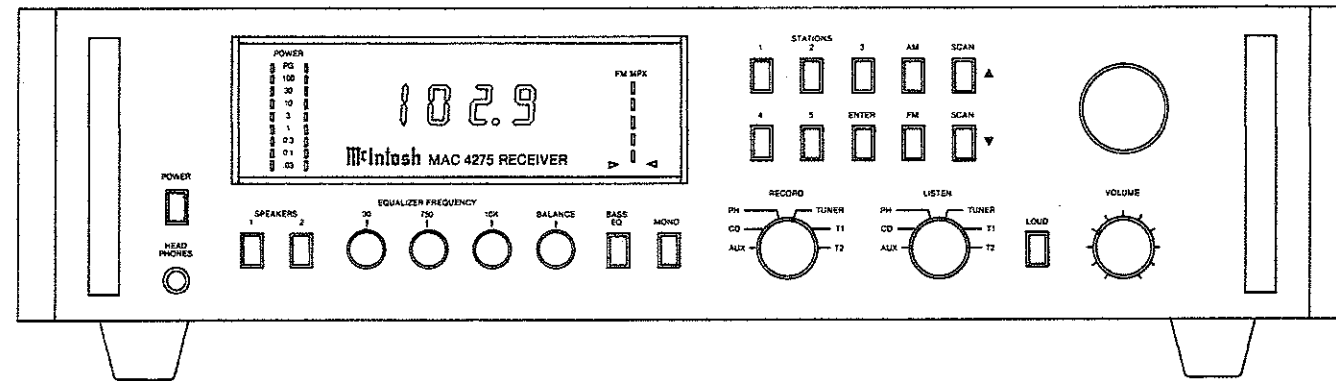


# MAC 4275

AM/FM RECEIVER



## CONTENTS

Performance Specifications.....	2-3
Mechanical Views.....	4
Block Diagrams.....	5-6
Section Locations.....	7
Section 1 — Audio.....	8-13
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# Performance Specifications

## AMPLIFIER SECTION

### STEREO POWER OUTPUT

75 watts into 8 ohm loads or 100 watts into 4 ohm loads is the minimum sine wave continuous average power output per channel, from 20 to 20,000Hz, with both channels operating.

### POWER BANDWIDTH

20 to 20,000Hz

### TOTAL HARMONIC DISTORTION

0.03% maximum at any power level from 250 milliwatts to rated power per channel, 20 to 20,000Hz, both channels operating.

### INTERMODULATION DISTORTION

0.03% maximum at any power level from 250 milliwatts to rated power per channel, for any combination of frequencies from 20 to 20,000Hz, with both channels operating.

### FREQUENCY RESPONSE

+0, -0.5dB from 20 to 20,000Hz at rated power.

### INPUT SENSITIVITY

Phono(MC) 0.12mV  
Phono(MM) 2.5mV produces rated output  
Tape, Aux 250mV produces rated output  
Power Amp 1.5V produces rated output

### SIGNAL TO NOISE RATIO, A-WEIGHTED

Power Amp 100dB below rated output  
Tape, Aux 95dB below rated output  
Phono 90dB with 10mV input

### MAXIMUM INPUT SIGNAL

Phono(MC) 4.1mV  
Phono(MM) 80mV  
High level 8V

### INPUT IMPEDENCE

Phono(MC) 100 ohms  
Phono(MM) 47k ohms  
Tape, Aux 20k ohms  
Power Amp 18k ohm

### DAMPING FACTOR

Greater than 50 at 8 ohms

### TAPE OUTPUT

Phono 250mV with rated input  
Tape 250mV with rated input  
Tuner 1.0V at 100% modulation (FM)

### PROGRAM EQUALIZER

±12dB at 30, 750, and 10kHz

## FM SECTION

### USABLE SENSITIVITY

11.25dB which is 1.0uV across 75 ohms

### 50dB QUIETING SENSITIVITY

Mono 15.2dB which is 1.6uV across 75 ohms  
Stereo 27dB which is 6uV across 75 ohms

### SIGNAL TO NOISE RATIO

Mono 80dB  
Stereo 75dB

### FREQUENCY RESPONSE

Mono +0.5, -0.5dB from 20 to 15kHz  
Stereo +0.5, -0.5dB from 20 to 15kHz

### HARMONIC DISTORTION

Mono 0.15% at 100Hz  
0.1% at 1k  
0.1% at 10k  
Stereo 0.1% at 100Hz  
0.1% at 1k  
0.25% at 10k

### INTERMODULATION DISTORTION

Mono 0.1%  
Stereo 0.2%

### CAPTURE RATIO

1.5dB

### ALTERNATE CHANNEL SELECTIVITY

60dB

### SPURIOUS RESPONSE

95dB

### IMAGE RESPONSE

90dB

### AM SUPPRESSION

60dB

### STEREO SEPARATION

35dB at 100Hz  
45dB at 1k  
40dB at 10k

### SCA REJECTION

65dB

**AM SECTION**

**SENSITIVITY**  
25uV (External Antenna)

**SIGNAL TO NOISE RATIO**  
50dB at 30% modulation  
60dB at 100% modulation

**HARMONIC DISTORTION**  
1.0% maximum at 50% modulation  
(0.2% typical)

**FREQUENCY RESPONSE**  
+0, -6dB to 30Hz to 3.5KHz

**ADJACENT CHANNEL SELECTIVITY**  
50dB minimum IHF

**IMAGE REJECTION**  
50dB minimum

**IF REJECTION**  
55dB minimum

**GENERAL INFORMATION**

**SEMICONDUCTOR COMPLEMENT**  
78 Silicon Diodes  
13 Tuning Devices  
24 Light Emitting Diodes  
4 Seven Segment LED Displays  
59 Bipolar Transistors  
3 Field Effect Transistors  
38 Integrated Circuits

**POWER REQUIREMENTS**  
120 volts, 50/60Hz, 60 to 575 watts

**WEIGHT**  
25 pounds (11.3kg) net, 32 pounds  
(14.5kg) in shipping carton.

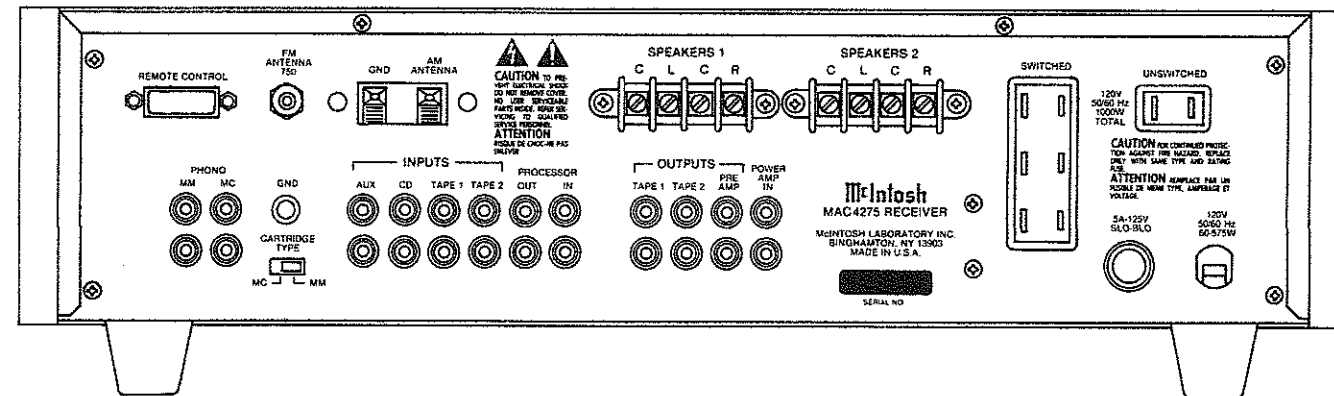


Fig. 1 Rear View

# Mechanical Views

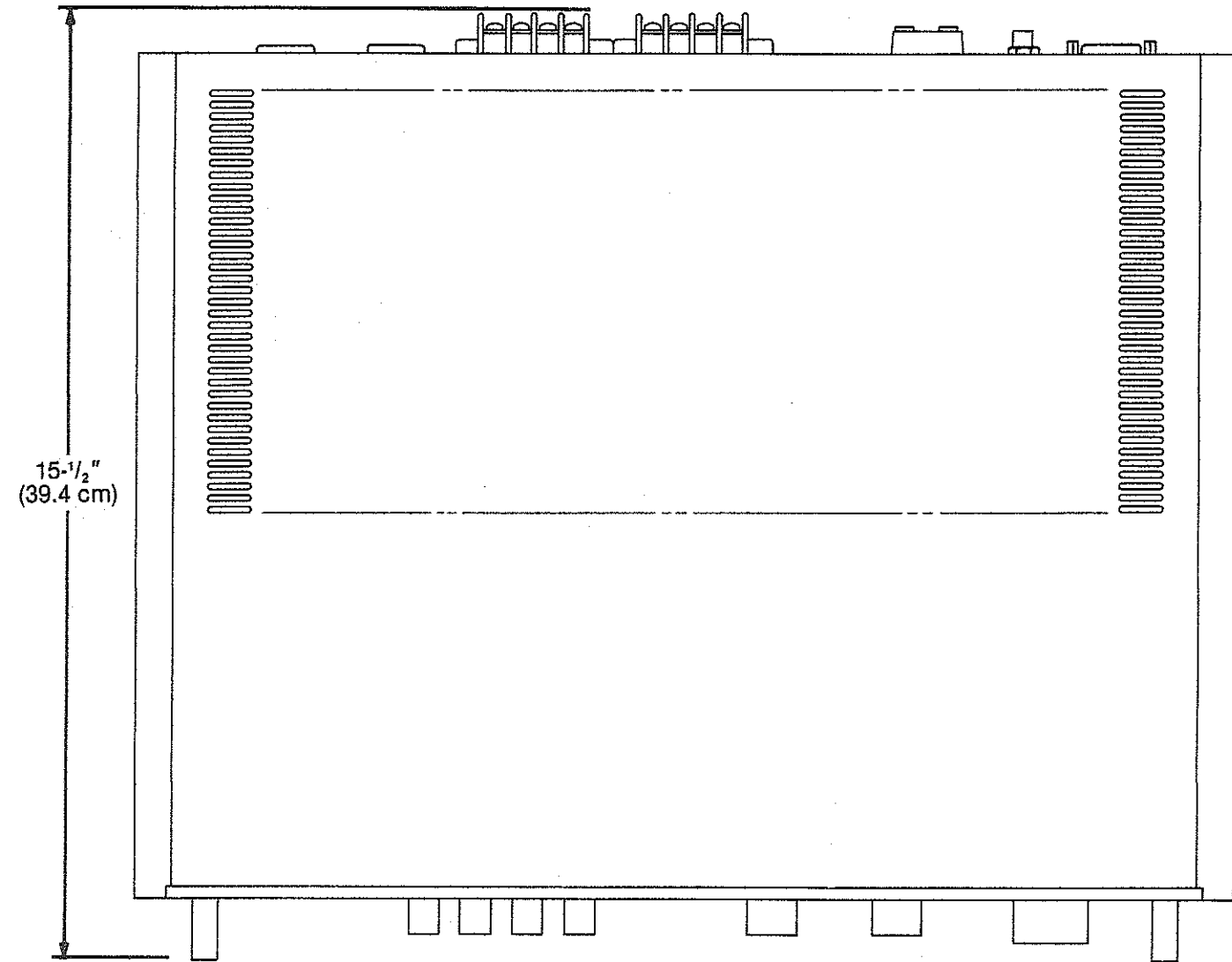


Fig. 2 Top View

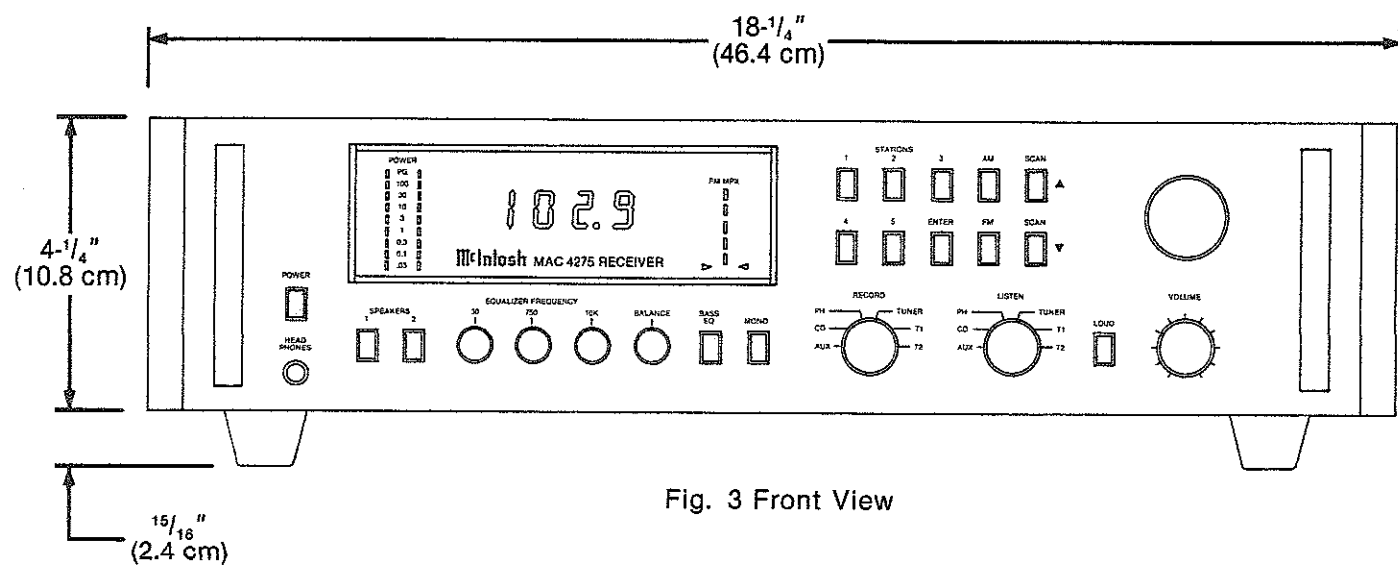
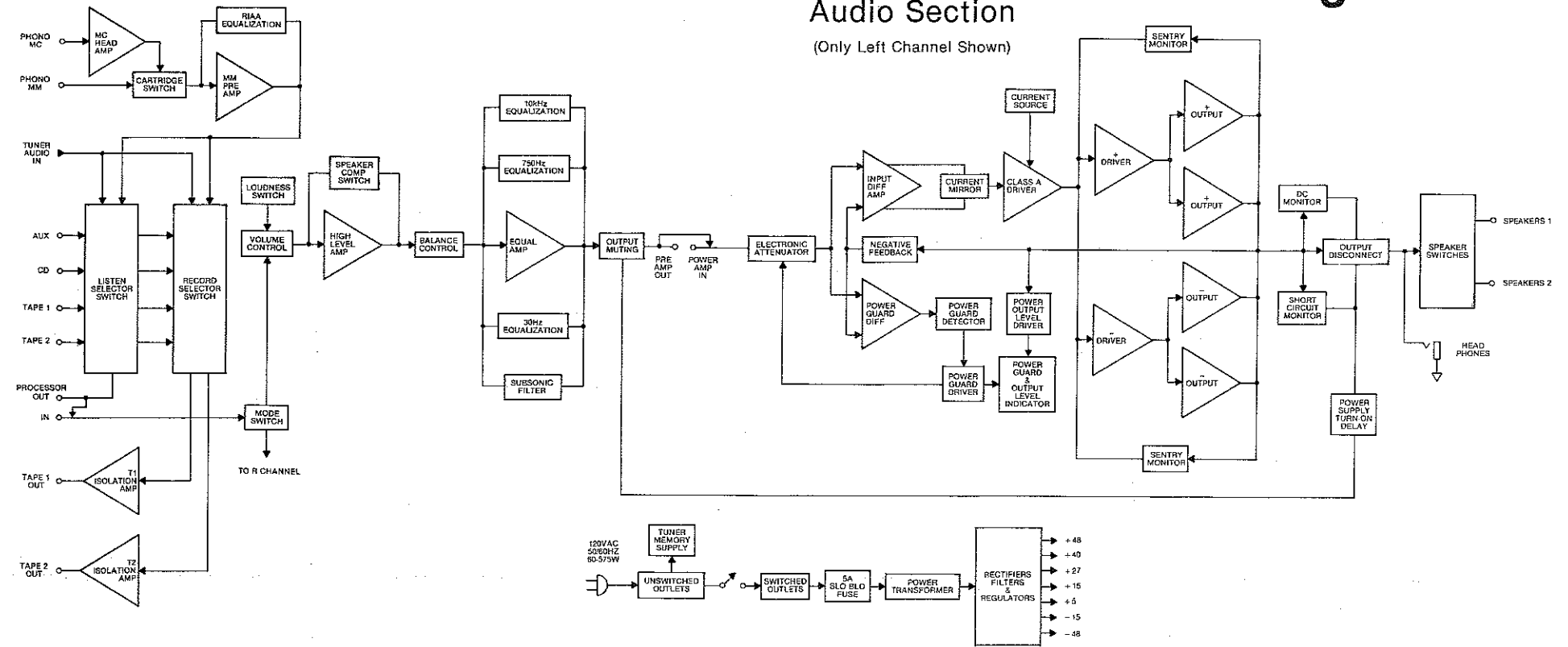


Fig. 3 Front View

# Block Diagram



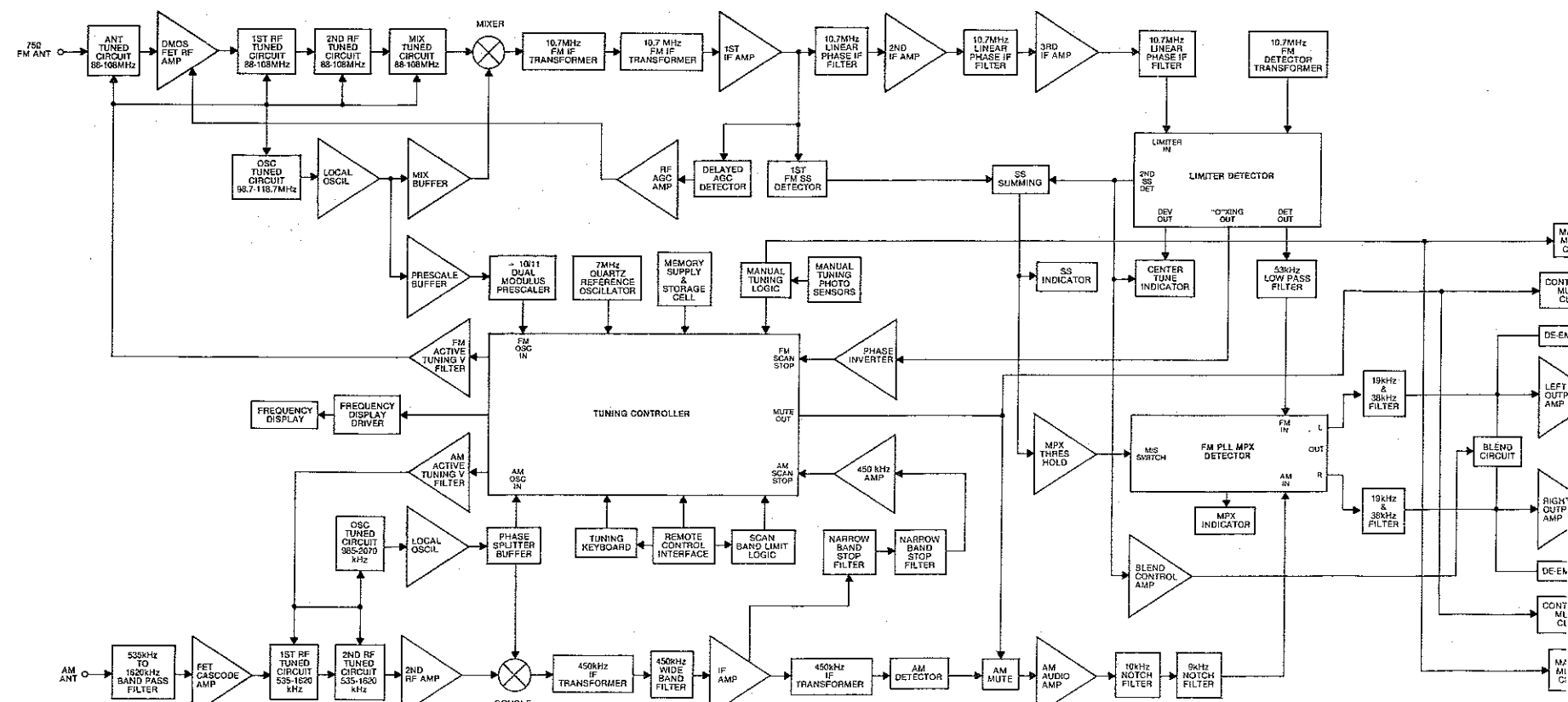
## FRONT PANEL AND TRIM PARTS LIST

Part No.	Part Description
046845	Front Panel
016227	Glass, Display
310095	Handle, Front Panel
310077	Knob, Tuning
310078	Knob, Control, Large
310079	Knob, Control, Small
100119	Mach Screw, #10 x 7/8, Phillips (for wood sides)
017246	Pushbutton, Black
017268	Pushbutton, Red
030241	Wood Side, Left
030242	Wood Side, Right
019045	Knob Spring (for tuning knob)

## INSTALLATION HARDWARE PARTS LIST

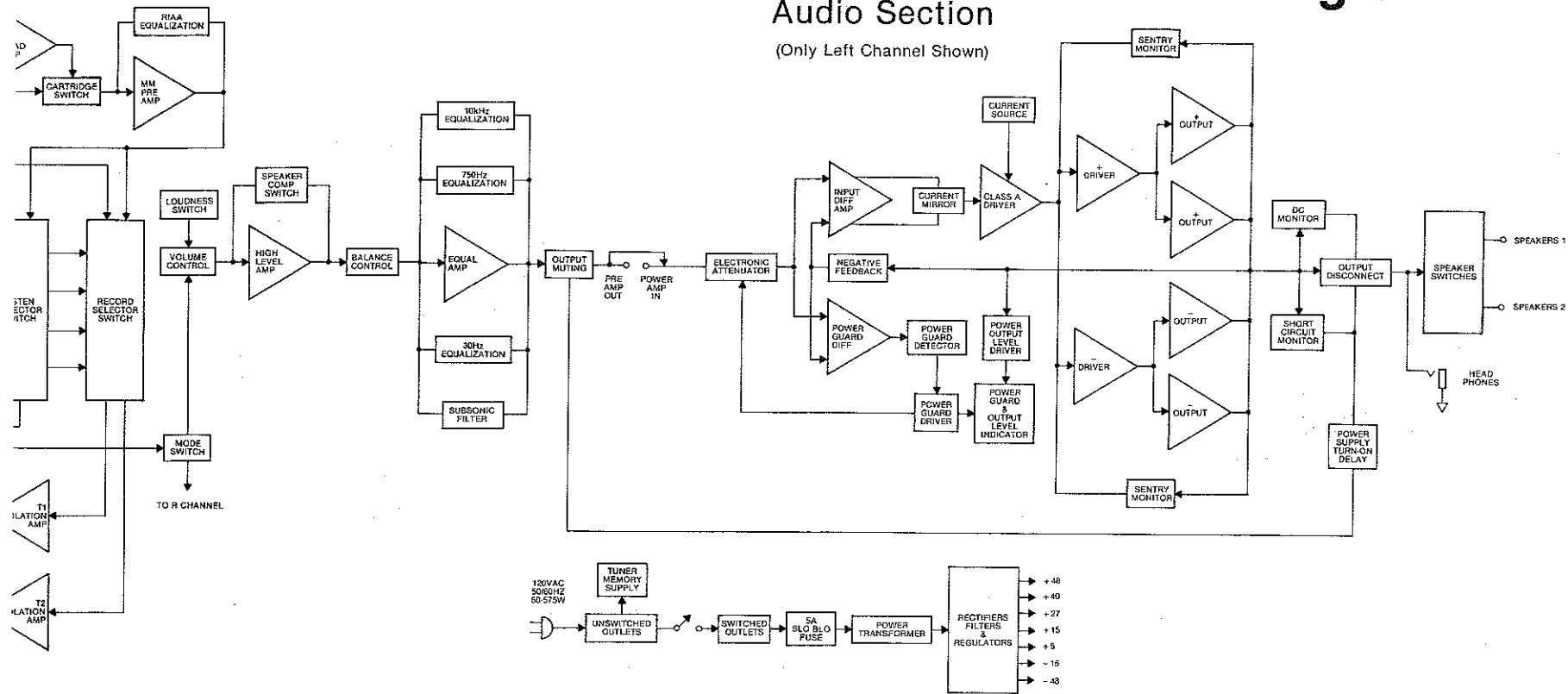
Part No.	Description
310048	FM Dipole
017218	Plastic Feet (4)
100159	Screw, #10 x 3/4 (for feet)
039621	MAC4275 Owners Manual

## Tuner Section



# Block Diagram

# Section Locations



### Tuner Section

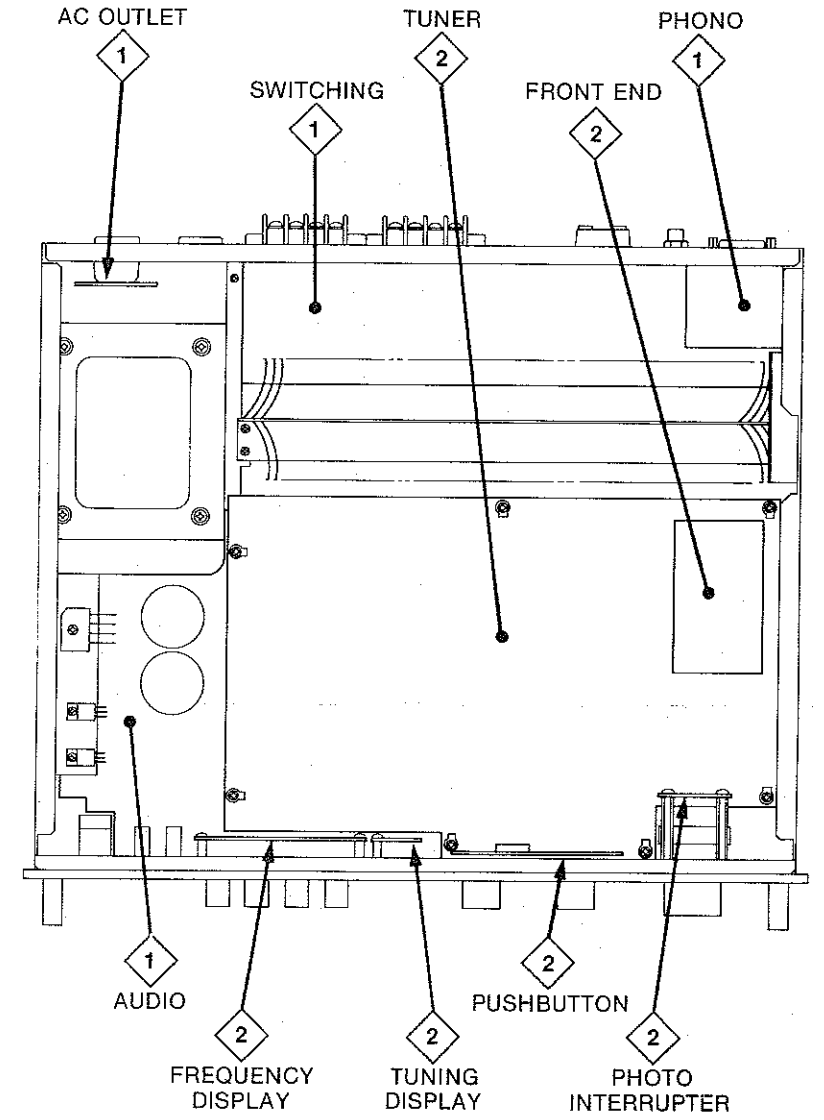
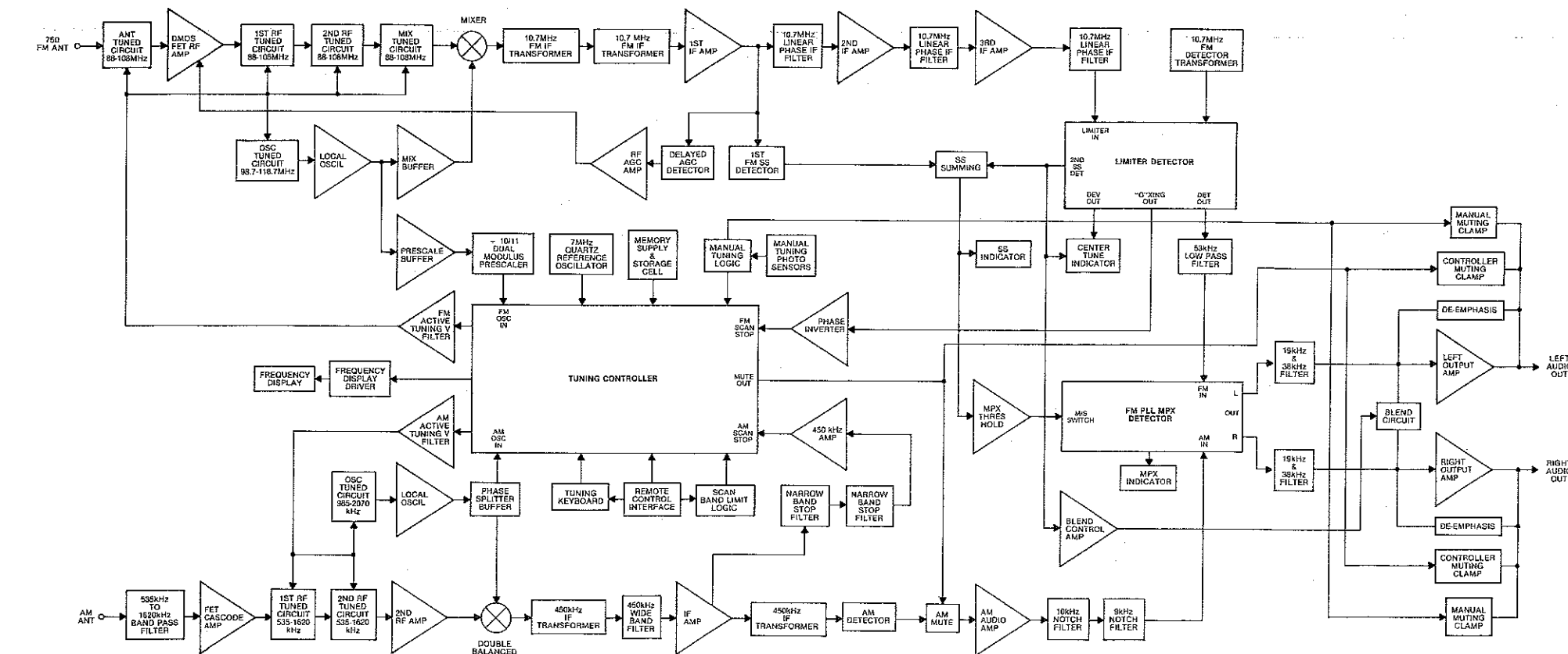
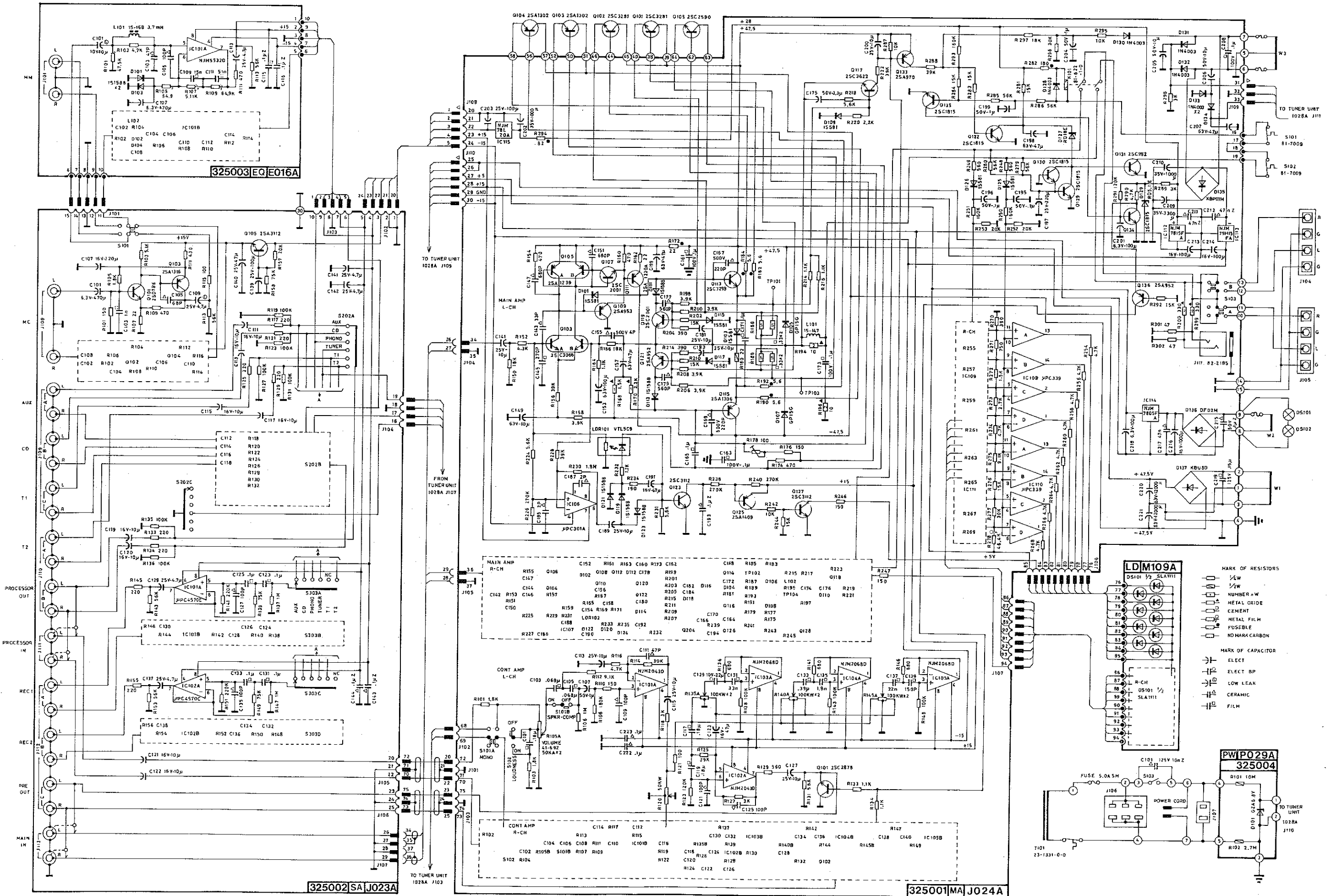


Fig. 4 Top View with cover removed.

# 1 Audio



325003 EQ E016A

325002 SA J023A

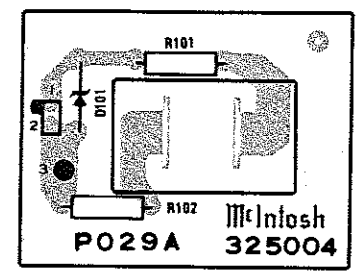
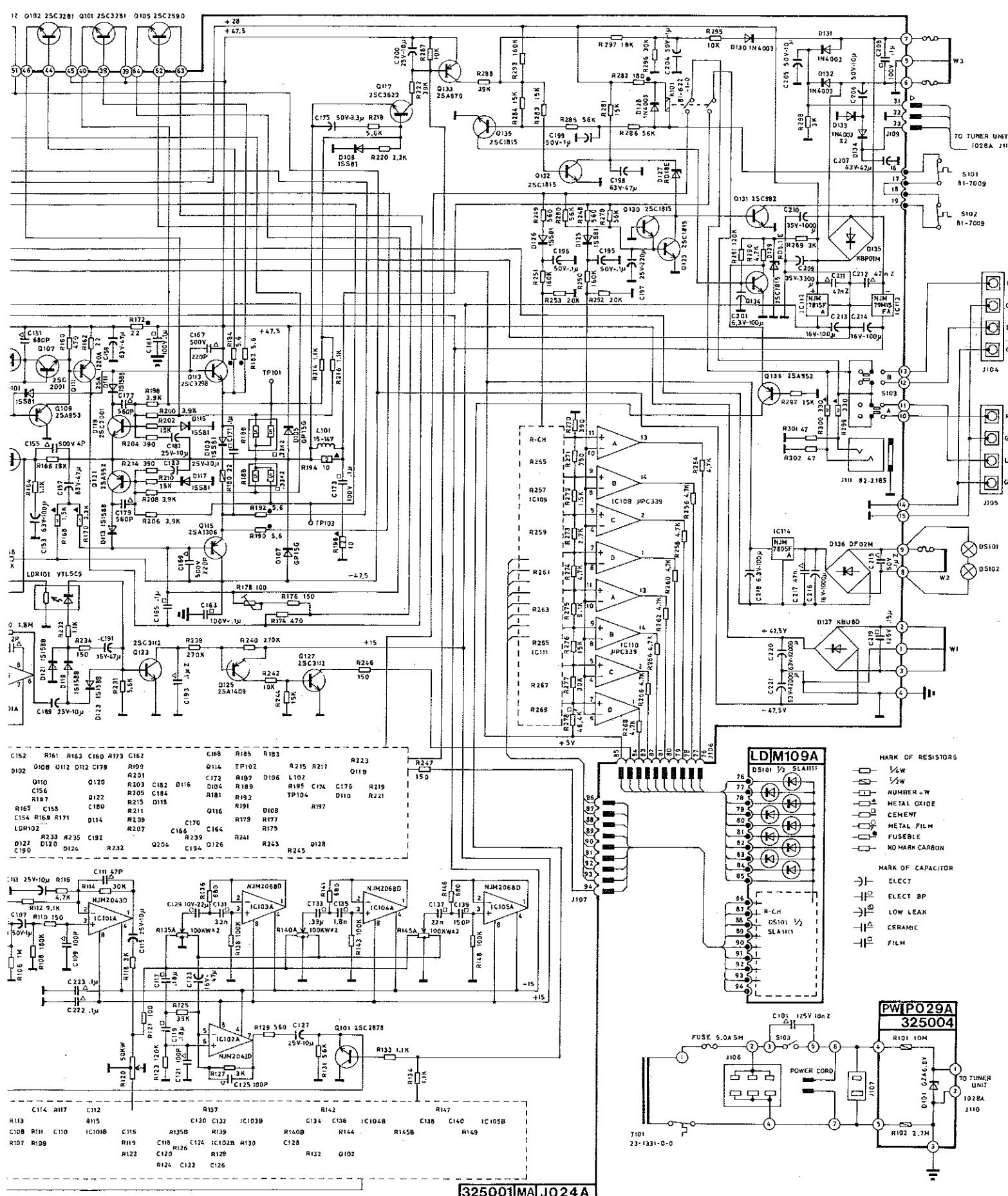
325001 MA J024A

PW1P029A  
325004

- MARK OF RESISTORS
- 1/4W
  - 1/2W
  - NUMBER = W
  - METAL OXIDE CEMENT
  - METAL FILM
  - FUSEBLE
  - NO MARK CARBON
- MARK OF CAPACITOR
- ELECT
  - ELECT BP
  - LOW LEAK
  - CERAMIC DS101
  - CERAMIC SLA111
  - FILM

POWER PARTS  
Sy No  
LIGHT DS



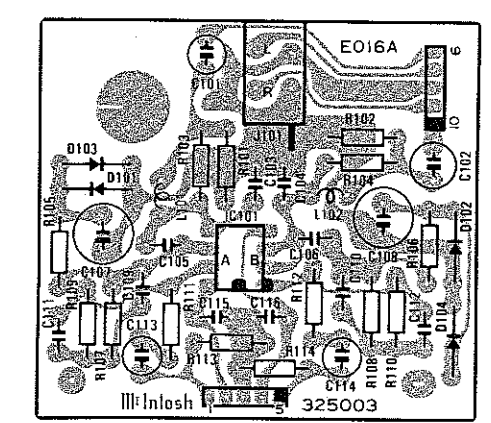


**BACK-UP POWER SUPPLY PARTS LIST**

Symbol No.	Part No.	Description
DIODES		
D101	310122	Zener, GZA6.8V

**CHASSIS MOUNTED COMPONENTS PARTS LIST**

Symbol No.	Part No.	Description
<b>LIGHTING DEVICES</b>		
DS101, DS102	310168	Lamp, 8V, 100mA
<b>FUSES</b>		
F1	310082	5A, 250V, SB, 3AG
<b>TRANSISTORS - LEFT CHANNEL</b>		
Q101, Q102	132238	2SC3281
Q103, Q104	132239	2SA1302
Q105	310162	2SC2590
<b>TRANSISTORS - RIGHT CHANNEL</b>		
Q101, Q102	132238	2SC3281
Q103, Q104	132239	2SA1302
Q105	310162	2SC2590
<b>SWITCHES</b>		
S101, S102	310175	Thermal Switch, 95°C
S103	310176	Power Switch, TV8
<b>TRANSFORMERS</b>		
T101	310183	Power Transformer



**PHONO PREAMP PARTS LIST**

Symbol No.	Part No.	Description
<b>INTEGRATED CIRCUITS</b>		
IC101	133094	NJM5532D



# Audio 1

## AMPLIFIER-POWER SUPPLY PARTS LIST

Symbol No.	Part No.	Description
<b>DIODES</b>		
D101-D104	310113	1SS81
D105-D108	310114	GP15G
D109,D110	310113	1SS81
D111-D114	310115	1S1588
D115-D118	310113	1SS81
D119-D124	310115	1S1588
D125,D126	310113	1SS81
D127	310116	Zener, RD18E B2
D128	310117	IN4003
D129	310118	Zener, RD5.1E B3
D130-D134	310117	IN4003
D135	310119	KBP01M
D136	310120	DF02M
D137	310121	KBU8D

## INTEGRATED CIRCUITS

IC101,IC102	310141	NJM2043D
IC103-IC105	310142	NJM2068D
IC106,IC107	133068	uPC301A
IC108-IC111	133092	uPC339C
IC112	133087	NJM7915FA
IC113	310143	NJM79M15FA
IC114	133108	NJM7805FA
IC115	310144	NJM78L20A

## LIGHT DEPENDENT RESISTORS

LDR101,LD102	144179	VTL5C9
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## RELAYS

K101	310182	Relay, MR72A24U
------	--------	-----------------

## TRANSISTORS

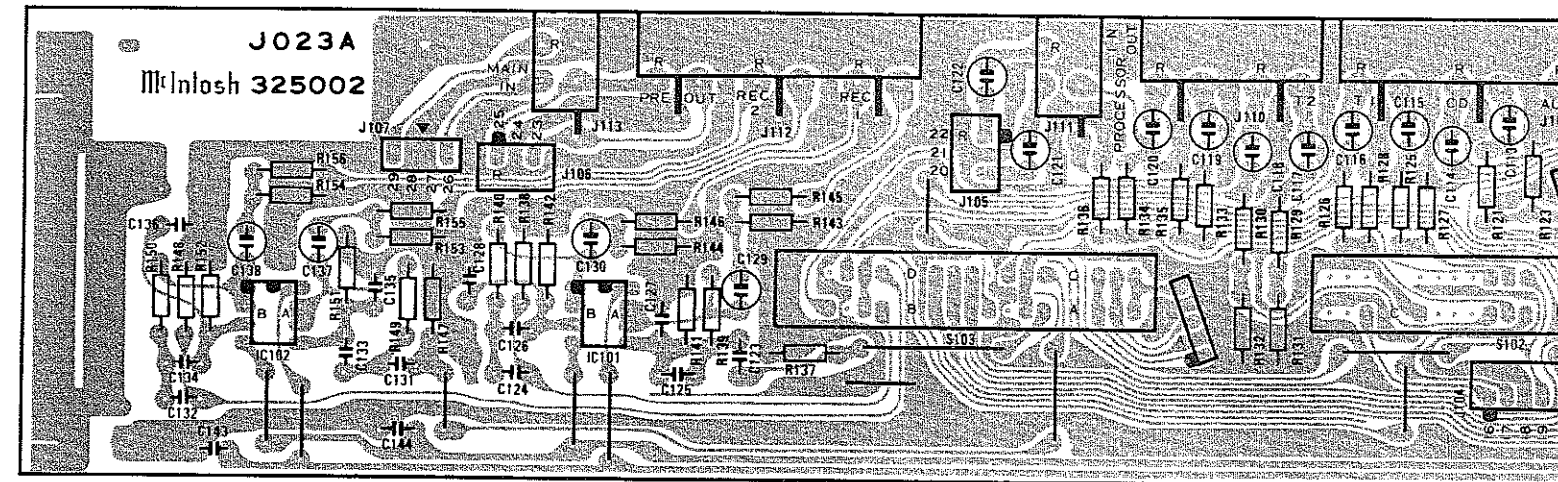
Q101,Q102	310152	2SC2878
Q103,Q104	310153	2SC3066
Q105,Q106	310154	2SA1239
Q107-Q108	310155	2SC2001
Q109,Q110	310156	2SA953
Q111,Q112	310157	2SA1220A
Q113,Q114	132231	2SC3298
Q115,Q116	132232	2SA1306
Q117,Q118	310158	2SC3622
Q119,Q120	310155	2SC2001
Q121,Q122	310159	2SA952
Q123,Q124	310151	2SC3112
Q125,Q126	310160	2SA1409
Q127,Q128	310151	2SC3112
Q129,Q130	310146	2SC1815
Q131	310161	2SC982
Q132,Q134	310146	2SC1815
Q133	132236	2SA970
Q135	310146	2SC1815
Q136	310159	2SA952

## RESISTORS

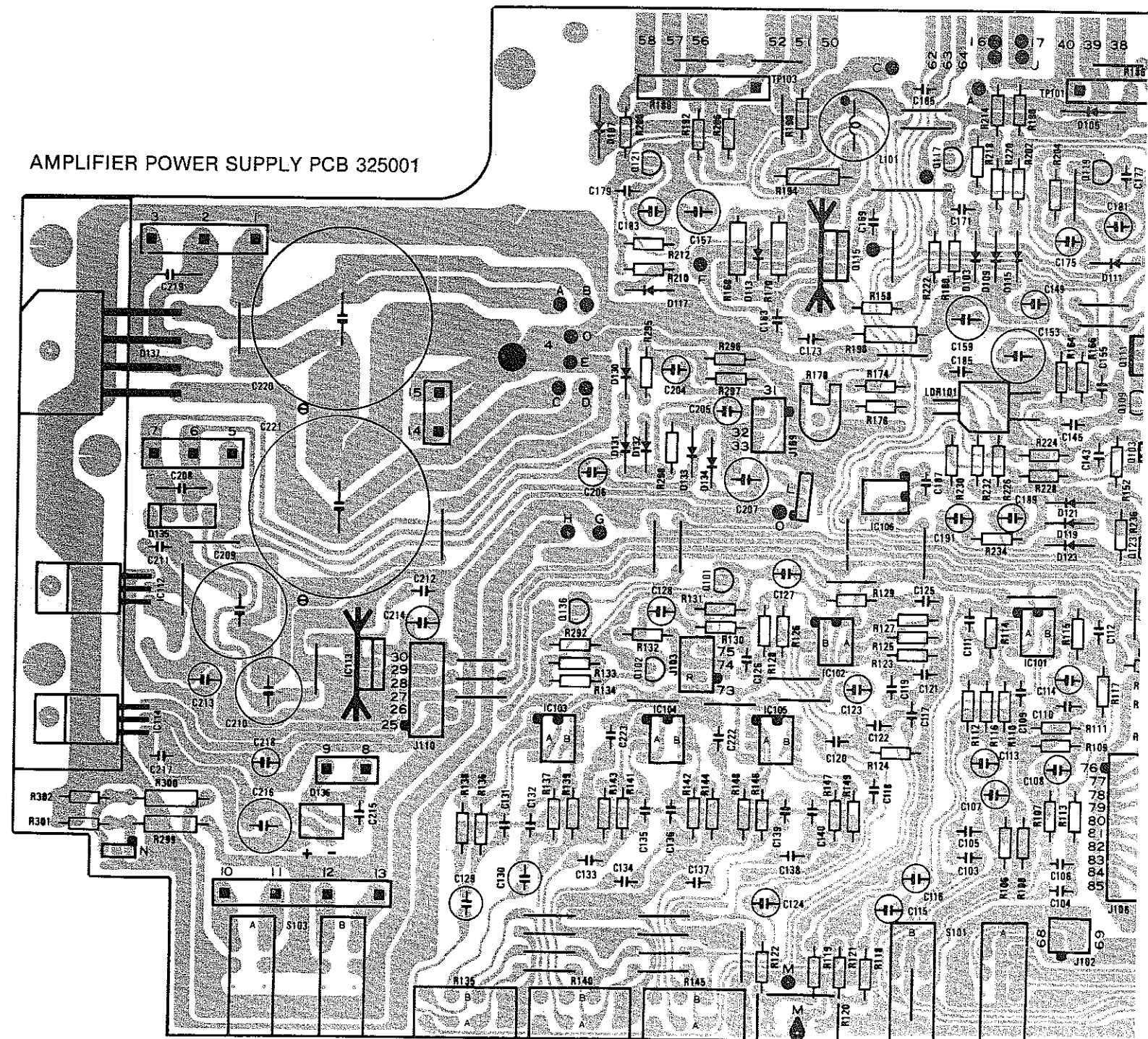
R105	310178	Volume Control, 50KAX2
R120	310179	Balance Control, 50KW
R135,R140	310180	Equalizer Control, 100KWx2
R145	310180	Equalizer Control, 100KWx2
R178,R179	310181	Bias Adjust, 100 ohm

## SWITCHES

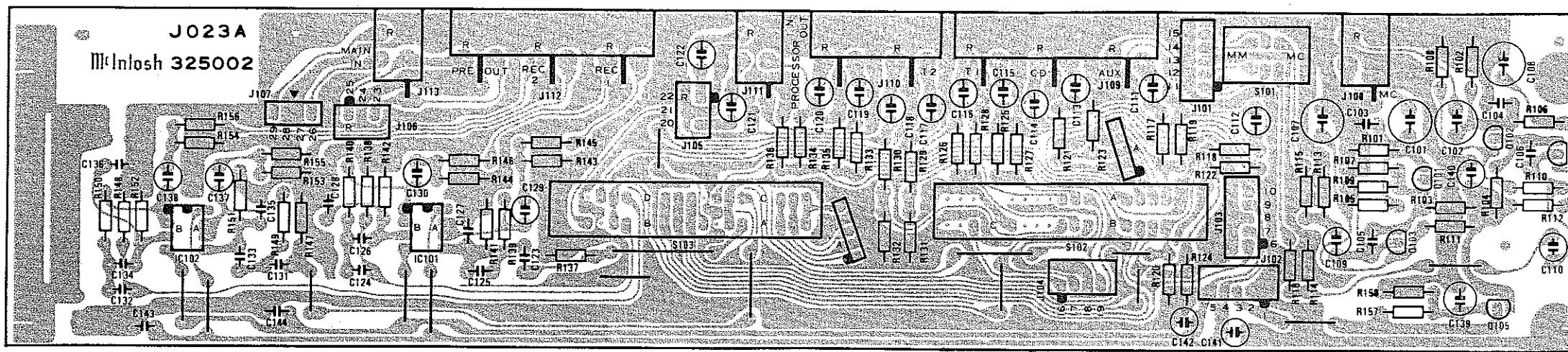
S101,S103	310173	Push Switch, SPUN23
S102	310174	Push Switch, SPUN12



SWITCHING PCB 325002



AMPLIFIER POWER SUPPLY PCB 325001

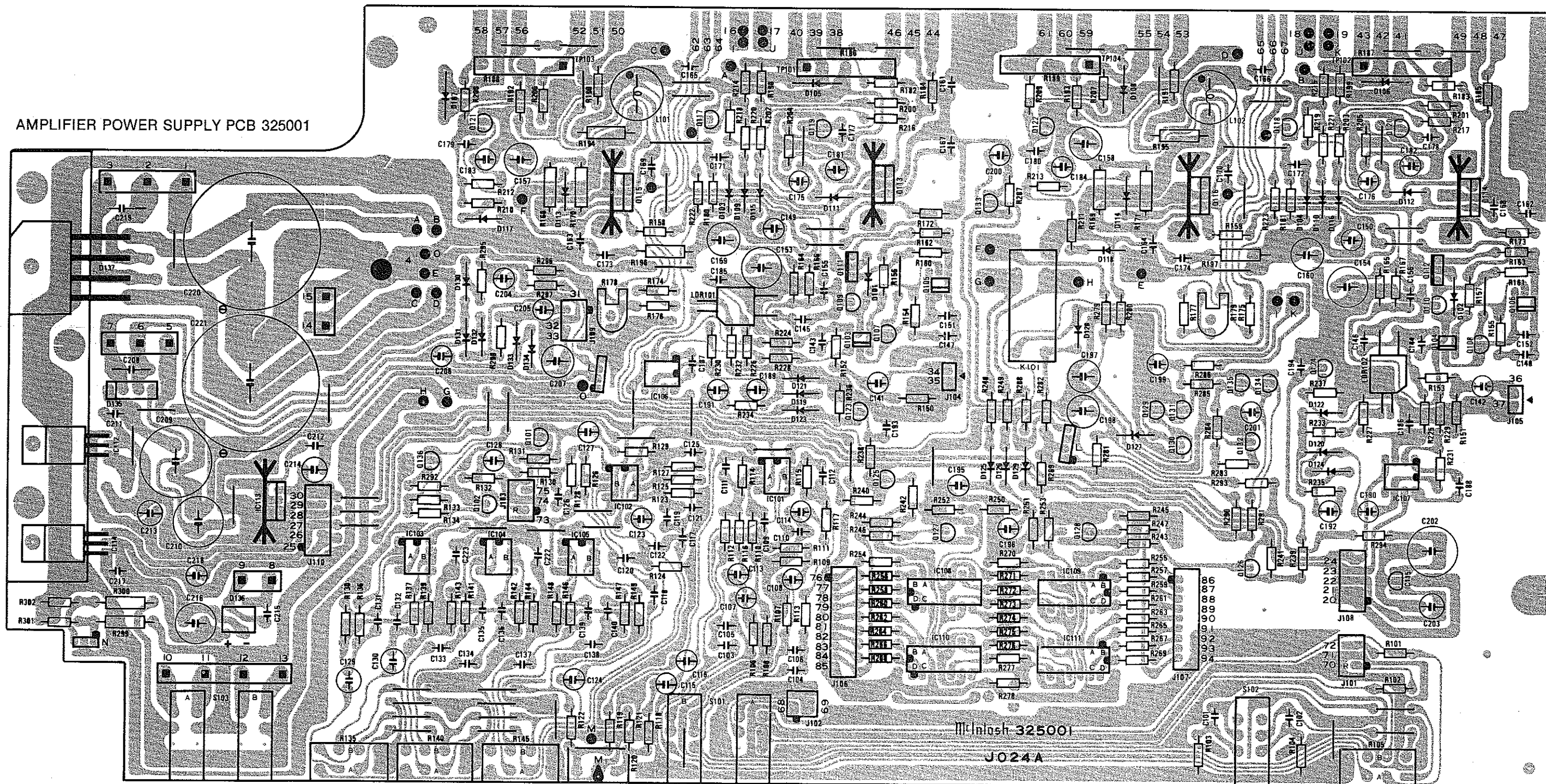


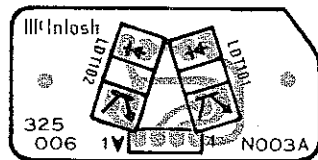
SWITCHING PCB 325002

SWITCHING PARTS LIST

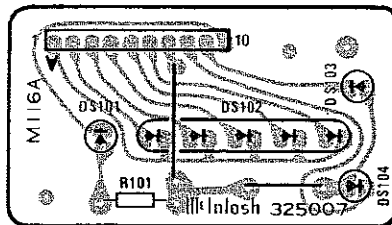
Symbol No.	Part No.	Description
<b>INTEGRATED CIRCUIT</b>		
IC101, IC102	310140	uPC4570C
<b>TRANSISTORS</b>		
Q101, Q102	310149	2SD786
Q103, Q104	310150	2SA1316
Q105	310151	2SC3112
<b>SWITCHES</b>		
S101	310170	Slide Switch, SSP322
S102	310171	Rotary Switch, SRRZL4
S103	310172	Rotary Switch, SRRZR4

AMPLIFIER POWER SUPPLY PCB 325001

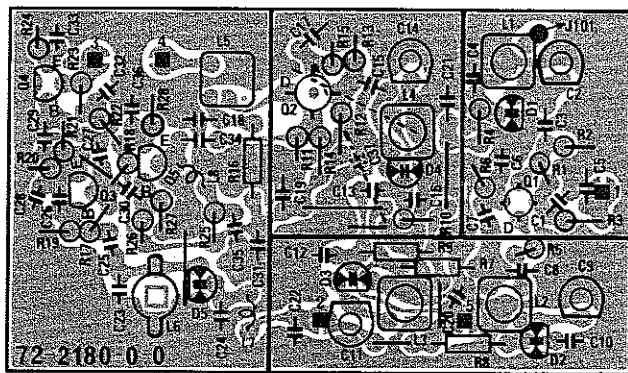




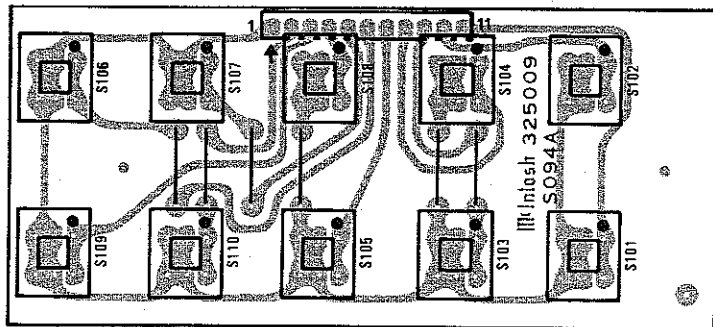
ROTORARY SENSOR  
PCB 325006



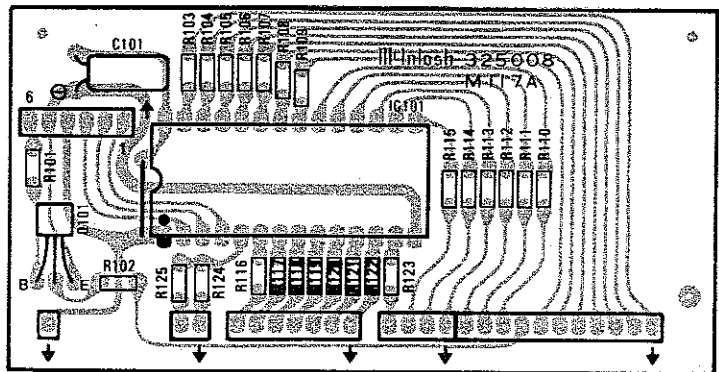
SIGNAL STRENGTH METER  
PCB 325007



FM FRONT END  
PCB F019B



SWITCHING  
PCB 325009



FREQUENCY DISPLAY  
PCB 325008

ROTORARY SENSOR  
PARTS LIST

Symbol No.	Part No.	Description
LDT101, LDT102	310177	TLP801P

PHOTO INTERRUPTOR

LDT101, LDT102	310177	TLP801P
----------------	--------	---------

SIGNAL STRENGTH METER  
PARTS LIST

Symbol No.	Part No.	Description
DS101	310163	LED, Red, SLP151B
DS102	310164	LED, Red, SLP152B
DS103, DS104	310165	LED, Red, TLR207

LIGHTING DEVICES

DS101	310163	LED, Red, SLP151B
DS102	310164	LED, Red, SLP152B
DS103, DS104	310165	LED, Red, TLR207

FM FRONT END  
PARTS LIST

Symbol No.	Part No.	Description
D1-D5	310108	Varicap, 15V55

DIODES

D1-D5	310108	Varicap, 15V55
-------	--------	----------------

SWITCHING  
PARTS LIST

Symbol No.	Part No.	Description
S101-S110	310169	Push Switch, SPEA12

SWITCHES

S101-S110	310169	Push Switch, SPEA12
-----------	--------	---------------------

FREQUENCY DISPLAY  
PARTS LIST

Symbol No.	Part No.	Description
DS101	310166	LED, SL-1015-41T

LIGHTING DEVICES

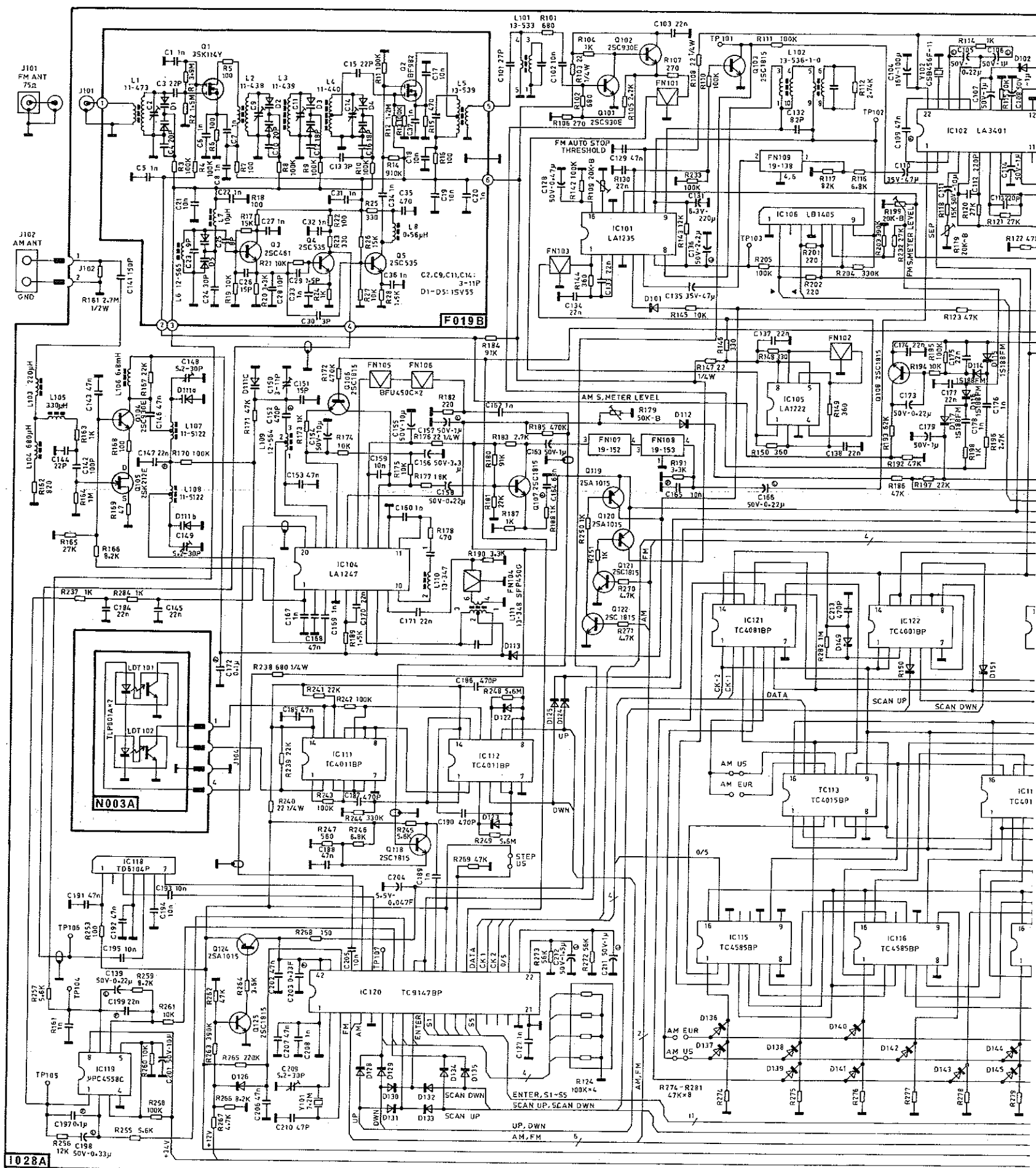
DS101	310166	LED, SL-1015-41T
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INTEGRATED CIRCUITS

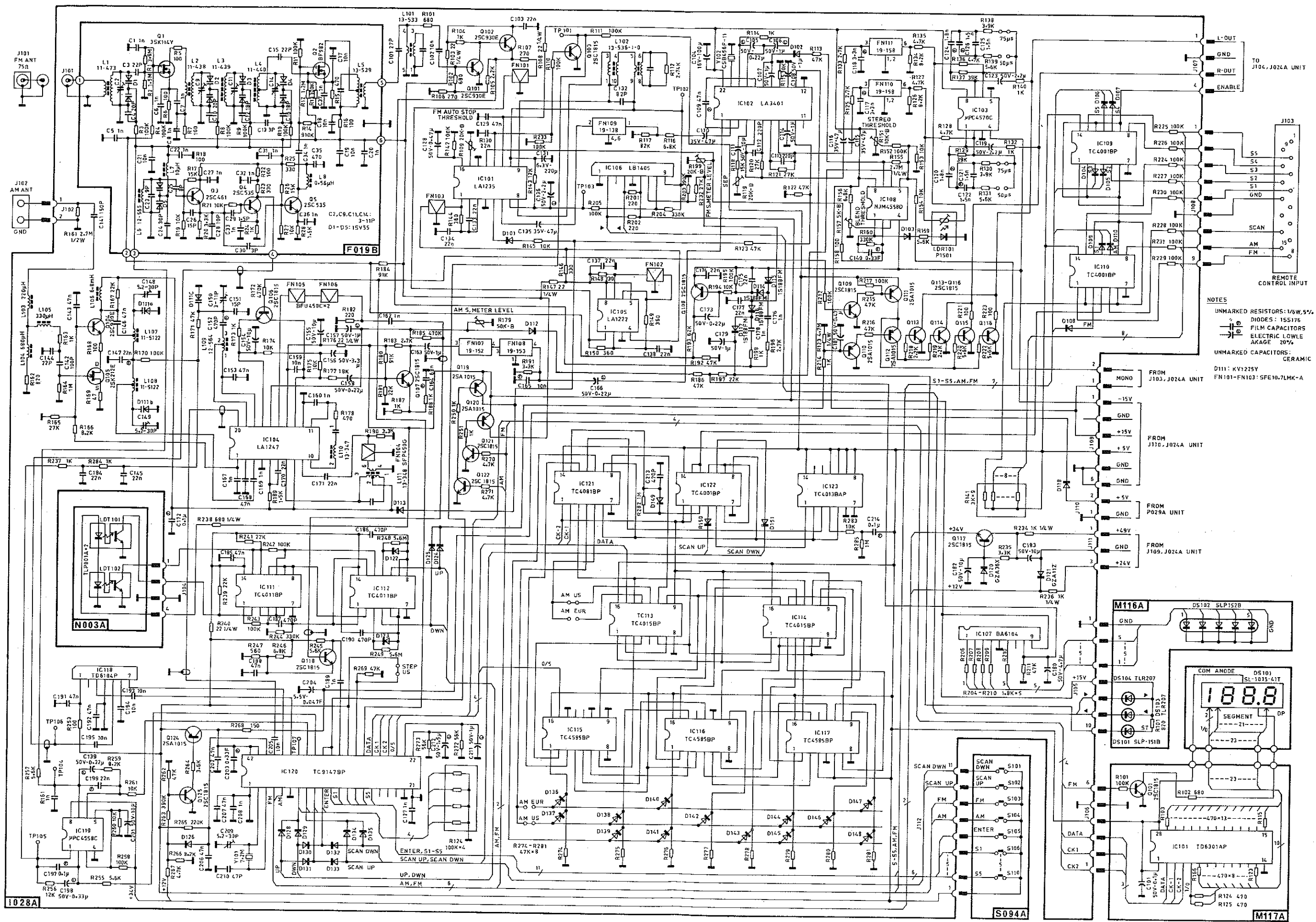
IC101	310139	TD6301AP
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TRANSISTORS

Q101	310146	2SC1815
------	--------	---------



51B  
52B  
07

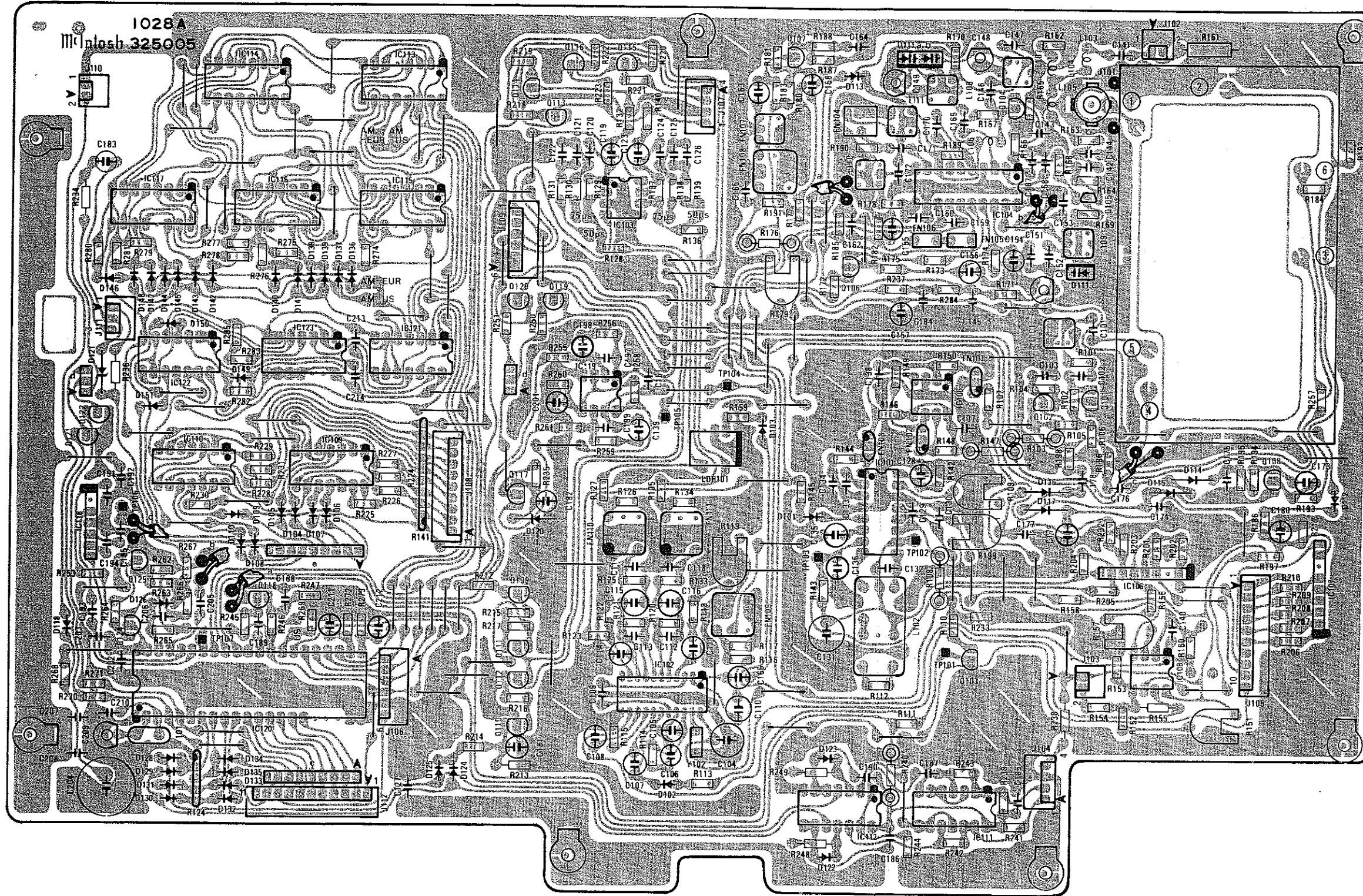


NOTES  
UNMARKED RESISTORS: 1/6W, 5%  
DIODES: 1SS175  
FILM CAPACITORS  
ELECTRIC LOWLE  
AKAGE 20%  
UNMARKED CAPACITORS:  
CERAMIC  
D111: KY1275V  
FN101-FN103: SFE10-7LMK-A

EA12

# Tuner 2

TUNER PCB 325005



## TUNER PARTS LIST

Symbol No.	Part No.	Description
<b>DIODES</b>		
D101-D110	310109	Signal, 1SS176
D111	310112	Varactor, KV1225Y
D112	310109	Signal, 1SS176
D113	310109	Signal, 1SS176
D118	310109	Signal, 1SS176
D120	310110	Zener, GZA36X
D121	310111	Zener, GZA11Z
D122-D126	310109	Signal, 1SS176
D128-D151	310109	Signal, 1SS176
<b>FILTERS</b>		
FN101-FN103	310124	Ceramic, SFE10.7 MLK-A
FN104	310125	Ceramic, SFP450G
FN105, FN106	310126	Ceramic, BFU450C
<b>INTEGRATED CIRCUITS</b>		
IC101	133110	LA1235
IC102	310129	LA3A01
IC103	310130	uPC4570C
IC104	310131	LA1247
IC105	310132	LA1222
IC106	310133	LB1450
IC107	310134	BA6104
IC108, IC119	133028	uPC4558C
IC109, IC110	133064	TC4001BP
IC111, IC112	133063	TC4011BP
IC113, IC114	310135	TC4015BP
IC115-IC117	310136	TC4585BP
IC118	310137	TD6104P
IC120	310138	TC9147BP
IC121	133076	TC4081BP
IC122	133064	TC4001BP
IC123	133053	TC4013BAP
<b>LIGHT DEPENDENT RESISTORS</b>		
LDR101	310123	Photo Coupler, P1501

# Alignment Procedure

## FM ALIGNMENT

### A. SYNTHESIZER FREQUENCY ADJUSTMENT

1. Connect a Frequency Counter between TP106 and ground.
2. Tune the Receiver to 98MHz.
3. Adjust C209 so the local oscillator frequency shown by the Frequency Counter reads 108.700MHz.

### B. FRONT-END ALIGNMENT

1. TUNING VOLTAGE
  - a. Connect a DMM to TP104.
  - b. Tune the Receiver to 88MHz and adjust L6 if the voltage is not 3.6V +/-0.5V.
  - c. Tune to 108MHz and check that the voltage is within 21 to 25 volts.
2. TRACKING ADJUSTMENT
  - a. Connect the FM Generator to the 75 ohm antenna input, and a Detector Probe to Pin 1 of IC105 and ground. (See how to make the Detector Probe in figures 5 and 6 on page 20).
  - b. Tune the receiver to 106MHz and adjust the generator so a waveform is displayed on the Oscilloscope.
  - c. Adjust C2, C9, C11 and C14 for maximum waveform height.
  - d. Tune to 90MHz and adjust the Generator so a waveform is displayed on the Oscilloscope.
  - e. Adjust L1, L2, L3 and L4 for maximum waveform height.
  - f. Repeat above steps a few times as necessary to obtain the maximum waveform height.

### C. IF ADJUSTMENT

1. Tune the Receiver to 98MHz and adjust the Generator to display a curve on the Oscilloscope.
2. Adjust L5 in the front-end for maximum output, and L101 for a symmetrical output curve, using as little input as possible such as 2uV at the antenna input.

### D. DETECTOR ALIGNMENT

1. Remove the Detector Probe and connect the tuner output to the Oscilloscope and Distortion Analyzer.
2. Connect a DC Meter across TP102 (-) and TP103 (+).
3. Tune the Receiver and Generator to 98MHz feeding 54uV to the antenna input.
4. Adjust L102 secondary for minimum distortion.
5. Adjust L102 primary for 0V center.
6. Repeat above steps for best result.
7. Adjust L5 in the front-end for minimum stereo L or R distortion.
8. Adjust L101 in the same way for the same result.
9. Repeat above steps for best result.
10. Check to confirm that the DC Meter reads 0V +/-50mV.

### E. DISTORTION

1. Tune the Receiver and Generator to 98MHz and feed 50uV to the antenna input.
2. The Distortion should be within the following limits:  
Less than 0.12%: MONO  
Less than 0.1%: L+R, L, R, L-R

### F. SEPARATION

1. Tune the Receiver and Generator to 98MHz and feed 50uV to the antenna input.
2. Modulate L Channel only and adjust R119 for minimum output on R Channel VTVM and Oscilloscope.
3. Modulate R Channel only and adjust R119 for minimum output on L Channel VTVM and Oscilloscope.
4. Readjust R119 if necessary to obtain the same reading on both channels.
5. Check and confirm that the reading is more than 46dB on each channel.

### G. AUTO BLEND

1. Tune the Receiver and Generator to 97.50MHz and feed 56uV to the antenna input.
2. Check and confirm that the S/N ratio is more than 60dB.
3. Adjust the attenuator of the FM Generator so the S/N ratio reads 60dB.
4. Adjust R157 so the S/N reading is 2dB down.

### H. SIGNAL METER

1. Tune the Receiver and Generator to 97.50MHz and feed 14dBu to the antenna input.
2. Adjust R199 so the second LED lights at this input level.

### I. AUTO STOP AND STEREO LEVEL

1. Tune the Receiver and Generator to 97.50MHz and feed 3.2uV to the antenna input.
2. Connect a DMM to TP101.
3. Adjust R109 to obtain a high level.
4. Next, adjust R151 so the Stereo Indicator LED lights.

## AM ALIGNMENT

### A. TUNING VOLTAGE ADJUSTMENT

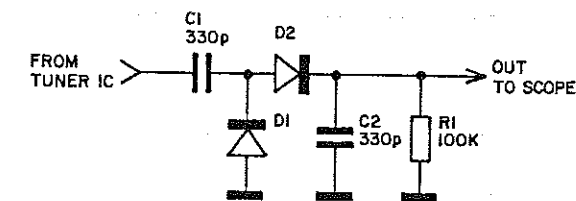
1. Connect a DMM to TP105.
2. Tune the Receiver to 520kHz and adjust L109 and C150 so the voltage reads within 1.6 to 1.7V.
3. Tune to 1710kHz and check that the voltage is within 27 to 28V.
4. Repeat above steps until within specified voltage.

### B. TRACKING ADJUSTMENT

1. Tune the Receiver and Generator to 1400kHz and feed 10uV to the antenna input.
2. Adjust C148 and C149 for maximum output.
3. Tune to 630kHz.
4. Adjust L107 and L108 for maximum output.
5. Repeat above steps as necessary.

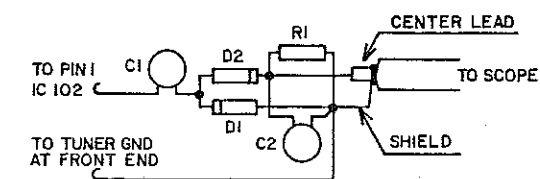
### C. SIGNAL METER

1. Tune to 1000kHz and feed 100uV to the antenna input.
2. Adjust R179 so the fifth LED lights.



SCHEMATIC DIAGRAM OF DETECTOR PROBE

Diodes should be point contact germanium; some commonly available types are: OA80  
AA119  
IN60  
IN34  
IN22



PICTORIAL DIAGRAM OF DETECTOR PROBE

Keep leads as short as possible to minimize stray signal pickup.

#### POWER AMPLIFIER BIAS ADJUSTMENT

1. Operate the Receiver 3 to 5 minutes without a signal (volume control CCW).
2. Connect a DC millivolt meter from TP101 to TP103 in the left channel.
3. Adjust R178 bias control for  $23\text{mV} \pm 2\text{mV}$ .
4. Connect a DC millivolt meter from TP102 to TP104 in the right channel.
5. Adjust R179 bias control for  $23\text{mV} \pm 2\text{mV}$ .

# Repacking Instructions

In the event it is necessary to return the MAC 4275 to McIntosh Laboratory for service, the unit must be repacked carefully using all of the original pads and carton.

If a shipping carton is needed, please call or write the Customer Service Department of McIntosh Laboratory. Order using the part numbers on the accompanying list.

Use the original shipping carton only if the pads and carton are in good serviceable condition.

QTY	PART NO.	DESCRIPTION
1	033512	Shipping carton only
1	033513	foam pad, left
1	033514	foam pad, right
1	046597	Shipping carton complete

**McIntosh<sup>®</sup>**  
**MAC4275 AM/FM RECEIVER**

The continuous improvement of its products is the policy of McIntosh Laboratory Incorporated, who reserve the right to improve design without notice. Because of the constant upgrading of McIntosh products' circuitry and components, the Company cannot insure, and does not warrant, the accuracy of the within schematic material, which is intended for information only.

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