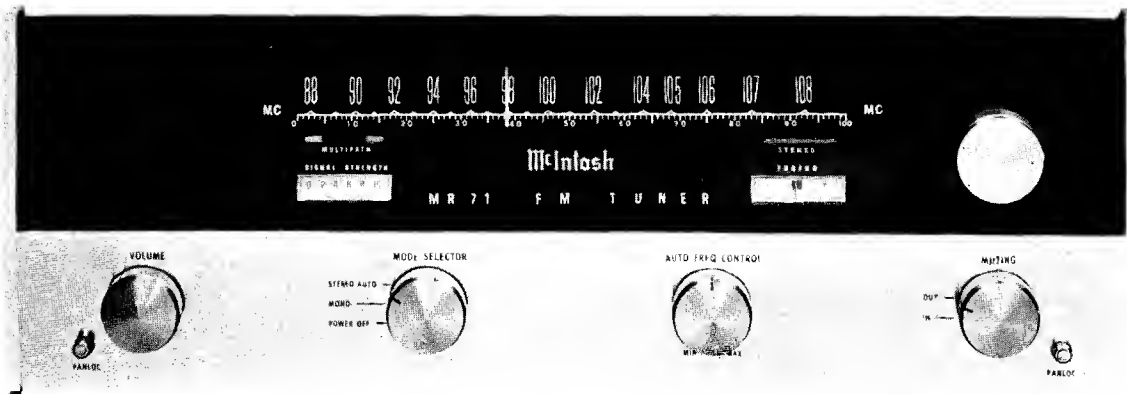


# McIntosh

## MR 71

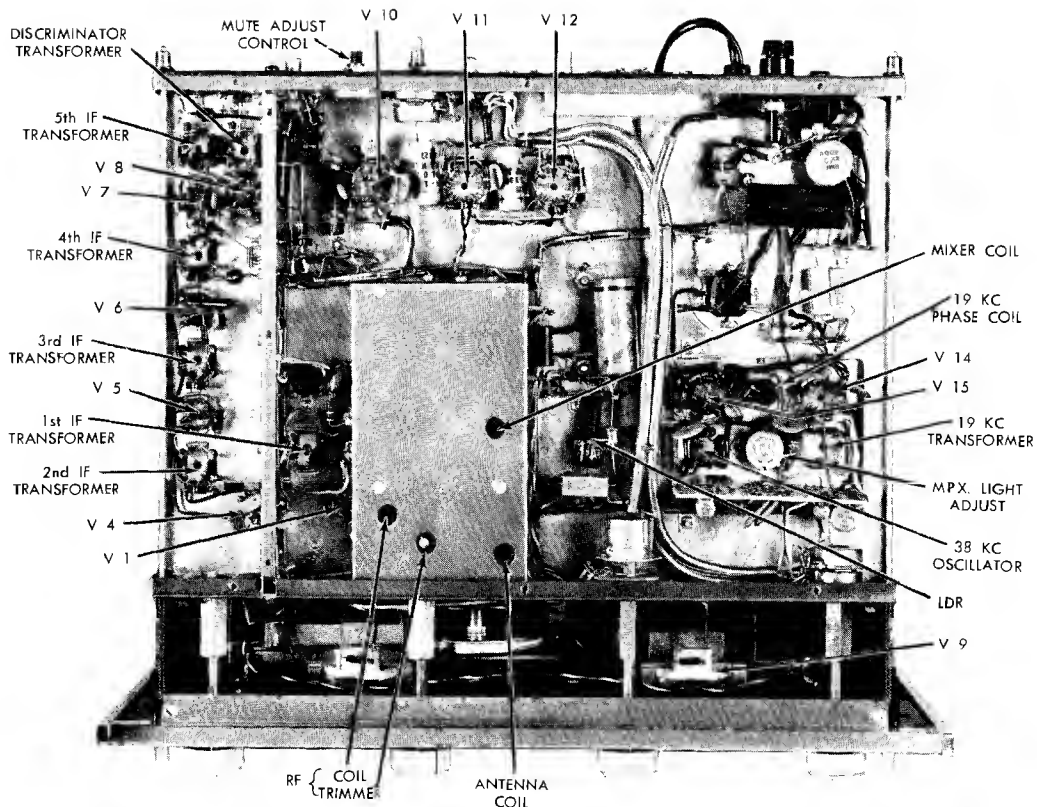
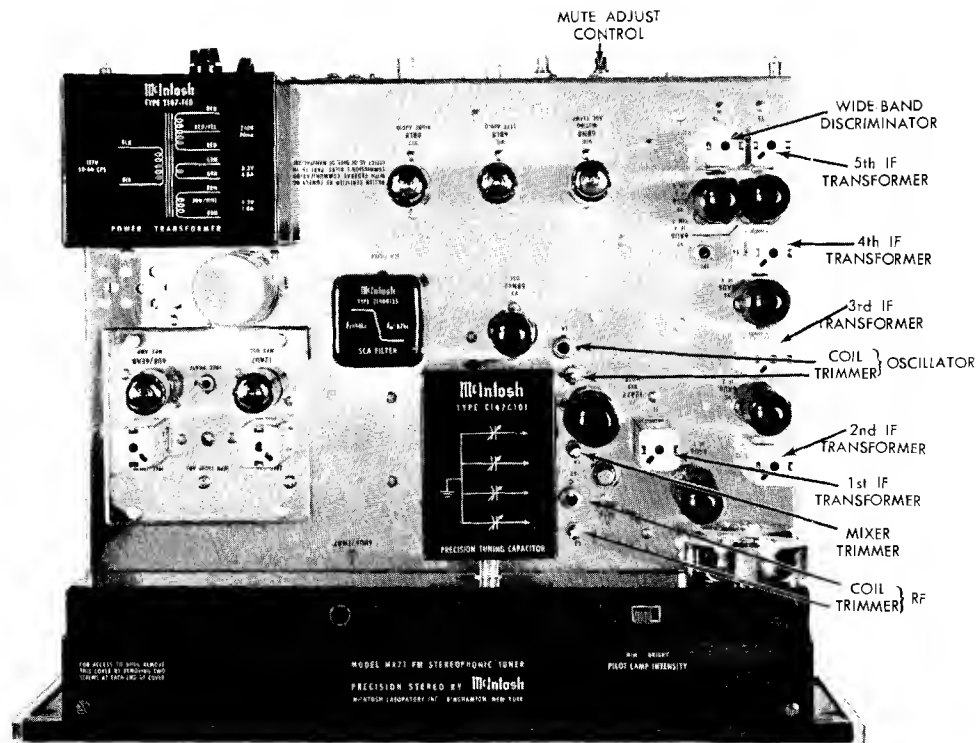


## SERVICE INFORMATION

STARTING WITH SERIAL NO. 20B01

McINTOSH LABORATORY INC. 2 CHAMBERS STREET BINGHAMTON, NEW YORK

MR 71



## ELECTRICAL SPECIFICATIONS

### Usable Sensitivity

2.5 microvolts at 100% modulation for less than 3% total noise and harmonic distortion.

### Audio Frequency Response

Within 1/2db from 20 to 20,000 cycles.

### Distortion

Less than 0.5% at 100% modulation.

### Capture Ratio

1.5db at 100% modulation.

### Muting

At least 60db noise reduction between stations.

### Image Rejection

Better than 80db at 90MHz.

### Hum

Better than 70db below 100% modulation.

### Output

Approximately 2.5 volts; low impedance.

### Multiplex Channel Separation

Better than 35db at 1000 cycles.

### Multiplex Filter

Greater than 48db suppression of 19kHz pilot and 38kHz carrier.

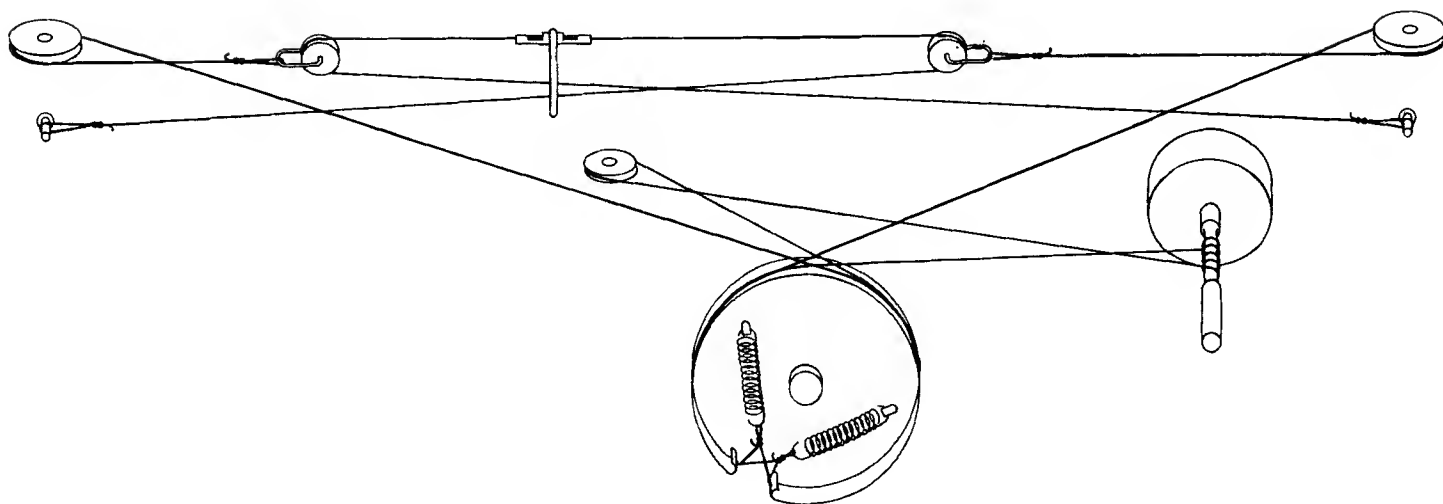
### SCA Filter

50db down at 67kHz to 74kHz.

### Power Consumption

70 watts, 105 to 125 volts, 50 to 60 cycles.

## DIAL STRINGING



## MR 71 ALIGNMENT INSTRUCTIONS

All McIntosh tuners are carefully aligned and tested at the factory using the finest available test equipment. All McIntosh tuners will meet their published specifications when shipped from the factory.

After extensive operation, especially when tubes have been replaced, it may be desirable to realign the tuner circuits for best performance. The charts below give complete information on the circuit realignment procedure for the MR 71 stereo tuner.

The test equipment listed (or its equivalent) is necessary to properly align an MR 71. The accuracy of the alignment will be directly related to the accuracy and calibration of the test equipment used.

If the necessary test equipment is not available, alignment should not be attempted. For additional information, contact Customer Service Department, McIntosh Laboratory Inc., 2 Chambers Street, Binghamton, New York 13903 (telephone 607-723-3512)

## TEST EQUIPMENT REQUIRED

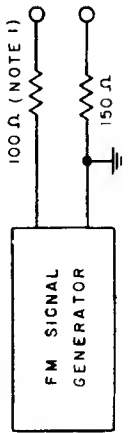
1. FM Signal Generator (Measurements 210A or equivalent)
2. VTVM
3. Multiplex Generator (RCA WR-51A or equivalent)
4. 10.7 MHz Generator (Preferably crystal controlled)
5. Oscilloscope (Hewlett-Packard 120B or equivalent)
6. Harmonic Distortion Analyzer, desirable but not essential (Hewlett-Packard 330B or equivalent)

## MULTIPLY DECODER ALIGNMENT

STEP	TUNER DIAL SETTING	SIGNAL GENERATOR			INDICATOR		ADJUST	TEST LIMITS	REMARKS
		FREQ.	COUPLING	MODULATION	TYPE	CONNECTED TO			
1	100MHz	100MHz modulated by MPX generator	300 ohm antenna terminals w/ approx. 1000 $\mu$ V signal w/* matching network	19kHz pilot only	DC VTVM	Pin 7 of 12AU7 tube. Place a 100K ohm resistor in series with the probe	19kHz phase coil and 19kHz transformer (T7)	Adjust for maximum negative DC voltage.	On the top of the chassis is an opening labeled "MPX Light Adjust." Insert a screwdriver into this opening from the top of the chassis and turn the control completely clockwise.
2	Same	Same	Same	1kHz (100% modulation) L or R only, pilot on.	Audio VTVM	Pin 1 or 2 of 38kHz transformer (T8)	38kHz transformer (Bottom Core)	Adjust for maximum voltage	
3	Same	Same	Same	Same	Audio VTVM and scope	L or R output jack	38kHz transformer (Top Core)	Adjust for stable scope display	1. Turn off 19kHz pilot on MPX generator. 2. Adjust top core of 38kHz transformer to obtain a stable and uniform 1kHz signal scope display. This adjustment may be critical, so turn core very slowly. 3. Turn 19kHz pilot back on.
4	Same	Same	Same	Same	Same	Same	19kHz phase coil	30db separation or more	Modulate left channel and measure right channel output. Adjust 19kHz phase coil for minimum right channel output (maximum separation). Remove all test leads from TP #2 for separation checks.
5	Same	Same	Same	Same	Same	Same	Same	Same	Modulate right channel and measure left channel output. Separation in steps 5 and 6 should be at least 30db.
6	Same	Same	Same	Same	Same	Same	Same	Same	This step checks the rejection of 19kHz and 38kHz frequencies. Residual output should be at least 40db below modulated output.
7	Same	Same	Same	Same	Same	Same	Same	Same	Turn control until light comes on. Then back off just enough to cause the light to go off. Then back off about 1/8 of a turn more. Light should operate ONLY on an MPX signal.
8	Same	Tune to a strong MONO FM station	Same	Turn off 1kHz audio modulation	MPX stereo indicator light on tuner	MPX light adj. control (R3)			

# FM ALIGNMENT

STEP	TUNER DIAL SETTING	SIGNAL GENERATOR			INDICATOR		ADJUST	TEST LIMITS	REMARKS
		FREQ.	COUPLING	MODULATION	TYPE	CONNECTED TO			
1	Point of no interference or signal	10.7MHz	Through external .01μF capacitor to pin 7 of 12AT7 mixer	CW	VTVM	TP #1	Maximum possible negative voltage	Shunt to ground the winding not being adjusted with a .01μF capacitor in series with a 1K ohm resistor. Attenuate signal generator until output voltage at TP #1 is less than 1.5 volts with one IF transformer winding shunted. IF transformers have terminal #1 marked with a green dot and are numbered clockwise.	
2	Same	Same	Same	Same	Same	Pin 6 of T5	Same		
3	Same	Same	Same	Same	Same	Junction of D4 and R12	Adj. for 0 volts		
4	Same	Same	Same	Same	Same	T6, Pin 6	Maximum negative voltage	If a distortion analyzer is available, omit this step at this time. Adjust T6 primary after step 9. At that time, use a strong signal from FM generator, modulate 100%, and use 75kHz deviation. Adjust primary for minimum distortion. Should be no greater than 0.5%.	
5	Same	Same	Same	Same	Same	TP #2	Adj. for 0 volts		
6	105MHz	300 ohm antenna terminals w/ matching network	100 cycles 75kHz deviation (100% modulation)	VTVM and scope connected to L or R audio output	Same	Oscillator Trimmer	Maximum negative voltage	As output increases, attenuate signal generator to keep maximum output at TP #1 to a low level. By doing so, precise alignment can be achieved.	
7	90MHz	Same	Same	Same	Same	Oscillator Coil	Same	Repeat steps 6 and 7 until dial calibration is accurate.	
8	105MHz	Same	Same	Same	Same	Mixer trimmer, RF trimmer, and Antenna Trimmer	Same		
9	90MHz	Same	Same	Same	Same	Mixer, RF, and Antenna coil tuning slugs.	Same	Repeat steps 8 and 9 until output is as high as possible.	
10	Point of no interference			Scope		Muting adj. control		Turn muting switch to "in" position. Adjust muting control until background noise just disappears.	
11	105MHz	Same	100 cycles, 75kHz deviation (100% modulation) attenuated to 2.5μV output	VTVM and scope connected to L or R audio output			IHFMM sensitivity 2.5μV for 3% total noise and distortion	Step 11 is an overall sensitivity check, and requires a distortion analyzer and FM signal generator with attenuator. With 2.5μV input at the 300 ohm antenna terminals, TP #1 voltage should be 3.0 volts or more.	



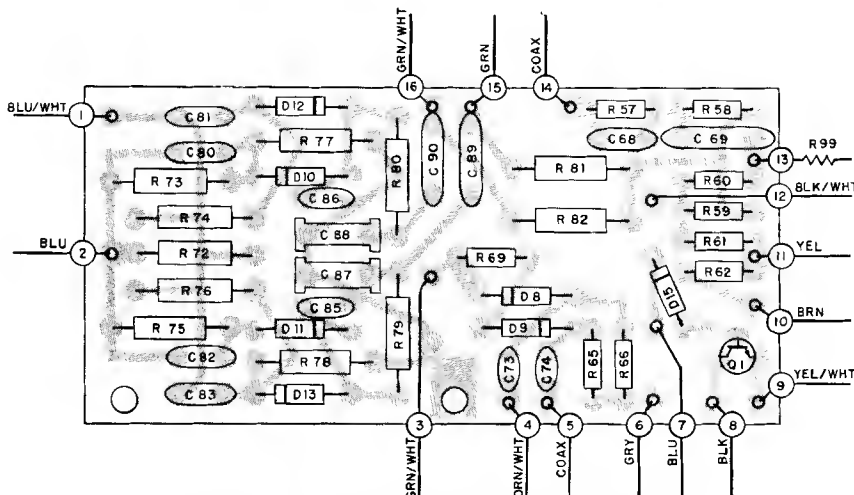
\* ANTENNA MATCHING NETWORK

TUNER 300 OHM ANTENNA TERMINALS

NOTE 1 : IF SIGNAL GENERATOR HAS OTHER THAN 50 OHM INTERNAL IMPEDANCE, USE A RESISTOR OF 150 OHMS LESS INTERNAL GENERATOR IMPEDANCE.

## SCHEMATIC NOTES

1. R104 does not appear in units below serial number 78B50.
2. R29 had a different value in earlier units.
3. C6 was 10pF in earlier units.
4. R27 was either 1.2K ohms or 2.2K ohms in earlier units.
5. R103 does not appear in units below serial number 67B00.
6. L6 was not used in some units below serial number 21B50; L1 was link coupled to L2.
7. C100 was used in some units below serial number 66B55.
8. R38 was 220K ohms in earlier units.
9. C101 does not appear in some earlier units.
10. In all units below serial number 62B00, C7 was 220pF and C43 was .01 $\mu$ F (disc); R102 was not used.
11. In all units below serial number 58B00, R92 and 93 was 680 ohms, R43 was 6.8K, and R64 was 220K.
12. R96 was 10 ohms in all units below serial number 39B00.
13. C58 was a .01 $\mu$ F (2 section) capacitor in earlier units.
14. R99 does not appear in earlier units.
15. C99 and R100 do not appear in units below serial number 45B00. Refer to McIntosh Service Bulletin #114 (part number 038-141)
16. C55 was 10pF in all units below serial number 45B00.
17. R3 was 5K ohms in some earlier units.
18. In all units below serial number 86B60, C71 is .0027 5% 100V. (Part No. 063-004)

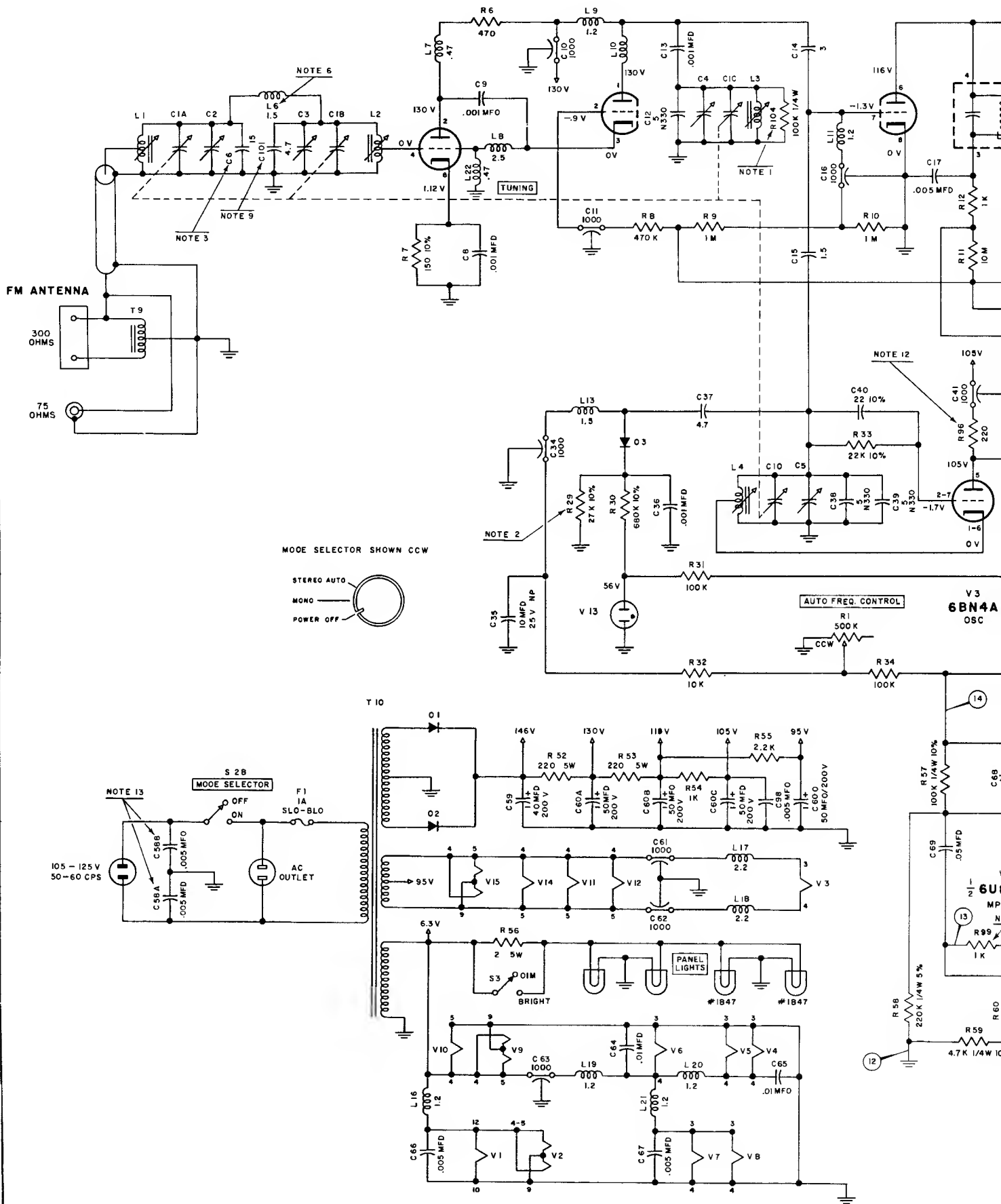


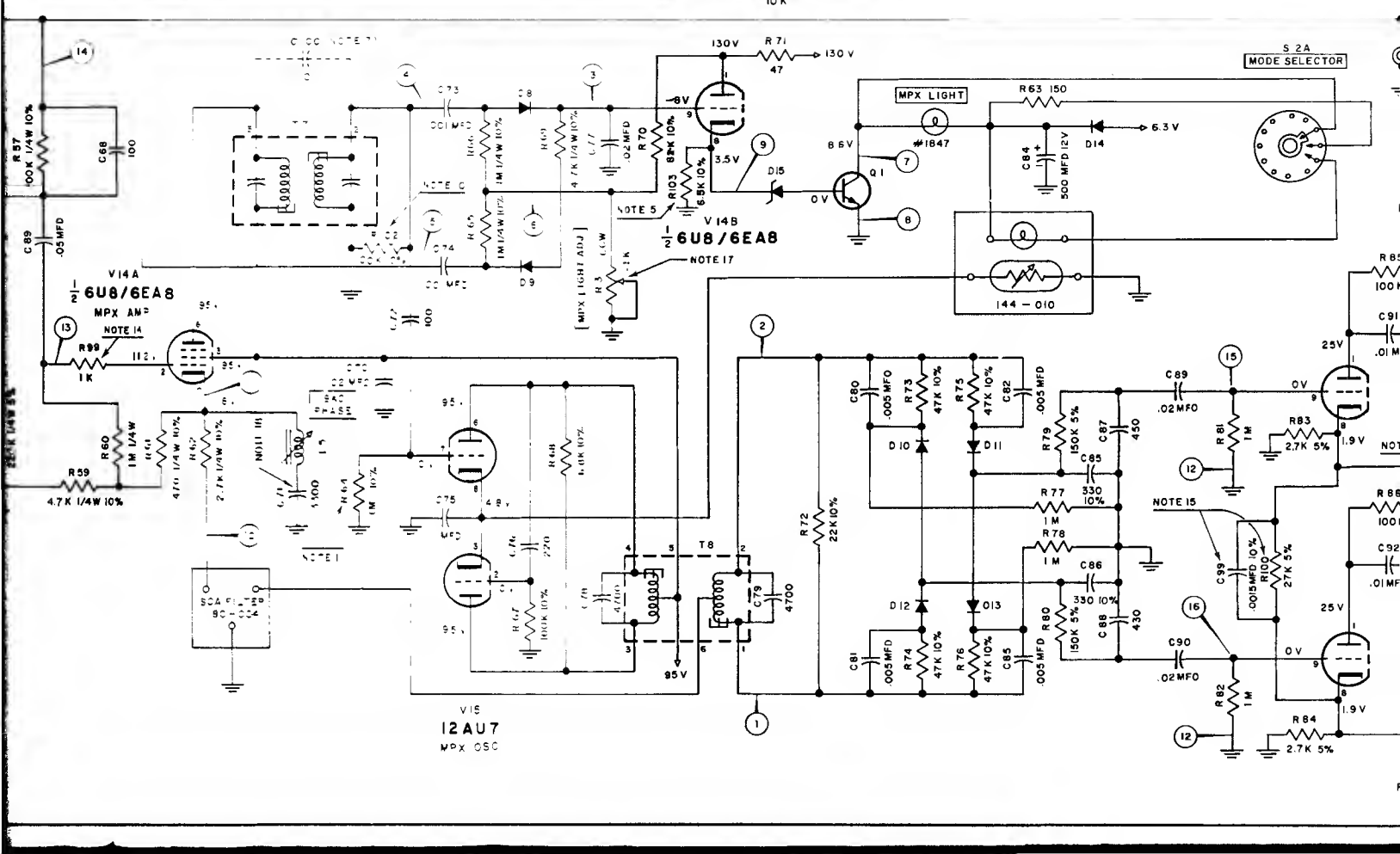
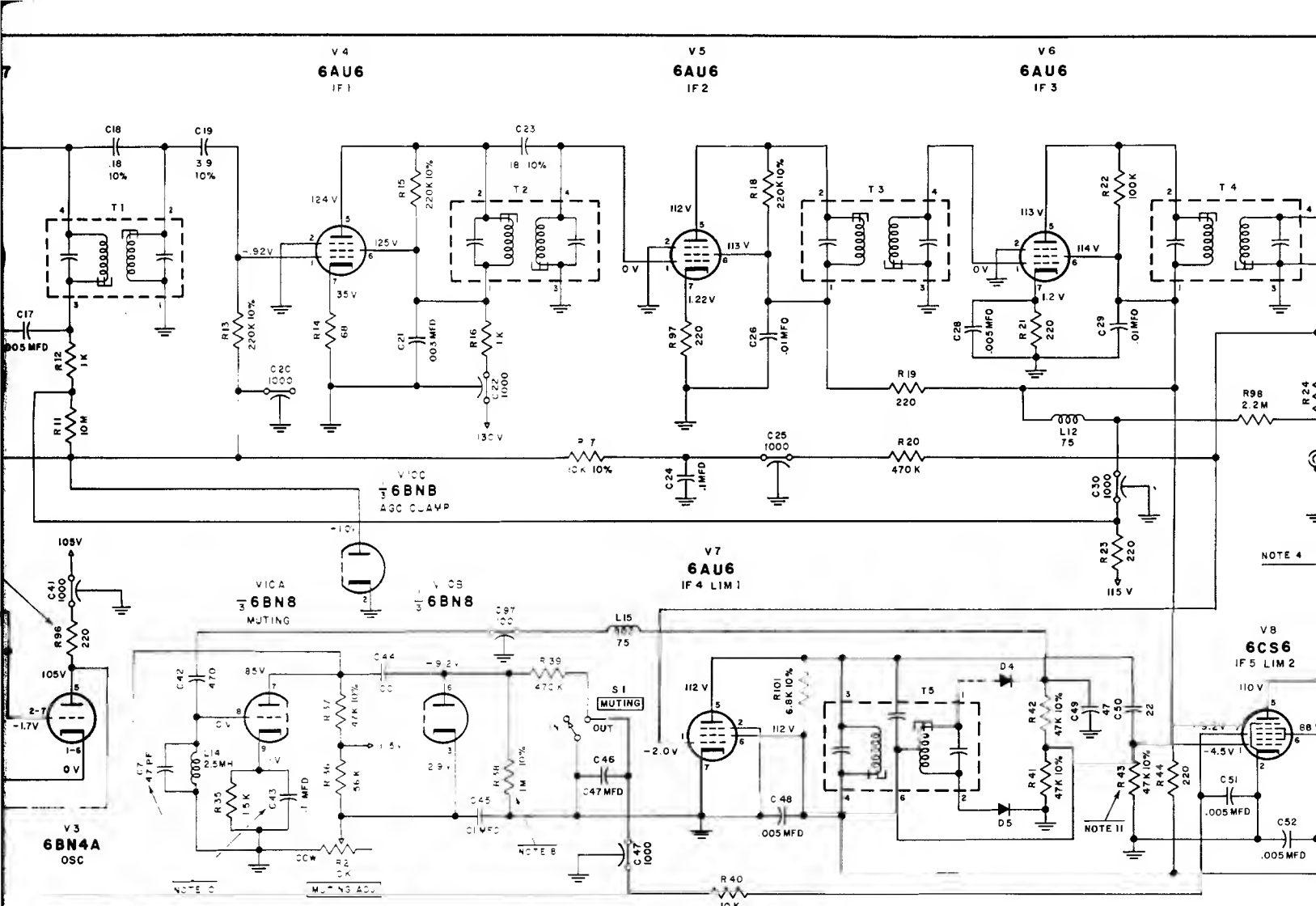
MPX PRINTED CIRCUIT BOARD 043-833

V1  
6DS4  
RF1

V2A  
1/2 12AT7

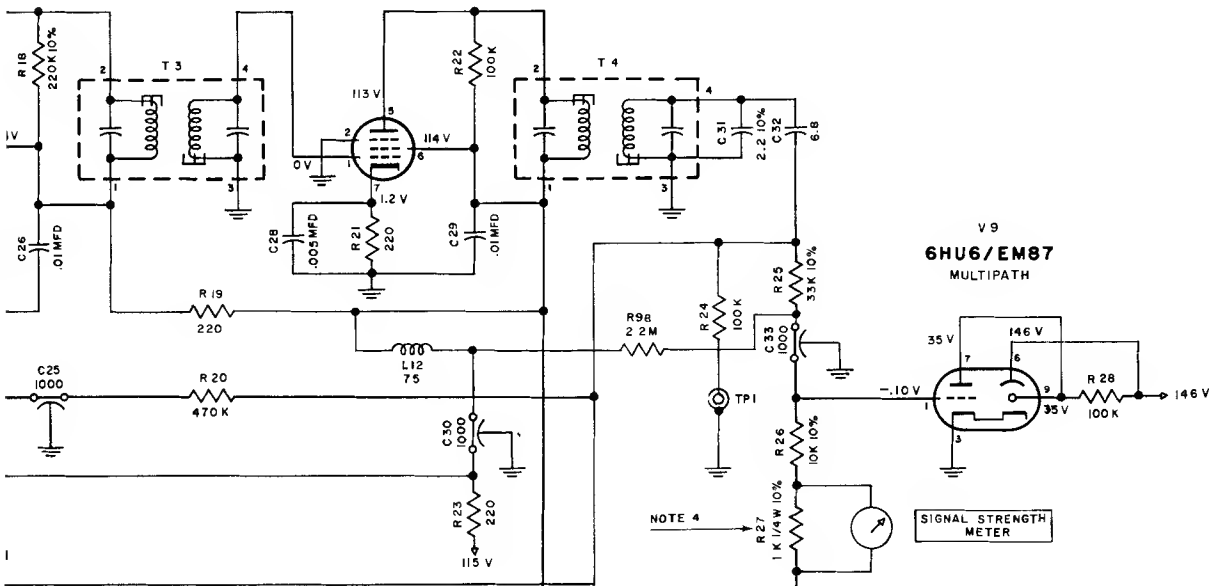
V2B  
1/2 12AT7  
MIXER



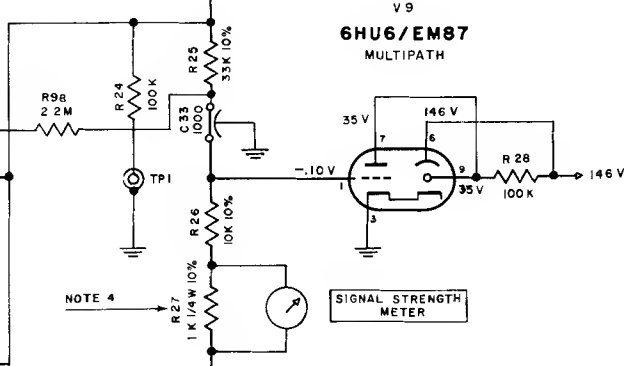




V 6  
**6AU6**  
 IF 3

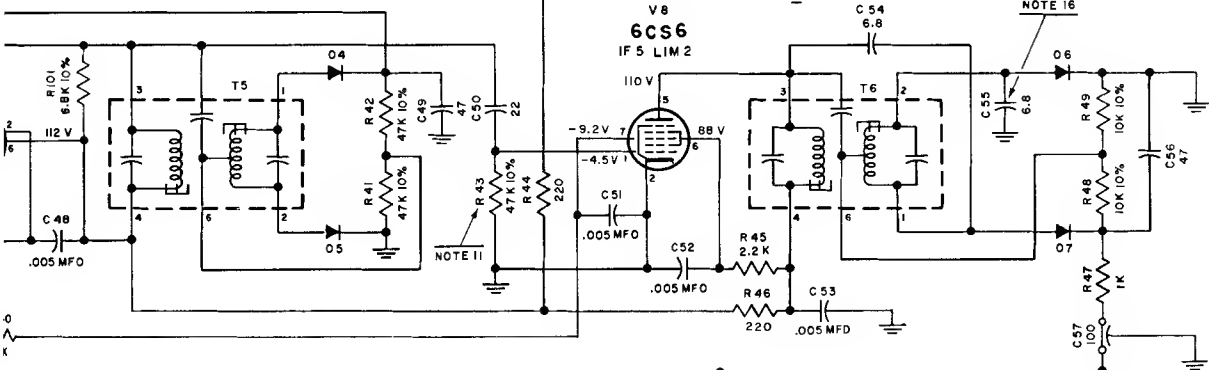


V 9  
**6HU6/EM87**  
 MULTIPATH



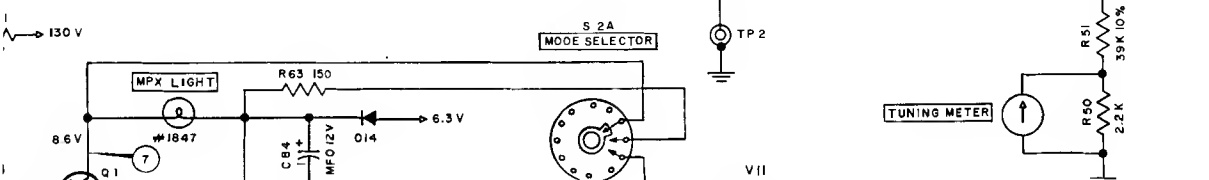
NOTE 4

SIGNAL STRENGTH METER



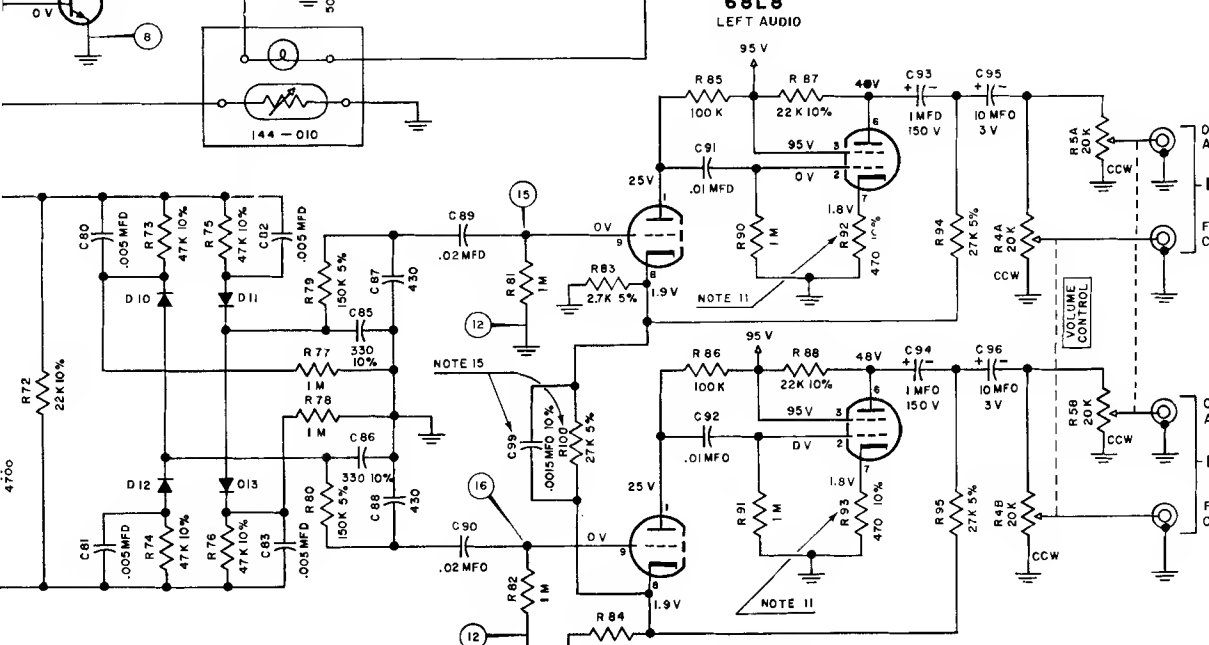
NOTE 11

NOTE 16



S 2 A  
 MODE SELECTOR

TUNING METER



NOTE 15

V 12  
**68L8**  
 RIGHT AUDIO

VOLUME CONTROL

OUTPUT ADJUST  
 LEFT OUTPUT  
 FRONT PANEL CONTROLLED

OUTPUT ADJUST  
 RIGHT OUTPUT  
 FRONT PANEL CONTROLLED

## REPLACEMENT PARTS

All parts not listed are common items obtainable from radio parts jobbers.

Replacement parts may be obtained when ordered by PART NUMBER from:

McIntosh Laboratory, Inc.  
Customer Service Department  
2 Chambers Street  
Binghamton, New York 13903  
(telephone 607-723-3512)

### CAPACITORS

Symbol Number	Description	Part Number
C35	Elect. 10 $\mu$ F 25V NP	066-005
C43	Mylar .1 $\mu$ F 250V	064-037
C59	Elect. 40 $\mu$ F 200V	066-049
C60	Elect. 50/50/50/50 $\mu$ F 200/200/200/200V	066-036
C71	Mylar 3300pF 125V	064-074
C75	Mylar .1 $\mu$ F 250V	064-037
C78	Mica 4700pF 100V	063-005
C79	Mica 4700pF 100V	063-005
C84	Elect. 500 $\mu$ F 12V	066-024
C93,94	Elect. 1 $\mu$ F 150V	066-050
C95,96	Elect. 10 $\mu$ F 3V	066-110

### DIODES

D1	Se. rectifier	070-005
D2	Se. rectifier	070-005
D3	Variable cap. diode	070-020
D4	Si. signal diode	070-022
D5	Si. signal diode	070-022
D6	Si. signal diode	070-022
D7	Si. signal diode	070-022
D8	Si. signal diode	070-022
D9	Si. signal diode	070-022
D10	Ge. signal diode	070-003
D11	Ge. signal diode	070-003
D12	Ge. signal diode	070-003
D13	Ge. signal diode	070-003
D14	Si. rectifier	070-030
D15	Zener diode 5.6V	070-035

### FUSES

F1	Fuse 1 Amp Slo-Blo	089-001
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### CHOKES

L1	Antenna coil	122-026
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L2	RF coil	122-057
L3	Mixer coil	122-058
L4	Oscillator coil	122-007
L5	Filter coil (19kHz phase)	122-008
L6	Choke 1.5 $\mu$ H	122-032
L7	Choke .47 $\mu$ H	122-010
L8	Choke 2.5 $\mu$ H	122-033
L9	Choke 1.2 $\mu$ H	122-011
L10	Parasitic choke	122-028
L11	Choke 1.2 $\mu$ H	122-011
L12	Choke 75 $\mu$ H	122-013
L13	Choke 1.5 $\mu$ H	122-032
L14	Choke 2.5 $\mu$ H	122-031
L15	Choke 75 $\mu$ H	122-013
L16	Choke 1.2 $\mu$ H	122-011
L17	Choke 2.2 $\mu$ H	122-001
L18	Choke 2.2 $\mu$ H	122-001
L19	Choke 1.2 $\mu$ H	122-016
L20	Choke 1.2 $\mu$ H	122-011
L21	Choke 1.2 $\mu$ H	122-011
L22	Choke .47 $\mu$ H	122-010

### METERS

Signal strength meter	124-005
Tuning meter	124-006

### TRANSISTORS

Q1	Si. NPN transistor	132-042
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### POTENTIOMETERS

R1	AFC control	134-068
R2	Muting adjust	134-063
R3	MPX light adjust	134-062
R4	Volume control	134-067
R5	Output adjust	134-001

### RESISTORS

R52	Wirewound 220 ohms 5W	139-009
R53	Wirewound 220 ohms 5W	139-009
R56	Wirewound 2 ohms 5W	139-005

### SWITCHES

S1	Muting switch	146-022
S2	Mode switch	146-063
S3	Lamp intensity switch	148-003

T1  
T2  
T3  
T4  
T5  
T6  
T7  
T8  
T9  
T10  
  
V1  
V2  
V3  
V4  
V5  
V6  
V7  
V8  
V9  
V10  
V11,1  
V14  
V15  
  
V13

	122-057
	122-058
r coil	122-007
11 (19kHz phase)	122-008
1.5μH	122-032
.47μH	122-010
2.5μH	122-033
1.2μH	122-011
choke	122-028
1.2μH	122-011
75μH	122-013
1.5μH	122-032
2.5mH	122-031
75μH	122-013
1.2μH	122-011
2.2μH	122-001
2.2μH	122-001
1.2μH	122-016
1.2μH	122-011
1.2μH	122-011
.47μH	122-010
METERS	
Length meter	124-005
ser	124-006
TRANSISTORS	
ransistor	132-042
POTENTIOMETERS	
ol	134-068
ust	134-063
adjust	134-062
ontrol	134-067
ust	134-001
RESISTORS	
220 ohms 5W	139-009
220 ohms 5W	139-009
2 ohms 5W	139-005
SWITCHES	
itch	146-022
ch	146-063
nsity switch	148-003

TRANSFORMERS		
T1	First IF	162-040
T2	Second IF	162-037
T3	Third IF	162-037
T4	Fourth IF	162-037
T5	Fifth IF	162-041
T6	Discriminator IF	162-041
T7	Amplifier (19kHz)	162-009
T8	Oscillator (38kHz)	162-010
T9	Balun	043-226
T10	Power	043-344
TUBES		
V1	6DS4 (nuvistor)	165-013
V2	12AT7	165-017
V3	6BN4A	165-008
V4	6AU6A	165-004
V5	6AU6A	165-004
V6	6AU6A	165-004
V7	6AU6A	165-004
V8	6CS6	165-011
V9	6HU6/EM87	165-025
V10	6BN8	165-009
V11,12	6BL8	165-007
V14	6EA8	165-044
V15	12AU7	165-018
FRONT PANEL AND TRIM		
	Volume knob	043-253
	Mode knob	043-253
	Muting knob	043-253
	AFC knob	043-253
	Tuning knob	043-272
	Front panel (complete)	043-356
	Front panel glass	016-014
	End cap (right)	018-043
	End cap (left)	018-044
LAMPS		
V13	Neon lamp	058-001
	#1847 (meters & stereo)	058-008
	Festoon (dial glass)	058-032
MOUNTING SYSTEM		
	Shelf bracket (right)	043-592

Shelf bracket (left)	
Mounting template	
Hardware package	
MISCELLANEOUS :	
EDR network	
SCA filter	
FM dipole antenna	
Dial glass	
Pointer	
Coax connector (75Ω)	
Line cord	
Dial cord	
Fuseholder	
Shipping carton	
Owners manual	
Plastic feet	
Tube shield (7 pin)	
Tube shield (9 pin)	

Shelf bracket (left)	043-593
Mounting template #100	038-179
Hardware package	043-450

MISCELLANEOUS ITEMS

LDR network	144-010
SCA filter	180-004
FM dipole antenna	170-033
Dial glass	016-073
Pointer	043-814
Coax connector (75 ohm)	127-015
Line cord	170-021
Dial cord	043-815
Fuseholder	178-001
Shipping carton	043-947
Owners manual	038-029
Plastic feet	017-041
Tube shield (7 pin)	073-005
Tube shield (9 pin)	073-006

1000226S6-M8331

**MODEL NUMBER:** MR 71

**MODIFICATION:** This modification increases stereo separation on MR 71 tuners to better than 35 db separation. This modification is in units with serial numbers above 45B00.

**DESCRIPTION:** The stereo multiplex detector in the MR 71 tuner is a self matrixing detector. It automatically recombines the L+R and L—R stereo information to produce L and R output. The SCA filter causes a slight loss in the L—R portion of the composite multiplex signal. This limits stereo separation to about 30 db. Separation is improved by increasing the difference signal gain in the tuner left and right audio amplifiers while leaving the common signal gain unchanged. This is done by connecting a RC network between the cathodes of the R and L input audio amplifier stages.

**PROCEDURE:**

1. Connect a 27K 5% ½ watt resistor and a .0015 MF 10% capacitor in parallel. Connect this network between pin #8 on one 6BL8 audio tube to pin #8 on the other 6BL8 audio tube.
2. Feed a multiplex signal modulated with 1KC audio left or right channel only into the tuner antenna input. Tune the tuner to the MPX signal. Align the 19KC phase adjust (coil L5) for maximum stereo separation. It is possible to obtain greater than 35 db separation between channels.

**NOTE:** Before making this alignment be sure the MPX generator is accurately set up. View the composite stereo signal at the generator with an oscilloscope. Do not attempt to estimate stereo separation by viewing the tuner discriminator output at TP 2. The signal at TP 2 should **NOT** look like an ideal multiplex signal.

**MATERIAL NEEDED:**

1. ea. resistor, 27K 5% ½w
1. ea. capacitor, .0015 MFD 10%