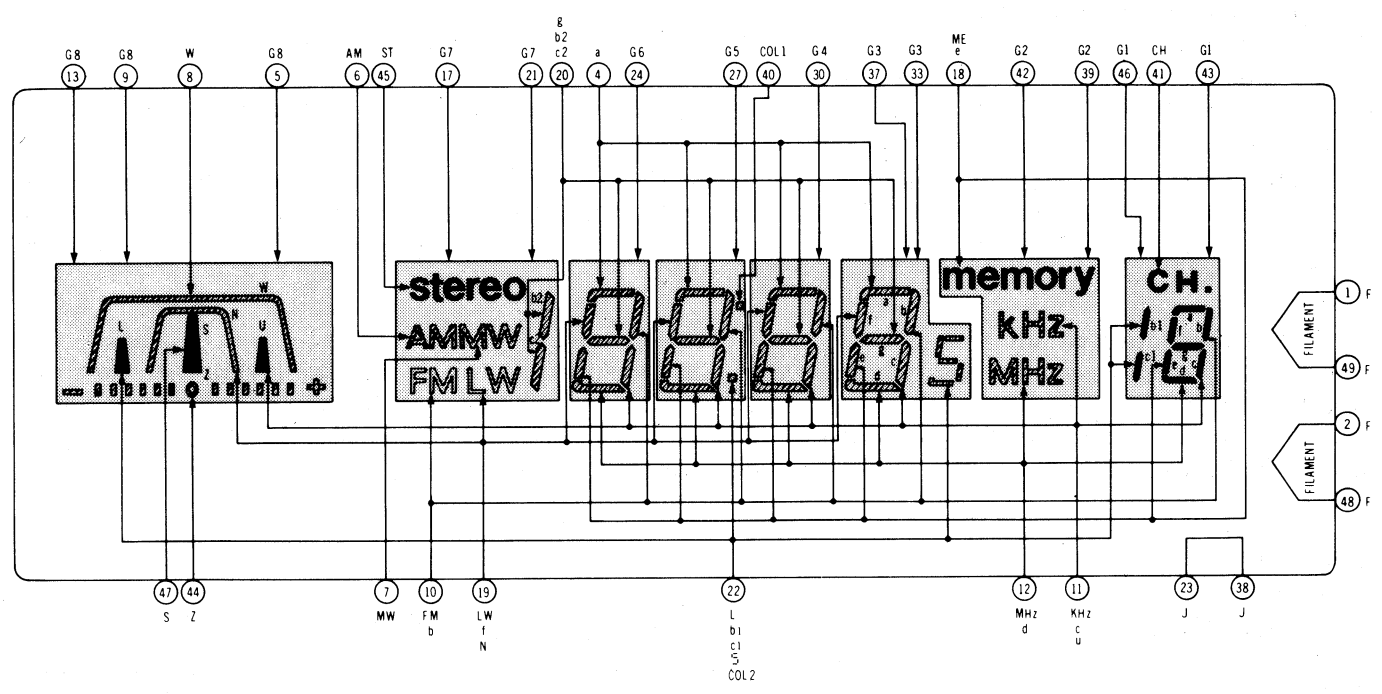
1. Music signal of power amplifier is applied to IC801 terminal ③ of D802 and Q806. When the signal rectified by D802 and C803 exceeds about 5V, Q806 turns "on" causing "L" input to be applied to IC801 terminal ③. Also, when the signal is over 2V, Q807 turns "on" causing "L" put to be applied to IC801 terminal ④. As "L" is put into IC801 terminals ③ and ④, the outputs of terminals ⑮ and ⑯ go "H" to make ICQ control.
2. PS801 is the thermistor (posistor) for heat sink temperature detection which detects the temperature [60°C (140°F)] of the heat sink. When the heat sink temperature becomes [60°C (140°F)], the resistance of PS801 increases causing "H" input to be applied to IC801 terminal ②. As "H" is put into IC801 terminal ②, the outputs of IC801 terminals ⑮ and ⑯ go "H" to make ICQ control.

Overload detection circuit

When speaker terminals are shorted, great current flows to R805 (R806) causing the base potential of Q801 (Q802) (overload detection circuit) to increase, then the base voltage of Q801 (Q802) rises and Q801 (Q802) turns "on". With Q801 (Q802) turned ON, both Q803 and Q804 turn "on" causing "L" input to be applied to IC801 terminal ⑧. Then, "L" output is applied to IC801 terminals ⑫ and ⑬. As terminal ⑫ goes "L" Q810 and Q811 turn "off" causing RLY601 to turn "off".

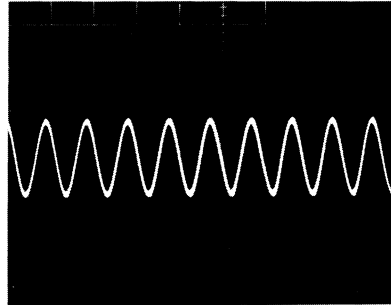


FLUORESCENT DISPLAY TUBE (FL) AND TIMECHART

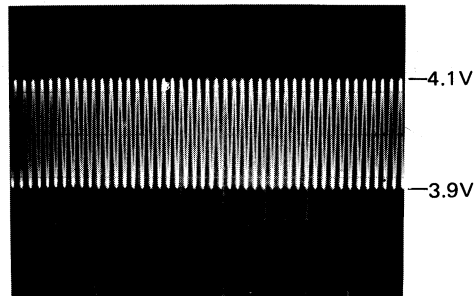


■ WAVEFORM

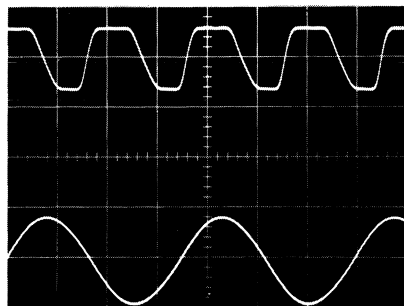
1 IC101 ⑤ pin
FM-IF (normal signal)
0.1V/DIV 0.1μsec/cm



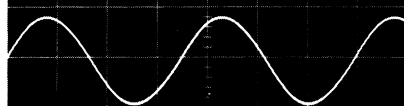
2 IC902 ② pin
FM-OSC
50mV/DIV (AC) 50 nsec/cm



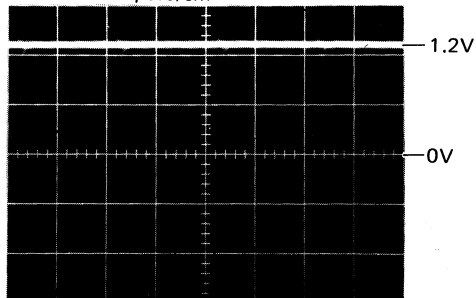
3 IC901 ⑱ pin
(FM)
1V/DIV
0.1μsec/cm



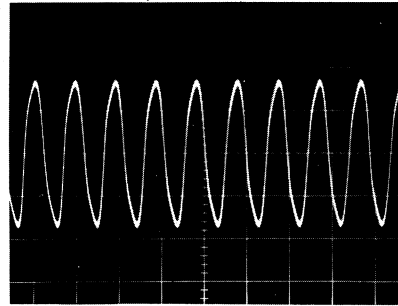
4 IC901 ⑲ pin
(AM)
1V/DIV
0.2 μsec/cm



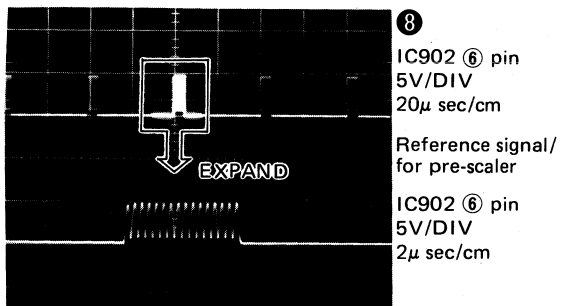
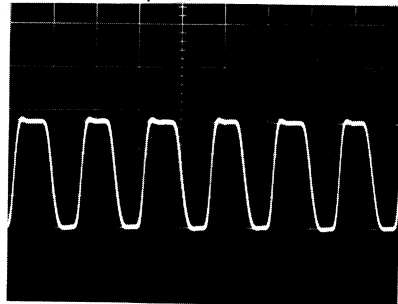
5 IC901 ⑱ pin
Frequency count-up
0.5V/DIV 20μsec/cm



6 TP102 (10.7MHz)
0.2V/DIV 0.1μsec/cm

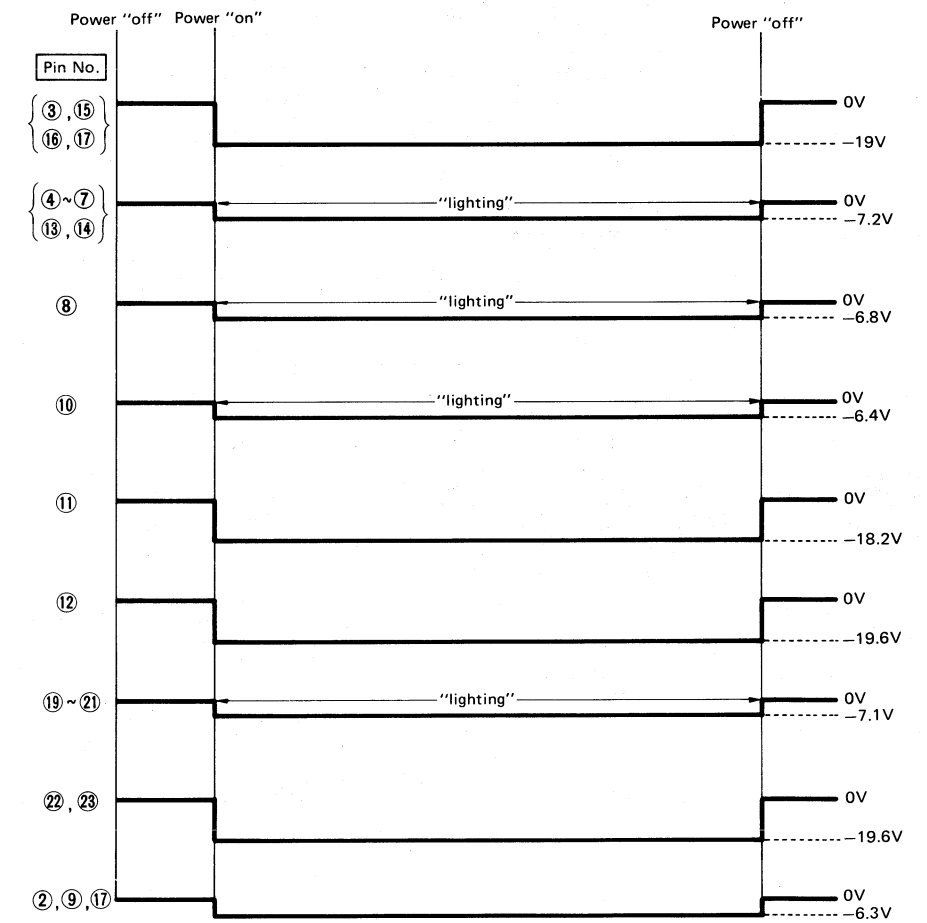
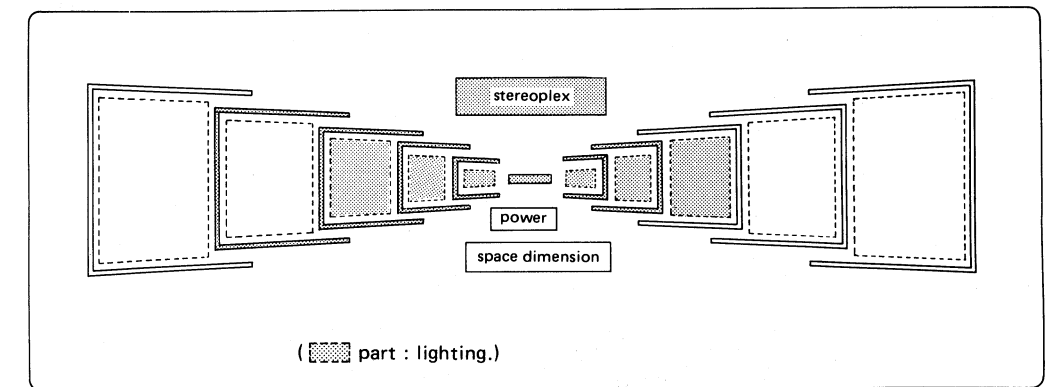
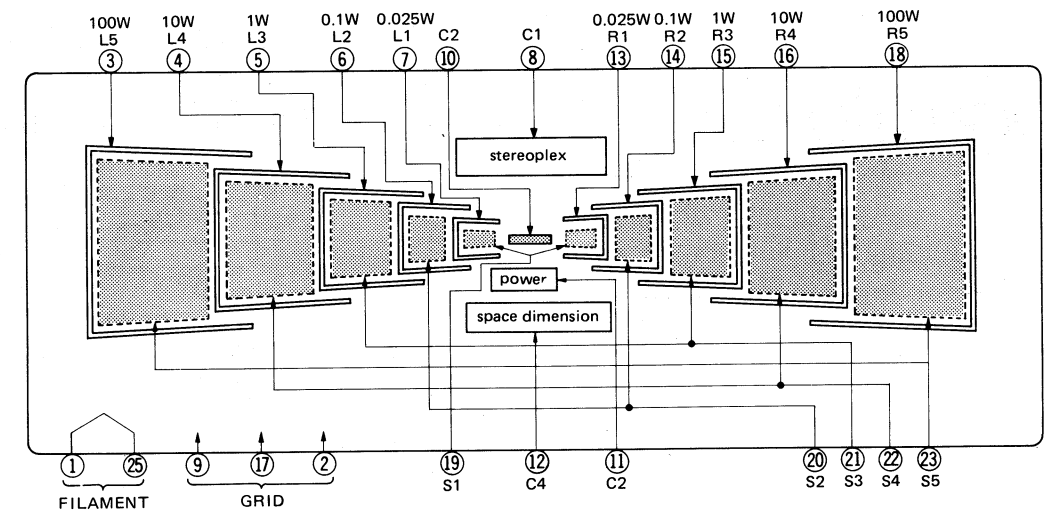


7 IC902 ⑤ pin
1/16 or 1/17 (FM OSC)
0.5V/DIV 0.1μsec/cm

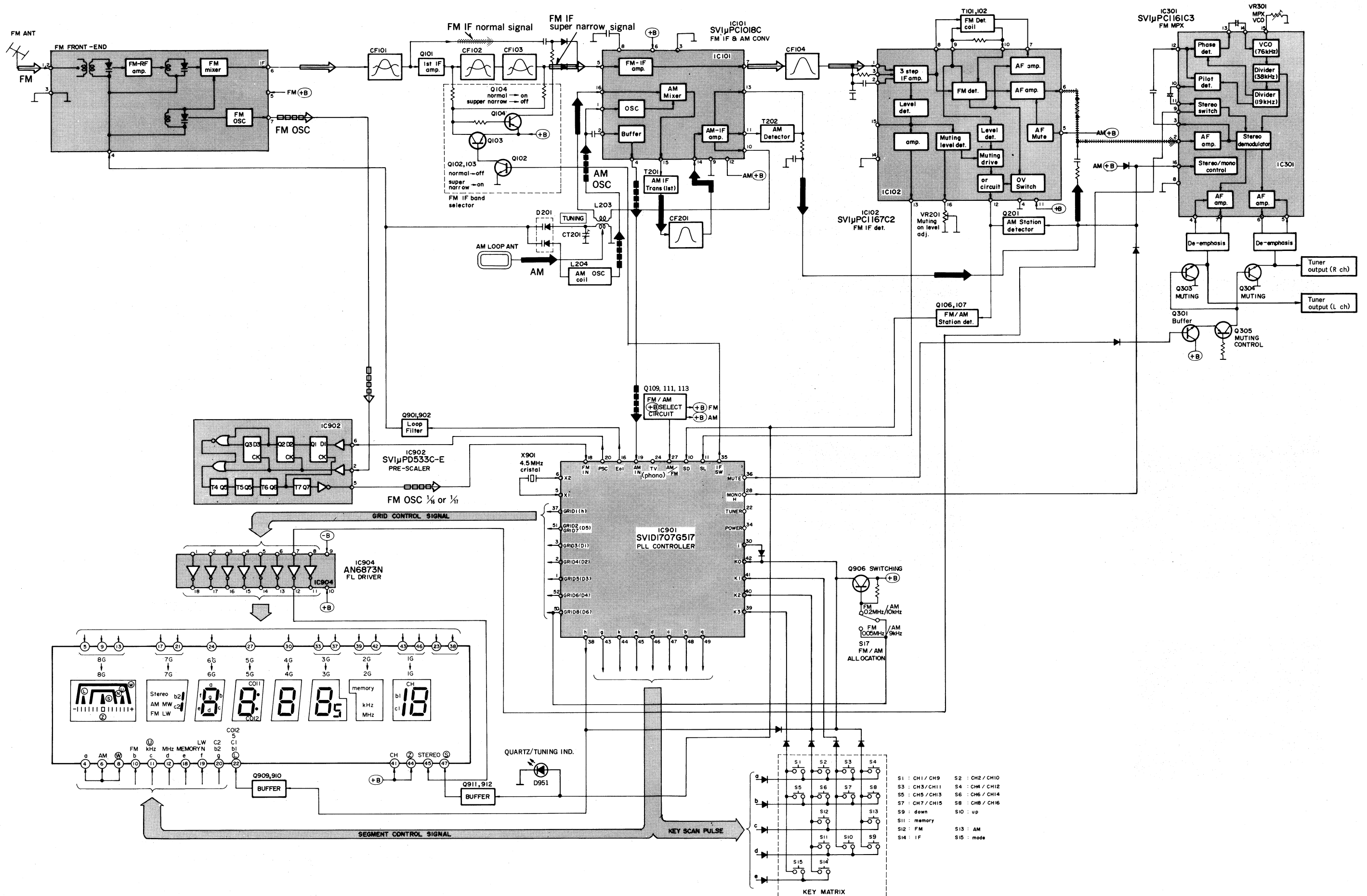


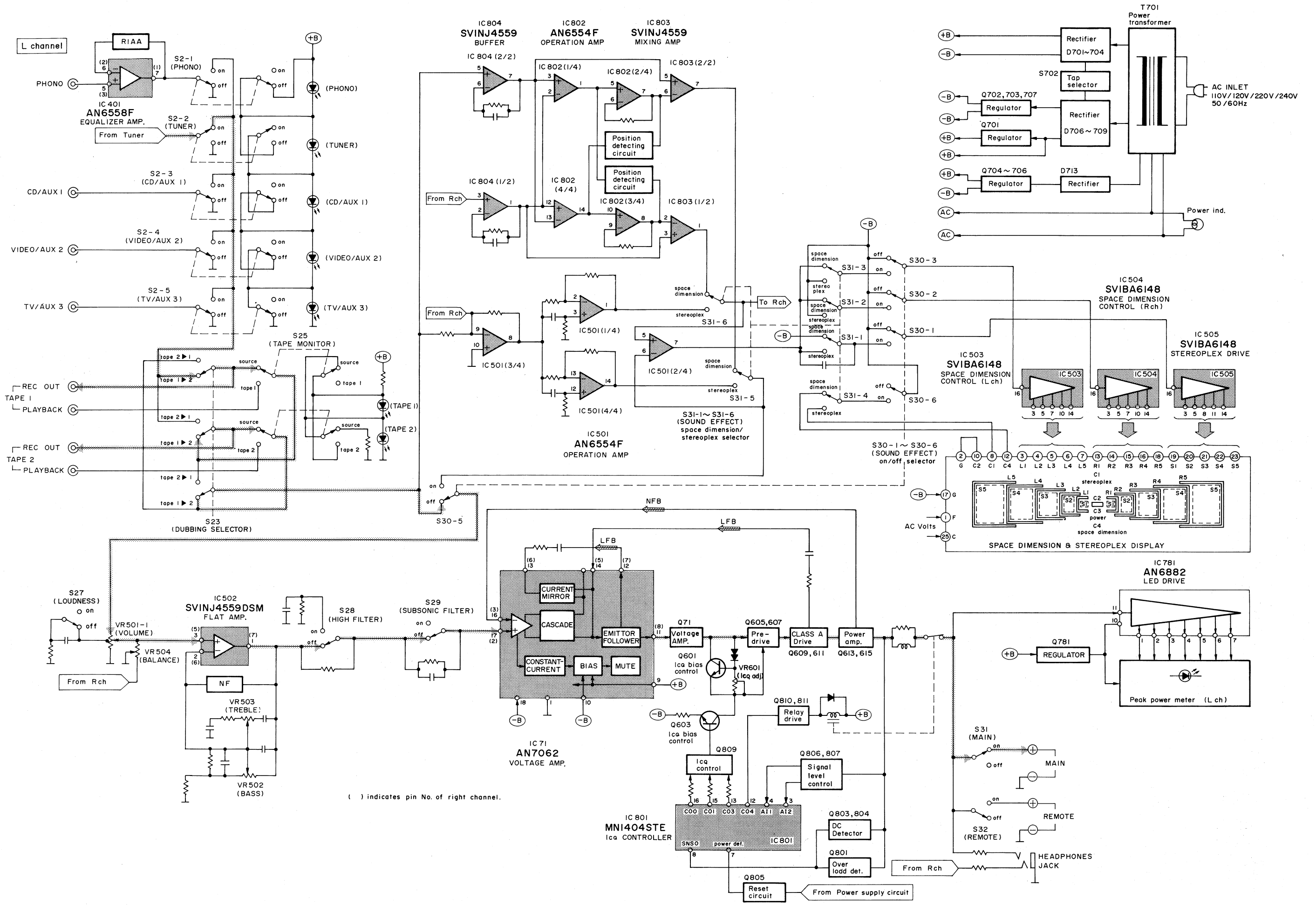
8 IC902 ⑥ pin
5V/DIV
20μ sec/cm
Reference signal/
for pre-scaler
IC902 ⑥ pin
5V/DIV
2μ sec/cm

■ STEREOPLEX/SPACE DIMENSION DISPLAY TUBE AND TIMECHART



■ BLOCK DIAGRAM





() indicates pin No. of right channel.

RESISTORS AND CAPACITORS

- Notes:**
- Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
 - 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.
 - The "S" mark is service standard parts and may differ from production parts.
 - The unit of resistance is Ω , (ohm).
K = 1000 Ω , M = 1000k Ω .
 - The unit of capacitance is μF . (microfarad).
P = 10⁻⁶ μF .
 - Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all area.

Numbering System of Resistor

Example

Type	Wattage	Shape	Tolerance	Value
ERD	25	F	J	101
ERG	2	AN	J	2R2

Resistor Type	Wattage	Tolerance
ERD : Carbon	10 : 1/8W	G : $\pm 2\%$
ERO : Metal Film	12 : 1/2W	J : $\pm 5\%$
ERG : Metal Oxide	S2 : 1/4W	K : $\pm 10\%$
ERC : Solid	25 : 1/4W	
	S1 : 1/2W	
	1 : 1W	
	2 : 2W	

ERD10TLJ □□□ → Chip type carbon

Numbering System of Capacitor

Example

Type	Voltage	Value	Tolerance	Peculiarity
ECKD	1H	102	Z	F
ECEA	50	M	R47	R

Capacitor Type	Voltage		Tolerance
	ECEA Type	Other	
ECEA : Electrolytic	OJ : 6.3V	1H : 50V	C : $\pm 0.25\text{pF}$
ECCD : Ceramic	1A : 10V	2H : 500V	J : $\pm 5\%$
ECKD : Ceramic	1C : 16V	KC : 400V AC	K : $\pm 10\%$
ECQM : Polyester	1E : 25V		Z : +80%, -20%
ECQP : Polypropylene	1H : 50V		M : $\pm 20\%$
ECES : Electrolytic	1V : 35V		P : +100%, -0%
	50 : 50V		
	25 : 25V		
	1J : 63V		
	2A : 100V		

RESISTORS

Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value
R71, 72	ERD10TLJ334U	330K	R187	ERDS2TJ393	39K	R503	ERDS2TJ103	10K	R619, 620	ERDS2TJ223	22K
R73, 74	ERD10TLJ102U	1K	R188	ERDS2TJ562	5.6K	R504, 505	ERDS2TJ103	10K	R621, 622	ERD25FJ100	10
R75, 76	ERD10TLJ124U	120K	R190	ERDS2TJ273	27K	R506	ERDS2TJ103	10K	R623, 624	ERD25FJ331	330
R77, 78	ERD10TLJ103U	10K	R201	ERDS2TJ102	1K	R507, 508	ERDS2TJ153	15K	R625, 626	ERDS2TJ184	180K
R79, 80	ERD10TLJ220U	22	R202	ERDS2TJ104	100K	R509, 510	ERDS2TJ393	39K	R627, 628	ERDS2TJ184	180K
R104	ERDS2TJ184	180K	R203	ERDS2TJ821	820	R511, 512	ERDS2TJ993	39K	R629, 630	ERDS2TJ124	120K
R105	ERDS2TJ102	1K	R205	ERDS2TJ273	27K	R513, 514	ERDS2TJ104	100K	R631, 632	ERDS2TJ332	3.3K
R106, 107	ERDS2TJ682	6.8K	R207	ERDS2TJ273	27K	R515, 516	ERDS2TJ333	33K	R633, 634	ERD25FJ470	47
R108	ERDS2TJ332	3.3K	R210	ERDS2TJ273	27K	R517	ERDS2TJ153	15K	R635, 636	ERDS2TJ221	220
R109	ERDS2TJ472	4.7K	R211	ERDS2TJ562	5.6K	R518	ERDS2TJ103	10K	R637, 638	ERDS2TJ331	330
R110	ERDS2TJ104	100K	R212	ERDS2TJ471	470	R519, 520	ERDS2TJ682	6.8K	R639, 640	ERG1ANJ100	10
R111	ERDS2TJ103	10K	R213	ERDS2TJ104	100K	R522	ERDS2TJ123	12K	R641, 642	ERG1ANJ100	10
R112	ERD25FJ151	150	R214	ERDS2TJ104	100K	R523, 524	ERDS2TJ474	470K	R643, 644	ERDS2TJ103	10K
R115	ERDS2TJ562	5.6K	R215	ERDS2TJ273	27K	R525, 526	ERDS2TJ474	470K	R647	ERD25FJ470	47
R118	ERDS1FJ823	82K	R216	ERDS2TJ823	82K	R527, 528	ERDS2TJ474	470K	R648	ERDS2TJ683	68K
R119	ERD25FJ821	820	R217	ERDS2TJ823	82K	R529, 530	ERDS2TJ474	470K	R649, 650	ERDS2TJ223	22K
R120	ERDS2TJ331	330	R301	ERD25FJ151	150	R531, 532	ERDS2TJ992	3.9K	R651	ERDS2TJ123	12K
R122	ERDS2TJ104	100K	R302	ERDS2TJ102	1K	R533, 534	ERDS2TJ223	22K	R652	ERG1ANJ561	560
R123	ERDS2TJ331	330	R305, 306	ERDS2TJ223	22K	R537, 538	ERDS2TJ102	1K	R653, 654	ERG1ANJ331	330
R124	ERDS2TJ824	820K	R307, 308	ERDS2TJ473	47K	R539, 540	ERDS2TJ393	39K	R656	ERD25FJ470	47
R125	ERD25FJ151	150	R309	ERDS2TJ153	15K	R541, 542	ERDS2TJ332	3.3K	R657, 658	ERDS2TJ104	100K
R126	ERDS2TJ183	18K	R310	ERDS2TJ221	220	R543, 544	ERDS2TJ824	820K	R701	ERC12ZGK335	3.3M
R127	ERDS2TJ393	39K	R313, 314	ERDS2TJ104	100K	R545, 546	ERDS2TJ103	10K	R703	ERG2ANJ181	180
R129	ERDS2TJ182	1.8K	R315, 316	ERDS2TJ392	3.9K	R547	ERDS2TJ103	10K	R706	ERDS2TJ562	5.6K
R130	ERDS2TJ683	68K	R319	ERDS2TJ103	10K	R549	ERDS2TJ103	10K	R707	ERDS2TJ153	15K
R131	ERDS2TJ682	6.8K	R320	ERDS2TJ104	100K	R550	ERDS2TJ102	1K	R708	ERDS2TJ123	12K
R134	ERD25FJ121	120	R321	ERDS2TJ102	1K	R551, 552	ERDS2TJ223	22K	R709	ERDS2TJ153	15K
R135, 136	ERDS2TJ103	10K	R325	ERDS2TJ332	3.3K	R557	ERDS2TJ333	33K	R710	ERDS2TJ562	5.6K
R137	ERDS2TJ273	27K	R326	ERDS2TJ474	470K	R559	ERDS2TJ273	27K	R711	ERDS1FJ471	470
R138	ERDS2TJ103	10K	R401, 402	ERDS2TJ391	390	R560	ERDS2TJ101	100	R712	ERD25FJ330	33
R139	ERDS2TJ473	47K	R403, 404	ERDS2TJ224	220K	R561, 562	ERDS2TJ824	820K	R713	ERDS1FJ100	10
R142	ERDS2TJ471	470	R405, 406	ERDS2TJ563	56K	R563, 564	ERDS2TJ824	820K	R715	ERG1ANJ331	330
R143	ERDS2TJ223	22K	R407, 408	ERDS2TJ271	270	R567, 568	ERDS2TJ222	2.2K	R716	ERDS2TJ152	1.5K
R144	ERDS2TJ272	2.7K	R409, 410	ERDS2TJ680	68	R571, 572	ERDS2TJ222	2.2K	R717	ERDS2TJ821	820
R145	ERDS2TJ123	12K	R411, 412	ERDS2TJ184	180K	R573, 574	ERDS2TJ104	100K	R718	ERDS2TJ392	3.9K
R146	ERD25FJ561	560	R413, 414	ERDS2TJ123	12K	R601, 602	ERDS2TJ681	680	R719	ERDS2TJ332	3.3K
R152	ERDS2TJ473	47K	R415, 416	ERDS2TJ563	56K	R611, 612	ERDS2TJ272	2.7K	R720	ERDS2TJ222	2.2K
R156	ERDS2TJ103	10K	R417, 418	ERDS2TJ102	1K	R605, 606	ERDS2TJ104	100K	R727	ERG1ANJ121	120
R158	ERDS2TJ473	47K	R421, 422	ERDS2TJ824	820K	R607, 608	ERDS2TJ272	2.7K	R728	ERG2ANJ680	680
R159	ERDS2TJ153	15K	R501, 502	ERDS2TJ222	2.2K	R613, 614	ERD25FJ681	680	R729	ERDS2TJ182	1.8K
R174	ERDS2TJ333	33K				R615, 616	ERD25FJ681	680	R750	ERDS2TJ101	100
R185	ERDS2TJ221	220				R617, 618	ERD25FJ182	1.8K	R781, 782	ERD25FJ392	3.9K
									R783, 784	ERD25TJ104	100K

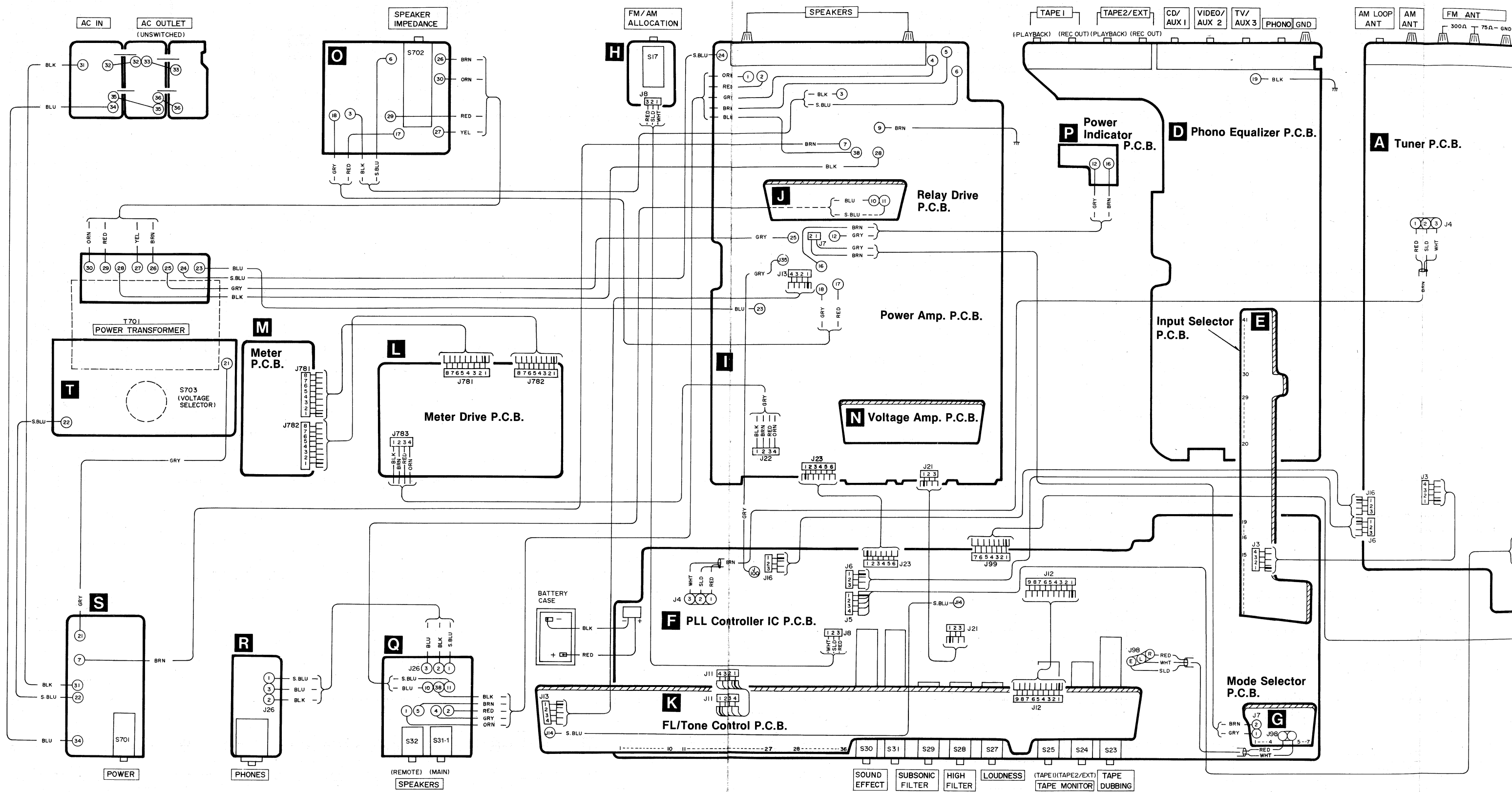
RESISTORS

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R785, 786	ERD25FJ391	390	R819	ERDS2TJ102	1K	R871, 872	ERDS2TJ273	27K	R906	ERDS2TJ103	10K
R787, 788	ERD25TJ224	220K	R820, 821	ERDS2TJ822	8.2K	R873, 874	ERDS2TJ183	18K	R909	ERDS2TJ103	10K
R789, 790	ERD25TJ153	15K	R822	ERDS2TJ394	390K	R875, 876	ERDS2TJ223	22K	R917	ERDS2TJ104	100K
R791, 792	ERD25FJ102	1K	R824	ERDS2TJ153	15K	R877	ERDS2TJ223	22K	R918	ERDS2TJ224	220K
R793, 794	ERD25TJ273	27K	R825	ERDS2TJ183	18K	R878	ERDS2TJ223	22K	R924	ERDS2TJ224	220K
R795, 796	ERDS1FJ101	100	R826, 827	ERDS2TJ223	22K	R879, 880	ERDS2TJ332	3.3K	R925	ERDS2TJ104	100K
R797	ERG2ANJ101	100	R828	ERDS2TJ223	22K	R881, 882	ERDS2TJ682	6.8K	R926, 927	ERDS2TJ104	100K
R798	ERD25FJ222	2.2K	R829	ERDS2TJ682	6.8K	R883, 884	ERDS2TJ102	1K	R928	ERDS2TJ103	10K
R801, 802	ERDS2TJ823	82K	R830	ERDS2TJ822	8.2K	R885, 886	ERDS2TJ473	47K	R929	ERDS2TJ102	1K
R803, 804	ERDS2TJ683	68K	R831	ERDS2TJ223	22K	R887, 888	ERDS2TJ103	10K	R930	ERD25FJ121	120
R805, 806	ERDS2TJ331	330	R851, 852	ERDS2TJ822	8.2K	R891, 892	ERD25TJ224	220K	R931, 932	ERD25TJ224	220K
R807, 808	ERDS2TJ272	2.7K	R853, 854	ERDS2TJ562	5.6K	R893, 894	ERD25FJ102	1K	R933, 934	ERDS2TJ101	100
R809	ERDS2TJ333	33K	R855, 856	ERDS2TJ472	4.7K	R895, 896	ERD25TJ124	120K	R936	ERDS2TJ221	220
R810	ERDS2TJ153	15K	R857, 858	ERDS2TJ183	18K	R897, 898	ERD25TJ224	220K	R941, 942	ERDS2TJ332	3.3K
R812	ERDS2TJ333	33K	R859, 860	ERDS2TJ272	2.7K	R899, 900	ERD25TJ224	220K	R943, 944	ERDS2TJ104	100K
R813	ERDS2TJ183	18K	R861, 862	ERDS2TJ272	2.7K	R901	ERDS2TJ102	1K	R945, 946	ERDS2TJ333	33K
R814	ERDS2TJ333	33K	R863, 864	ERDS2TJ682	6.8K	R902	ERDS2TJ561	560	R947	ERDS2TJ100	10
R815	ERDS2TJ273	27K	R865, 866	ERDS2TJ472	4.7K	R903	ERDS2TJ103	10K	R950	ERDS2TJ333	33K
R816, 817	ERDS2TJ103	10K	R867, 868	ERDS2TJ273	27K	R904	ERDS2TJ824	820K	R958	ERDS2TJ103	10K
R818	ERDS2TJ103	10K	R869, 870	ERDS2TJ273	27K	R905	ERDS2TJ223	22K	R959	ERDS2TJ151	150

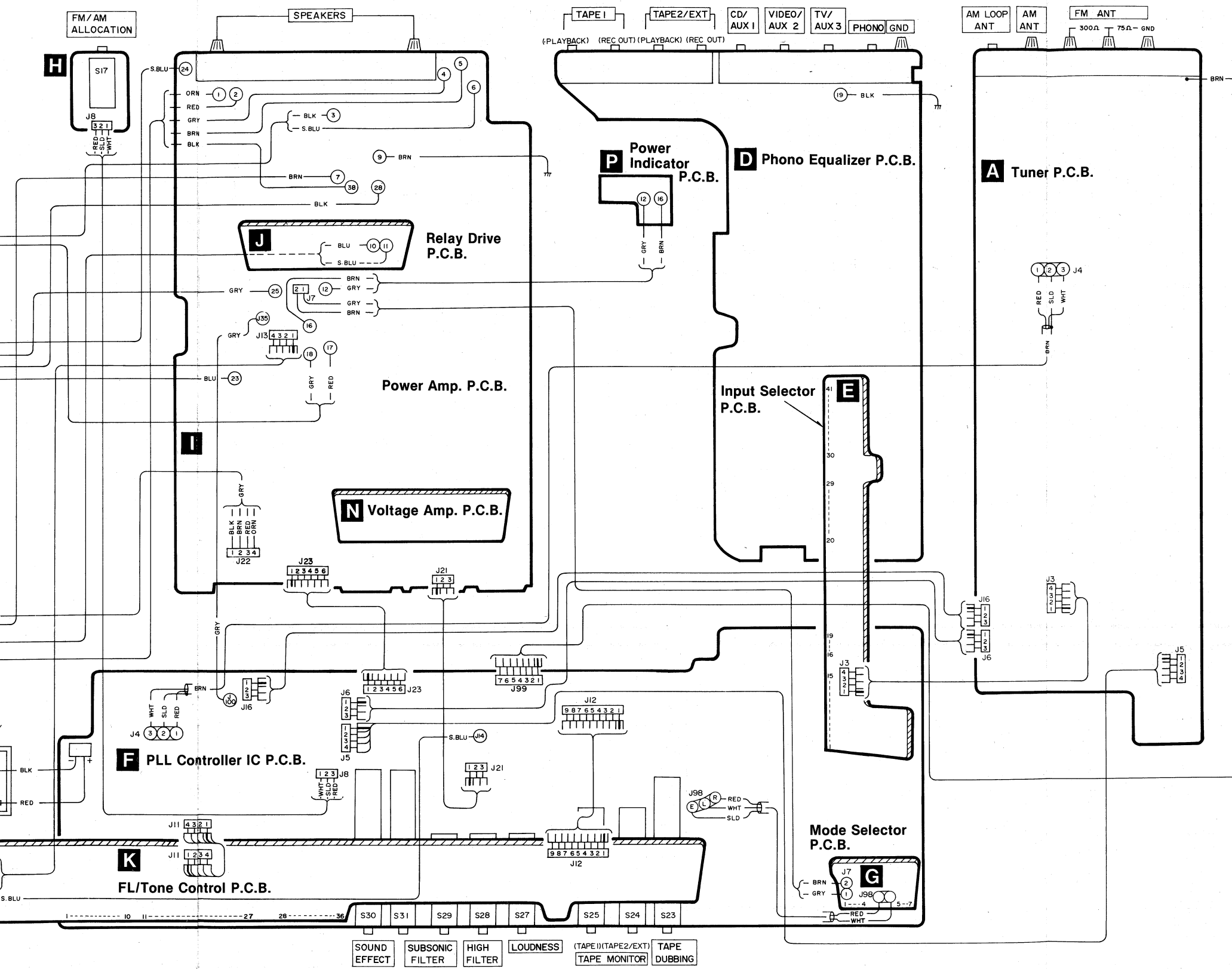
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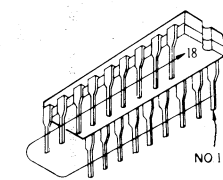
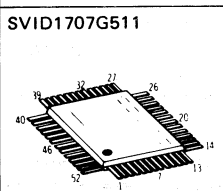
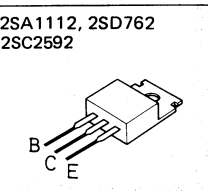
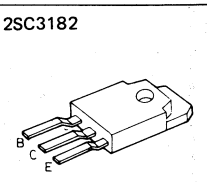
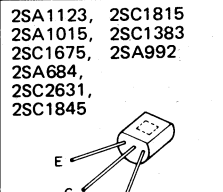
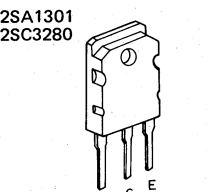
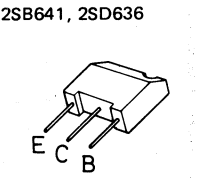
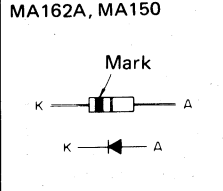
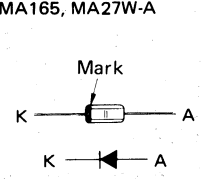
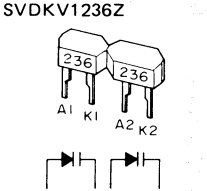
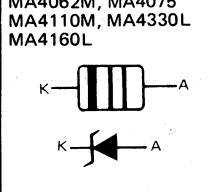
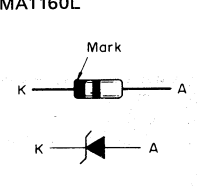
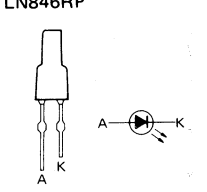
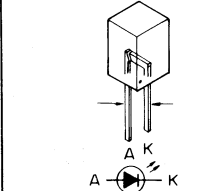
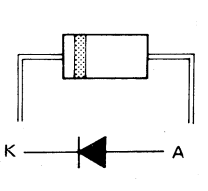
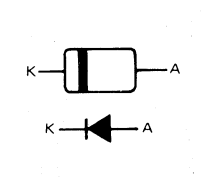
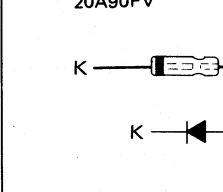
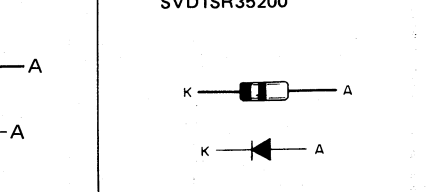
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C71, 72	ECEA50Z3R3	3.3	C309, 310	ECQM1H223JZ	0.022	C549	ECEA1EU330	33	C781, 782	ECEA1HU2R2	2.2
C73, 74	ECCD1H390K	39P	C311, 312	ECEA1EU3R3	3.3	C550	ECEA1VU221	220	C783, 784	ECEA50ZR1	0.1
C75, 76	ECCD1H820K	82P	C315	ECEA1HU4R7	4.7	C551, 552	ECEA1EU3R3	3.3	C785, 786	ECEA1EU100	10
C77, 78	ECKD1H391KB	390P	C317	ECKD1H223ZF	0.022	C553, 554	ECKD1H391KB	390P	C787	ECKD1H103ZF	0.01
C102	ECEA1HU010	1	C318	ECEA1HUR47	0.47	C555, 556	ECQM1H332JZ	0.0033	C801	ECEA1AU101	100
C104	ECKD1H223ZF	0.022	C319	ECQP1471JZ	470P	C559					

WIRING CONNECTION DIAGRAM



■ TERMINAL GUIDE OF TRANSISTORS, DIODES AND IC'S



<table border="1"> <tr><td>AN6558F</td><td>8 pin</td></tr> <tr><td>SVINJ4559DSM</td><td>8 pin</td></tr> <tr><td>SVIUPB553C-E</td><td>14 pin</td></tr> <tr><td>AN6554F</td><td>14 pin</td></tr> <tr><td>MN1404STE</td><td>16 pin</td></tr> <tr><td>SVIUPC1018C</td><td>16 pin</td></tr> <tr><td>SV1BA6148</td><td>16 pin</td></tr> <tr><td>SVIUPC1167C2</td><td>16 pin</td></tr> <tr><td>SVIUPC1161C3</td><td>16 pin</td></tr> <tr><td>AN6882</td><td>18 pin</td></tr> <tr><td>AN6873N</td><td>18 pin</td></tr> <tr><td>AN7062</td><td>18 pin</td></tr> </table> 			AN6558F	8 pin	SVINJ4559DSM	8 pin	SVIUPB553C-E	14 pin	AN6554F	14 pin	MN1404STE	16 pin	SVIUPC1018C	16 pin	SV1BA6148	16 pin	SVIUPC1167C2	16 pin	SVIUPC1161C3	16 pin	AN6882	18 pin	AN6873N	18 pin	AN7062	18 pin
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SVINJ4559DSM	8 pin																									
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SVIUPC1167C2	16 pin																									
SVIUPC1161C3	16 pin																									
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AN6873N	18 pin																									
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A

B

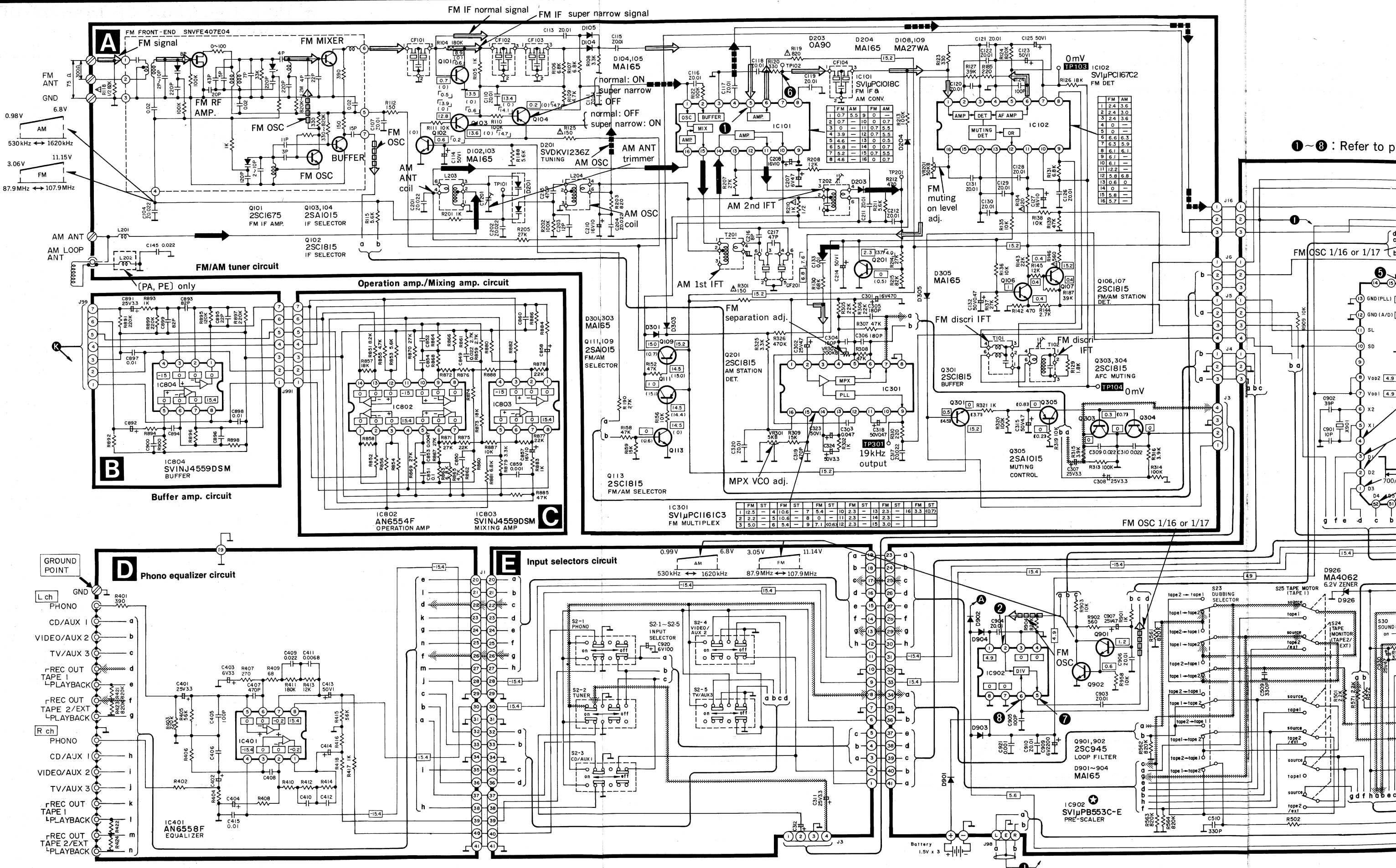
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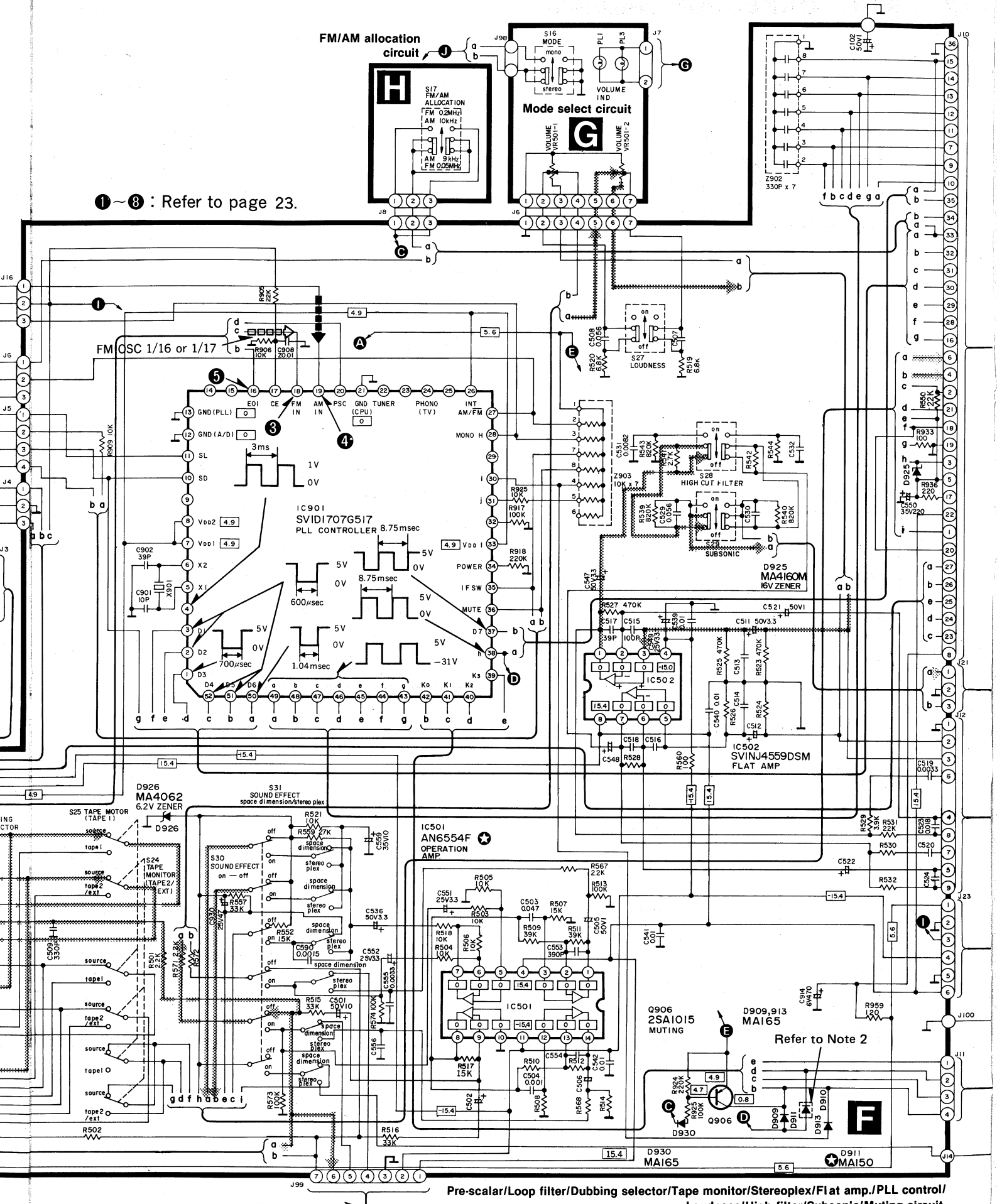
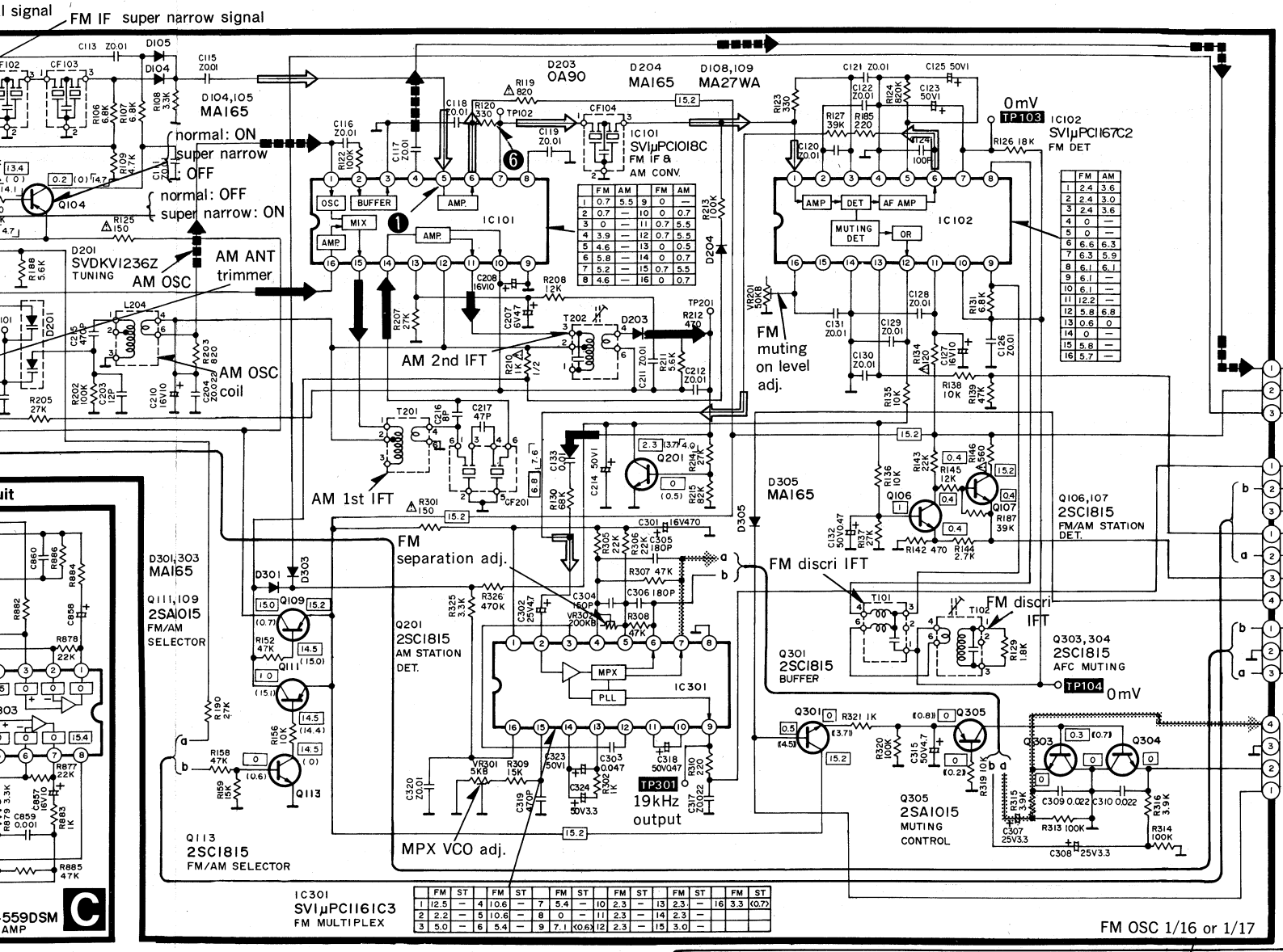
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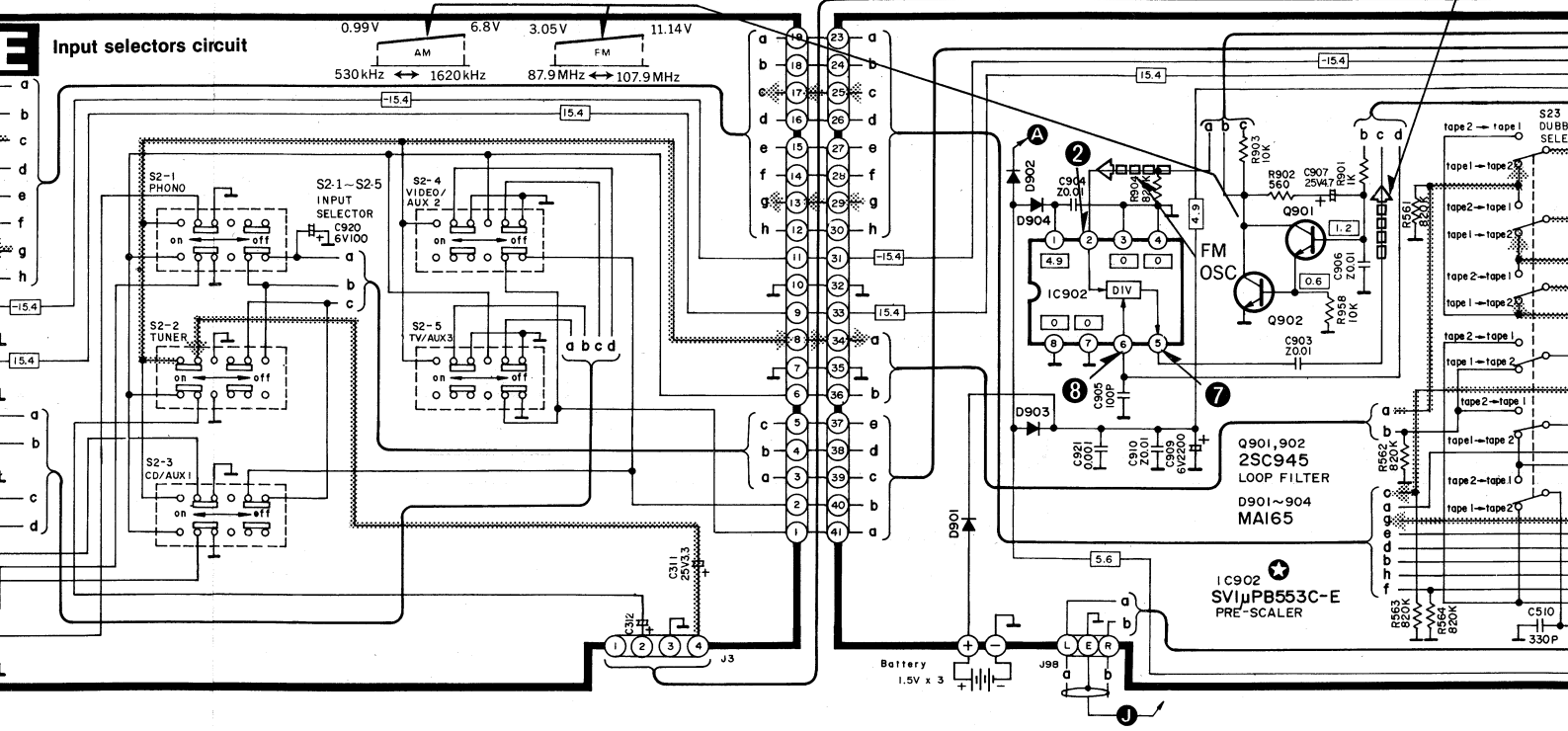
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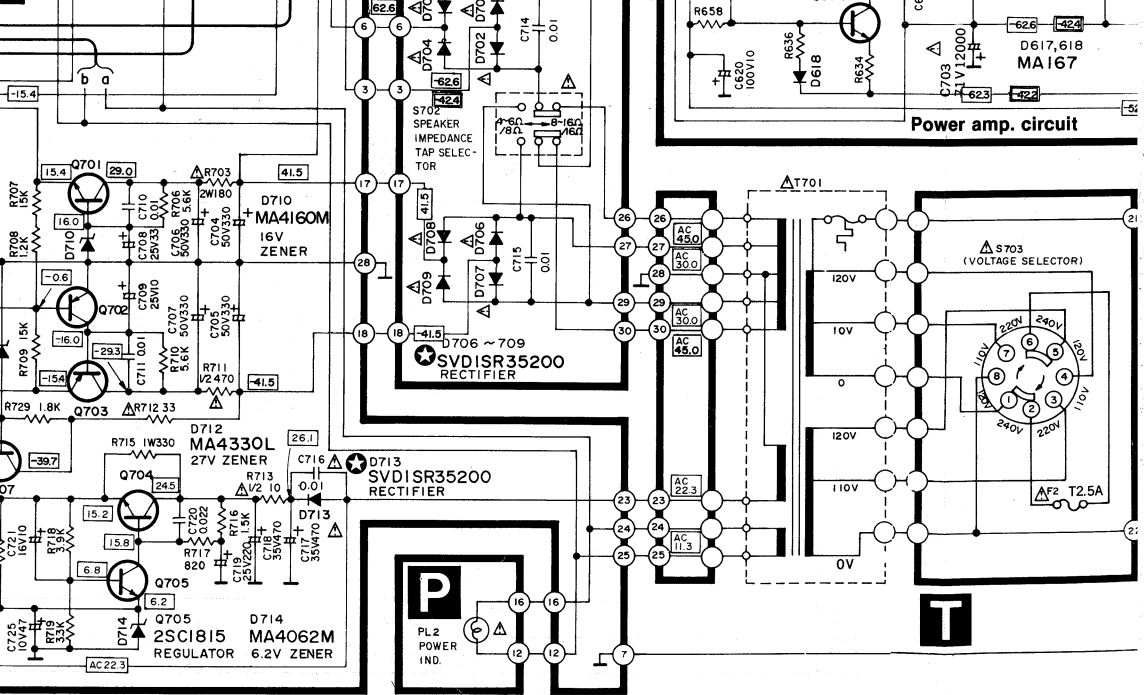
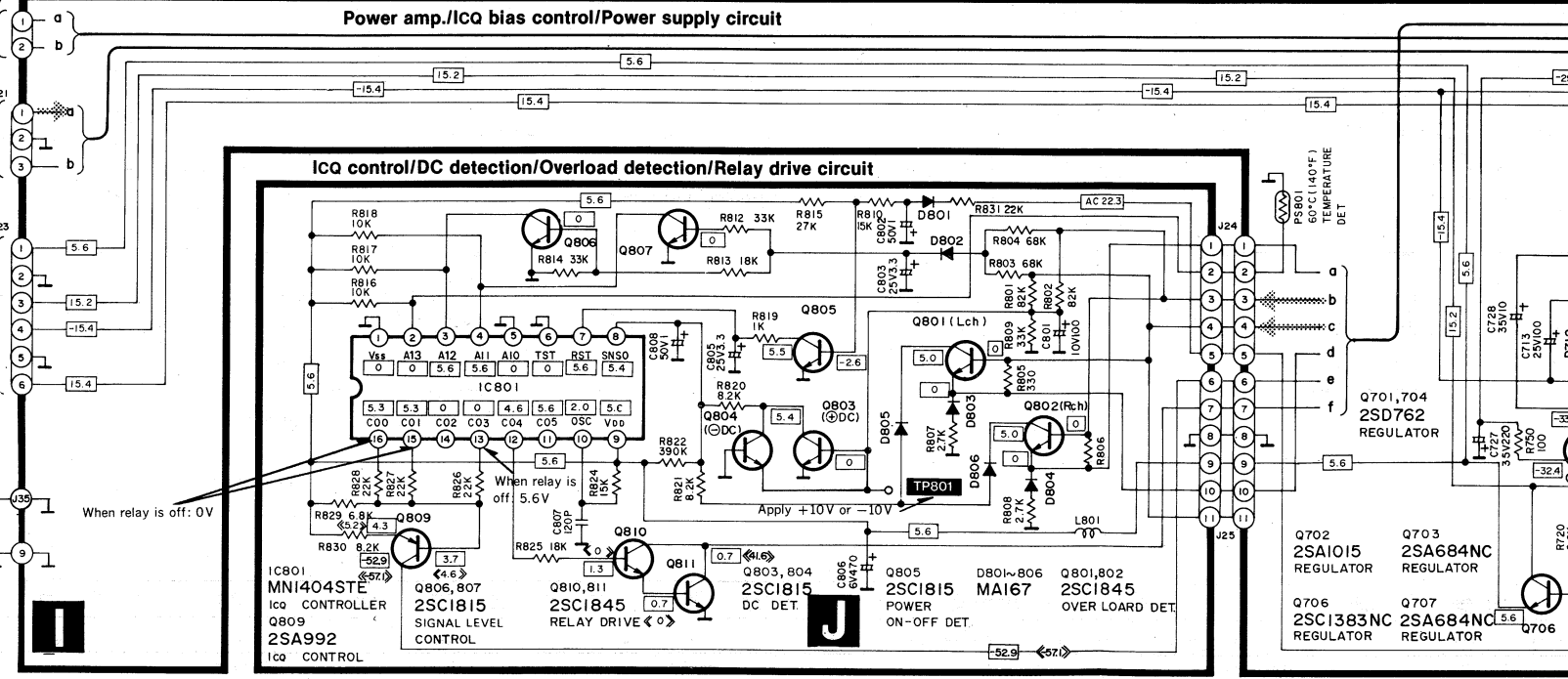
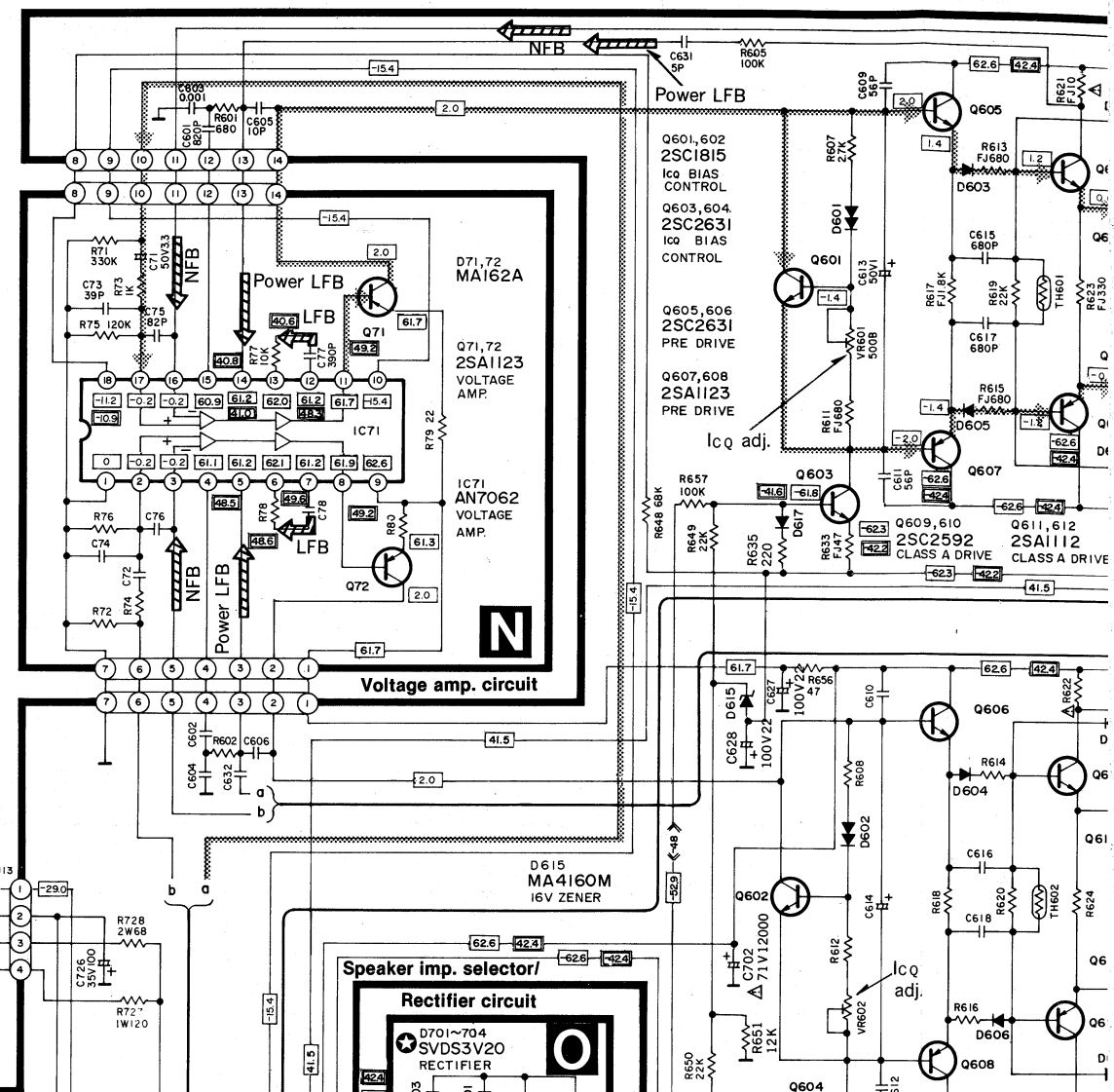
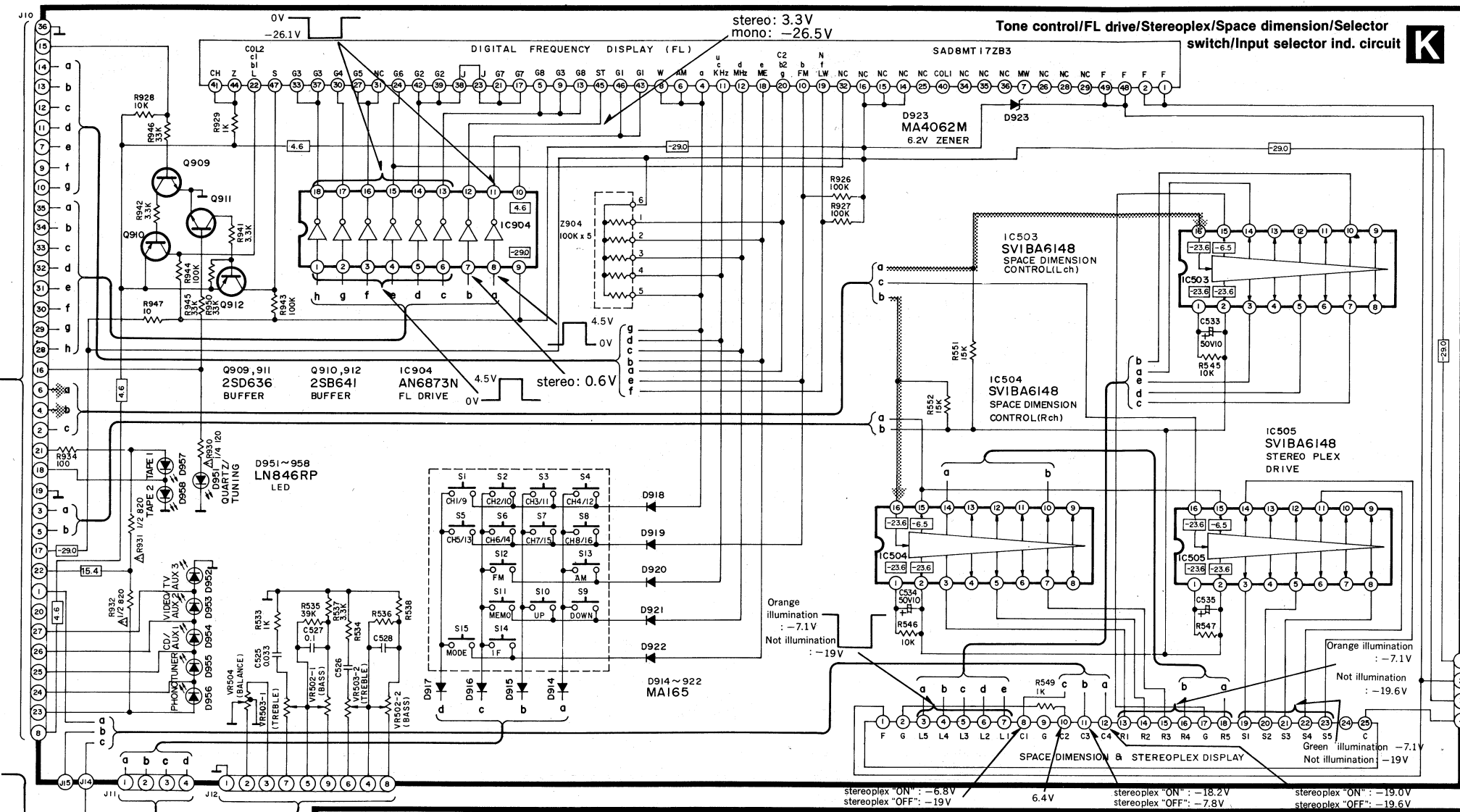


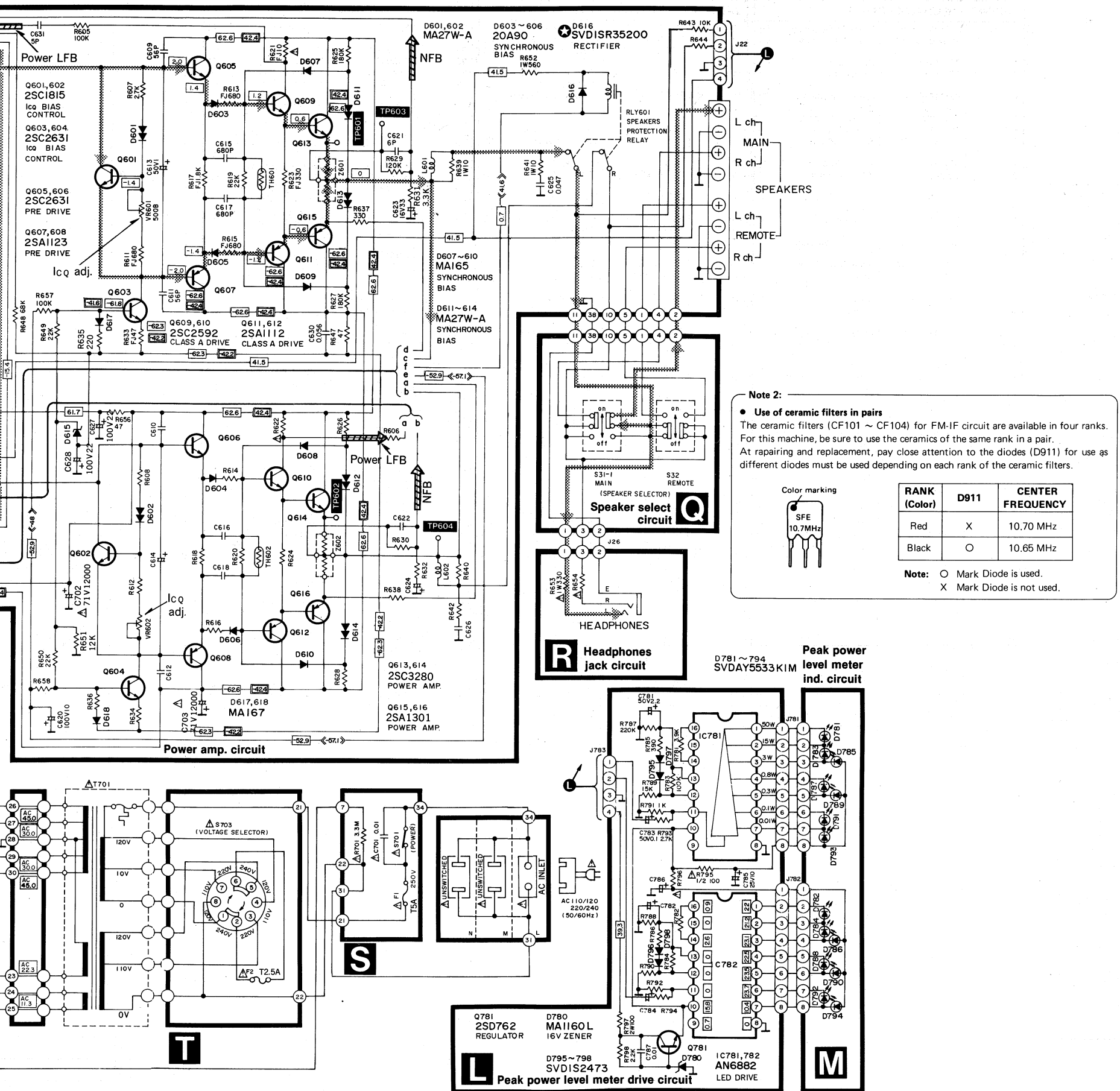
1-8: Refer to page



1-8: Refer to page 23.







Note 2:
 • Use of ceramic filters in pairs
 The ceramic filters (CF101 ~ CF104) for FM-IF circuit are available in four 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 diodes (D911) for use as different diodes must be used depending on each rank of the ceramic filters.

RANK (Color)	D911	CENTER FREQUENCY
Red	X	10.70 MHz
Black	○	10.65 MHz

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

■ 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 ⚡ 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.

Note 1:

- 1. S1 ~ S8 : Preset tuning switch.
 - [S1 — CH 1/CH 9 S4 — CH 4/CH 12 S7 — CH 7/CH 15]
 - [S2 — CH 2/CH 10 S5 — CH 5/CH 13 S8 — CH 8/CH 16]
 - [S3 — CH 3/CH 11 S6 — CH 6/CH 14]

* With it lightly pushed and released, the 1 ~ 8 CH (front stations) are received.
 * With it continuously pushed and released, the 9 ~ 16 CH (back stations) are received.

- 2. S2-1 ~ S2-5 : Input selector switch in "tuner" position.
 - (S2-1 : phono, S2-3 : CD/aux 1 S2-5 : TV/aux 3)
 - (S2-2 : tuner, S2-4 : video/aux 2)
- 3. S9, 10 : Tuning switch.
 - [S9 — down (tuning to lower frequency)
 - [S10 — up (tuning to higher frequency)
- 4. S11 : Memory switch.
 - (manual ↔ auto)
- 5. S12, 13 : Band selector switch.
 - S12 — FM, S13 — AM
- 6. S14 : FM IF band selector switch.
 - (normal/super narrow)
- 7. S15 : FM mode selector switch.
 - (auto ↔ mono)
- 8. S16 : Mode selector switch in "stereo" position.
 - (■ stereo, — mono)
- 9. S17 : FM/AM allocation switch in "FM 0.05MHz/AM 9 kHz" position.
 - (FM 0.05MHz/AM 9 kHz step ↔ FM 0.2 MHz/AM 10 kHz step)
- 10. S23 : Tape dubbing selector switch in "tape 1 → 2" position.
 - (■ tape 1 → 2, — tape 2 → 1)
- 11. S24 : Tape monitor selector switch in "source" position.
 - (■ source, — tape 2/ext)
- 12. S25 : Tape monitor selector switch in "source" position.
 - (■ source, — tape 1)
- 13. S27 : Loudness switch in "off" position.
 - (■ off, — on)
- 14. S28 : High cut filter switch in "off" position.
 - (■ off, — on)
- 15. S29 : Subsonic filter switch in "off" position.
 - (■ off, — on)
- 16. S30 : Sound effect (on/off) switch in "off" position.
 - (■ off, — on)
- 17. S31 : Sound effect (space dimension/stereoplex) switch in "space dimension" position.
 - (■ space dimension, — stereoplex)
- 18. S31-1 : Main speaker switch in "on" position.
 - (■ off, — on)
- 19. S32 : Remote speaker switch in "off" position.
 - (■ off, — on)
- 20. S701 : Power switch in "on" position.
- 21. S702 : Speaker impedance selector switch in "8 ~ 16Ω/16Ω" position.
 - (■ 8 ~ 16Ω//16Ω, — 4 ~ 6Ω/8Ω)
- 22. S703 : Voltage selector switch in "240V" position.
 - (110V ↔ 120V ↔ 240V ↔ 220V)

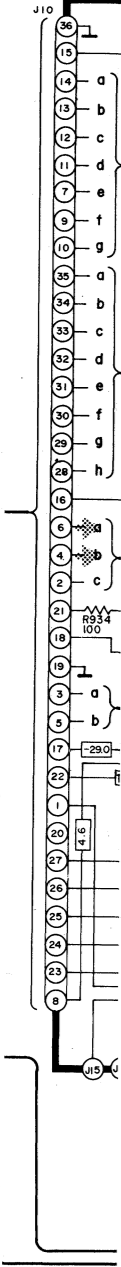
23. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
 * Figures in □ stand for DC voltage in FM signal (monaural signal) reception mode.
 * Figures in < > 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 TV signal reception mode.
 * Figures in (()) stand for DC voltage in muting.
 * Figures in [] stand for DC voltage in 4 ~ 6Ω/8Ω. (Low tap)
 * Figures in << >> stand for DC voltage in overload detection circuit is on.



25. Important safety notice:
 Components identified by ⚡ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

REPLACEMENT PARTS LIST

- Notes:**
- Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
 - 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.
 - The "S" mark is service standard parts and may differ from production parts.
 - Bracketed indications in Ref. No. columns specify the area.
 - The parenthesized number in the column of description stand for the quantity per set.



Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC71 IC101	AN7062 SV1 μ PC1018C	Voltage Amp. FM IF & AM Converter FM Det
IC102 IC301 IC401 IC501, 802 IC502, 803, 804 IC503-505	SV1 μ PC1167C2 SV1 μ PC1161C3 AN6558F AN6554-M SVINJ4559DSM SVIBA6148	MPX Equalizer Operation Amp. Flat Amp. Power Meter (L, R) Stereoplex Power Ind
IC781, 782 IC801 IC901 IC902 IC904	AN6882 MN1404STE SVID1707G517 μ PB553AC AN6873N	ICQ Controller PLL Controller Pre-Scaler FL Drive
TRANSISTORS		
Q71, 72 Q101 Q102, 106, 107, 113, 201, 301, 303, 304, 601, 602, 705, 803-807	2SA1123-R 2SC1675L1 2SC1815-Y	Voltage Amp. FM IF Amp. IF Selector, FM/ AM Station Det, FM/AM Selector, Regulator AGC, AM AGC, AM Station Det, AFC Muting, ICQ, Regulator Switching
Q103, 104, 109, 111, 305, 702, 906	2SA1015Y	IF Selector, FM/ AM Selector, Muting Control, Regulator ICQ Control, Pre Drive
Q603-606	2SC2631-R	Pre Drive Drive (New Class A) Drive (New Class A)
Q613, 614 Q615, 616 Q701, 704 Q703, 707 Q706 Q781 Q801, 802, 810, 811 Q809 Q901, 902	2SC3280-R 2SA1301-R 2SD762-R 2SA684-RNC 2SC1383 2SD762-R 2SC1845-E 2SA992E 2SC1815Y	Power Amplifier Power Amplifier Regulator Regulator Regulator Regulator Over Load Det, Relay Drive ICQ Control Switching (Product Part No. is 2SC945P)
Q909, 911 Q910, 912	2SD636 2SB641	Buffer Buffer
DIODES		
D104, 105, 204, 301, 303, 305 607-610, 901-904, 908, 909, 913-922, 930, 949 D601, 602, 611-614 D201	MA165 MA27W-A SVDKV1236Z	Switching Switching Tuning (AM Variable Capacitor)
D203 D615, 710, 925 D617, 618, 801-806	20A90 MA4160M MA167	16V, Zener Switching

Ref. No.	Part No.	Description
D603-606 D621-624 D616, 706-709, 713 D701-704	20A90 MA162A SVD1SR35200 SVDS3V40	Switching Switching Rectifier (Product Part No. is SVDS3V20)
D712 D714, 926 D780 D781-794	MA4330L MA4062-M MA1160L SVDA5533K1M	33V, Zener 6.2V, Zener 16V, Zener L.E.D Peak Power Meter
D795-798	MA162A	Switching (Product Part No. is SVD1S2473)
D911 D923 D927 D951-958	MA162A MA4075M MA162A LN846RP	Switching 7.5V, Zener Switching L.E.D
COILS		
L201 L202 [PA, PE] only L203 L204 L601, 602 L801	SLQZ10G1-D SLQZ10G1-D SLA2B1-P SL02B7-P SLQY07G-30 SLQX101-3M	Choke Choke AM Antenna AM OSC Choke Choke
TRANSFORMERS		
T101 T102 T201 T202 T701	SLI4C541-Z SLI4C543-Z SLI2C127-M SLI2C413 SLT5Q141	FM IFT FM IFT AM IFT AM IFT Power Source
CERAMIC FILTERS		
CF101 CF102, 103 CF104 CF201	SVFE107MM-A SVFE107MM-D SVFE107M2-A SVFE107M2-D SVFE107ML-A SVFE107ML-D (Use pair ranks as same as CF101, 102, 103 and 104) SVFSFZ450F7L	FM, 10.7MHz (Red) FM, 10.65MHz (Black) FM, 10.7MHz (Red) FM, 10.65MHz (Black) FM, 10.7MHz (Red) FM, 10.65MHz (Black)
X901	SVQ43U452-D	4.5MHz, Counter OSC
CRYSTAL		
VARIABLE RESISTORS		
VR201 VR301 VR302 VR501 VR502, 503	EVN58AA00B54 EVN75AA00B53 EVN58AA00B55 EWAPAA00B54 EWANA6X05C15	Muting ON Level Adj. 50k Ω (B) VCO Adj. 5k Ω (B) Separation Adj. 500k Ω (B) Volume Control, 50k Ω (B) Tone Control, 100k Ω (C)

Ref. No.	Part No.	Description
VR504 VR601, 602	EWANF5X05G15 EVNK6AA00B52	Balance Control, 100k Ω (G) ICQ Control Adj. 500 Ω (B)
VARIABLE CAPACITOR		
CT201	ECRHA010A11	AM Antenna, Trimmer
FRONT END		
	SNVFE407E04	FM Front End
THERMAL DETECTOR		
PS801	SRPBG47101	60°C (140°F) Sensor
THERMISTERS		
TH601, 602	RRT104	100k Ω
FLUORESCENT DISPLAY TUBES		
FL FL	SAD8MT17ZB3 SADBG247Z	Digital Frequency Display Power Meter & Stereoplex Display
RELAY		
RLY601	SSY126	Speaker Protection (Product parts No is SSY124)
COMPONENT COMBINATIONS		
Z601, 602 Z902 Z903 Z904	ERF3GBKR22N EXFP7331MW EXBP87103K EXBP85104K	0.22 Ω (\times 2) 330pF (\times 7) 10k Ω (\times 7) 100k Ω (\times 5)
LAMPS		
PL1, 3 PL2	XAMR74S17 XAMS6Q17-1	Volume Ind. Power Ind.
FUSES		
F1 F2	XBA2C50TR0 XBA2C25TR0	250V, T 5A 250V, T 2.5A
SWITCHES		
S1-15 S2-1-2.5 S16 S17 S23, 30, 31 S24, 25 S27-29 S31, 32 S701 S702 S703	SSG13 SSH556 SSH1164 SSS43 SSH1035 SSH1033 SSH1031 SSH2047 SSH1057-1 SSH1173 ESE37219	FM/AM Preset Tuning, Tuning Input Selector Mode Selector FM/AM Allocation Tape Dubbing Stereoplex Tape Monitor Subsonic Filter, High Filter Speaker Selector Power Source Speaker Impedance Selector Voltage Selector

Ref. No.	Part No.	Description
CABINET and CHASSIS PARTS		
1 1 3 3 4 5 6 7 8 9 9 10 11 12 13 13 13-1 13-1 13-2 13-2 14 15 16 17 18 19 19 20 21 22 23 23 24 24 25 25 26 27 28 29 30 31	SGWA850-SP SGWA850-KC SGX7669 SGX7669-1 SBC5730-T SBC573N-T SBC5730M-T SBC573H-T SBC573G-T SBD96 SBD96-1 SBE295A SHR5274 SGU412 SGXA850-SP SGXA850-KC SGK1845-1A SGK1845-1B SGU413-1A SGU413-1B SUG185 SUW2849 SHR9731 SUS191-1 SHR9724 SBC483-6T SBC483-8T SBC565-3 SBC565-4 SUS257 SDU197-1 SDU197 SDU247 SDU247-1 SDL86C SDL86D SHG436 SJJ71B SHR415 SBC627 SHR415 SMX611-1	Front Panel Ass'y (1) Front Panel Ass'y (1) Ornament (1) Ornament (1) Button, TV/AUX3 (1) Button, Video/AUX2 (1) Button, CD/AUX1 (1) Button, Tuner (1) Button, Phono (1) Knob, Volume (1) Knob, Volume (1) Holder, Volume (1) Spacer, Volume (1) Transparent Plate (1) Grille, Sub Panel Ass'y (1) Grille, Sub Panel Ass'y (1) Sheet (1) Sheet (1) Indication Plate (1) Indication Plate (1) Connection Rod (2) Bracket, Connection Rod (1) Rod (1) Holder, Volume (1) Spring, Input Selector Button (5) Holder, Input Selector Button (5) Button, Mode Speaker (3) Button, Mode Speaker (3) Button (7) Button, Stereoplex Spring, Button (11) Filter (1) Filter (1) Filter (1) Filter (1) Indication Plate (1) Indication Plate (1) Rubber, Indication Plate (1) Jack, Headphones (1) Lock Pin (12) Button, Power Switch (1) Rock Pin (2) Shield Plate (1)

Ref. No.	Part No.	Description
CABINET and CHASSIS PARTS		
32 33 38 41 41 42 43 43 44 45 46 47 48 49 49 50 51 52 53 54 55 56 57 58 60 61 62 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84	SUW2013-1 SUW2851 SUW2839 SBD97 SBD97-1 SBZ9018 SGX7668 SGX7668-1 SMP374 SMP375 SMN1916-1 SMN1916 SMN1915 SKC1130S1A SKC1130BB1 SMC1148 SML139-2 SMX767 SUW2840 SUW2841 SKUA850-SP SUW2854 SKL249 SUW2837 SJF4419-6 SJF3059-14N SJF3057N RJT202B SJF4815-1 SUW2848-2 SBC527 SMX515 SJS9232B SJS9231B SJS9232A SJS9231A SGPA850-SP SHR401-1 SJB3005-1 SJC7 SJC9 SGK1569-1 SQX4779 SJT347 SHR301 SJT3213 SJS5215	Bracket, P.C.B (1) Bracket, P.C.B (1) Bracket, P.C.B (1) Knob, Bass, Treble, Balance (3) Knob, Bass, Treble, Balance (3) Connection Rod, Tone, Balance (3) Ornament (1) Ornament (1) Holder, LED (1) Holder, LED (2) Holder, FL (1) Holder, FL (1) Holder, FL (1) Cabinet (1) Cabinet (1) Shield Plate (1) Bracket, Power Transformer (1) Insulation Sheet (4) Bracket (1) Bracket (1) Bottom Board Ass'y (1) Bracket (1) Foot (4) Bracket (1) Terminal Board, Antenna (1) Terminal Board, Input (1) Terminal Board, Tape (2) Terminal (1) Terminal Board, Speaker (1) Bracket (1) Button, Speaker Impedance (1) Insulation Plate (1) Socket, AC Outlet (2) Socket, AC Inlet (1) Cover, AC Outlet (2) Cover, AC Inlet (1) Rear Panel Ass'y (1) Lock Pin (2) Battery Case (1) Terminal (2) Terminal (2) Label (1) Label (1) Holder, Fuse (4) Clamper (4) Post (2 Pin) (2) Socket (2 Pin) (1)

Ref. No.	Part No.	Description
CABINET and CHASSIS PARTS		
85 86 86 86 87 N1 N2 N3 N4 N5 N6 N7 N8 N9 N9 N10 N11 N12 N13 N14 N20 N21 N30 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A10 [PC]	SJT783 SJS5327 SJS5421 SJS5519 SJS5627 SDH566 XTBS3+8BFZ1 XTB3+8G XSN3+6S XTS3+8B XTW3+10H XTW3+12J XTW3+8H XTB4+8F SNE2095-4 SNE2095-5 XSN26+5FZ XTB3+10BFZ XSN3+12S XWA3B XTB3+8BFZ XWA3B XWA26BFZ XNH10E SJA168 SSA267-1 SQX4885-3 SJP9215 SSA902 SQX4849-1 SMA231 SMA233-1 XTN3+10AFZ SQF12128 SQF12129	Terminal (2) Socket (3 Pin) (2) Socket (4 Pin) (3) Socket (5 Pin) (1) Socket (6 Pin) (1) Reflector Plate (1) Tapping with Detent, ϕ 3x8 (30) Tapping, ϕ 3x8 (1) ϕ 3x6 (9) Tapping, ϕ 3x8 (1) Tapping, ϕ 3x10 (4) Tapping, ϕ 3x12 (4) Tapping, ϕ 3x8 (7) Tapping, ϕ 4x8 (4) Cabinet (4) Cabinet (4) XSN26+5FZ (2) Tapping, ϕ 3x10 (4) Tapping, ϕ 3x12 (2) XWA3B (2) Tapping, ϕ 3x8 (6) WASHERS Spring, ϕ 3 (9) Spring, ϕ 2.6 (2) NUT ϕ 10 (1) ACCESSORIES AC Cord (1) Cord, FM Antenna (1) Cord, TV Connection (1) Label (1) AM Loop Antenna (1) Label (1) Holder (B) (1) Holder (A) (1) Screw, Loop Antenna Holder (2) Instruction Book (1) Instruction Book (1) PACKING PARTS Polyethylene Bag (1) Polyethylene Bag (1) Pad, Left Side (1) Pad, Right Side (1) Carton Box (1) Label (2)

EXPLODED VIEW

