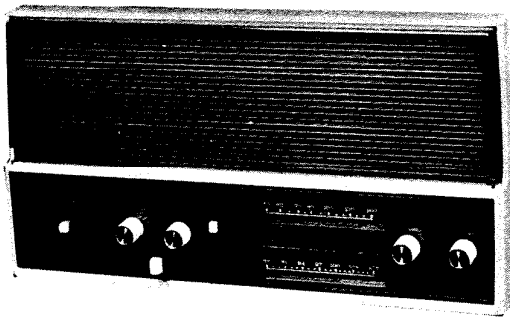


NuTone

SERVICE MANUAL



Model 2063-B, 2064-B



Model 2090-B, 2091-B

AM-FM TRANSISTOR RADIO and INTERCOM

Models 2063-B, 2064-B, 2090-B, 2091-B

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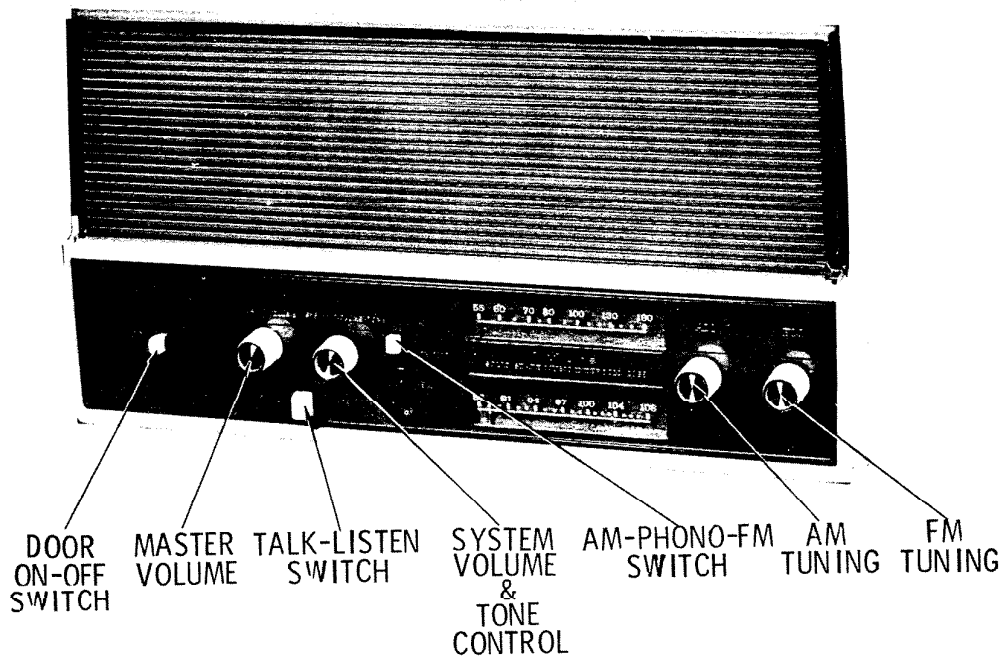


Fig. 1. Master Station Front Panel – Models 2063-B, 2064-B.

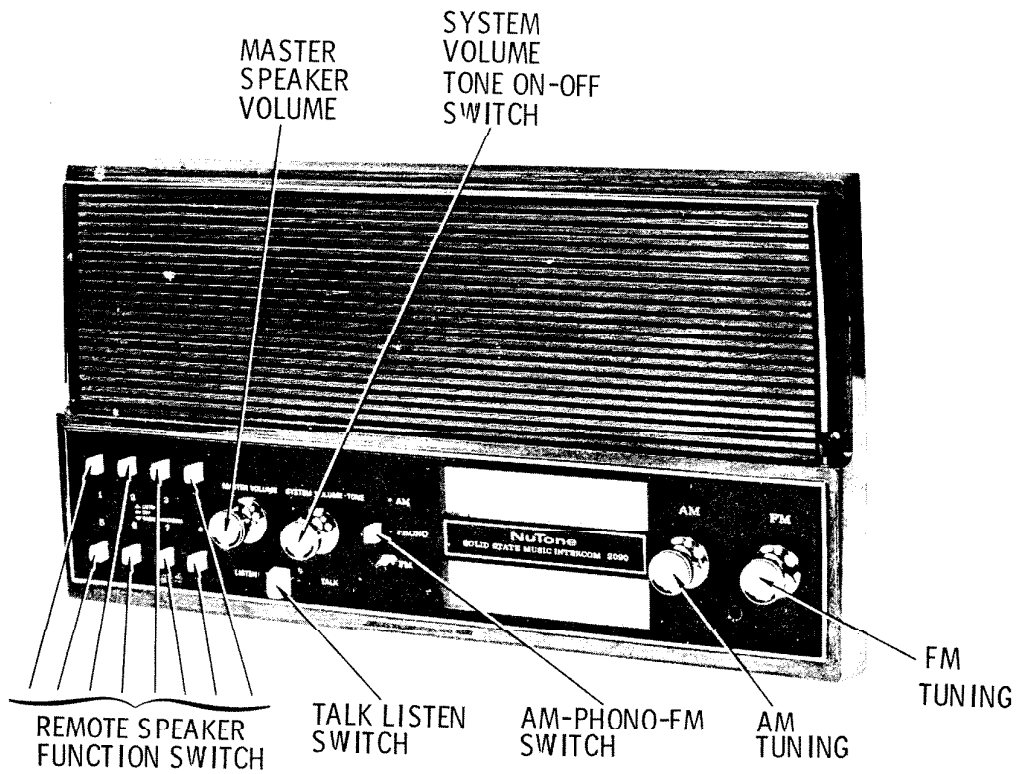


Fig. 2. Master Station Front Panel – Models 2090-B, 2091-B.

CHECK-OUT PROCEDURE

Failure to pass any of these tests indicates a fault that should be corrected.

1. Set all Remote Station Selector Switches to OFF (center) position (not necessary on Models 2063-B and 2064-B).
2. Rotate Master Speaker Volume Control fully clockwise.
3. Turn unit on with ON-OFF Volume Knob and set control two-thirds clockwise. AM-FM Scales will be illuminated.
4. Set Selector Switch to AM position. Tune in an AM radio station and check reception.
5. Set Selector Switch to FM position. Tune in an FM radio station and check reception.
6. Rotate Tone Control full range, noting increase and decrease in treble and bass emphasis.
7. With radio playing, push all Remote Station Selector Switches on Master to Radio-Intercom (down) position (not necessary when checking Models 2063-B and 2064-B, except door speaker switch). Check all Remote Speaker Stations for radio reception. Check operation of all Remote Speaker Volume Controls.
8. Talk from Master to the Remote Speaker Stations by pushing Master Talk-Listen Switch to Talk (right) position. Check for intercom operation at all Remote Speakers.
9. Push Master Talk-Listen Switch to Listen (left) position to hear reply from Remote Stations. Operation of Talk-Button on Remote Speaker is not required.
10. Let Master Talk-Listen Switch return to center position. Talk from each Remote Speaker station to Master and other Remotes by depressing Talk Button on Remote Speaker. On Model 2028 Remote Speaker used with Model 2063-2064 Master, check lock position of Talk Button.
11. With radio playing, push all Remote Station Selector Switches on Master to Listen (up) position (not necessary when servicing Models 2063-B and 2064-B). Talk from each Remote Speaker Station to Master without operating Talk Button of Remote.

Note: If intercom volume level does not override radio, remove Master Unit from wall and adjust R59 Level Set control on the bottom left of printed board for normal listening level with system Volume control one-third to one-half clockwise rotation.

12. Return all Remote Station Selector Switches to Radio Intercom or OFF (center) position (Models 2090-B and 2091-B only). Connect signal from Record Changer to Phono Jack of Master. Set Selection Switch in Phono position and check for phono reception.

MASTER STATION DISASSEMBLY INSTRUCTIONS

How to Remove Master Unit for Service

1. Turn ON-OFF System Volume Control to OFF position.
2. Remove two front panel mounting screws.
3. Pull Master Unit slightly forward, and pull off antenna connections from terminals in upper right corner of housing. Depress white tabs to remove blue signal plug from switch housing.

OPERATION AND TESTING – BENCH SERVICE

1. An auxiliary power transformer (Fig. 3) is required to supply power to the Master Unit when it is removed from the wall mounting for testing on the service bench.
2. Connect auxiliary 3.2 ohm speaker to pins 7 and 8 of blue signal plug to check output and intercom calls from remote speakers to master. Talk into auxiliary speaker and observe intercom reception on master speaker.

Note: If auxiliary speaker is in close proximity to the Master, proper intercom operation can be noted by feedback oscillations of speakers.

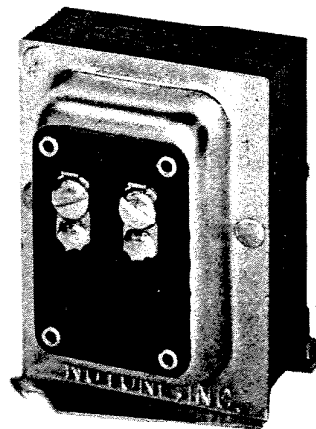
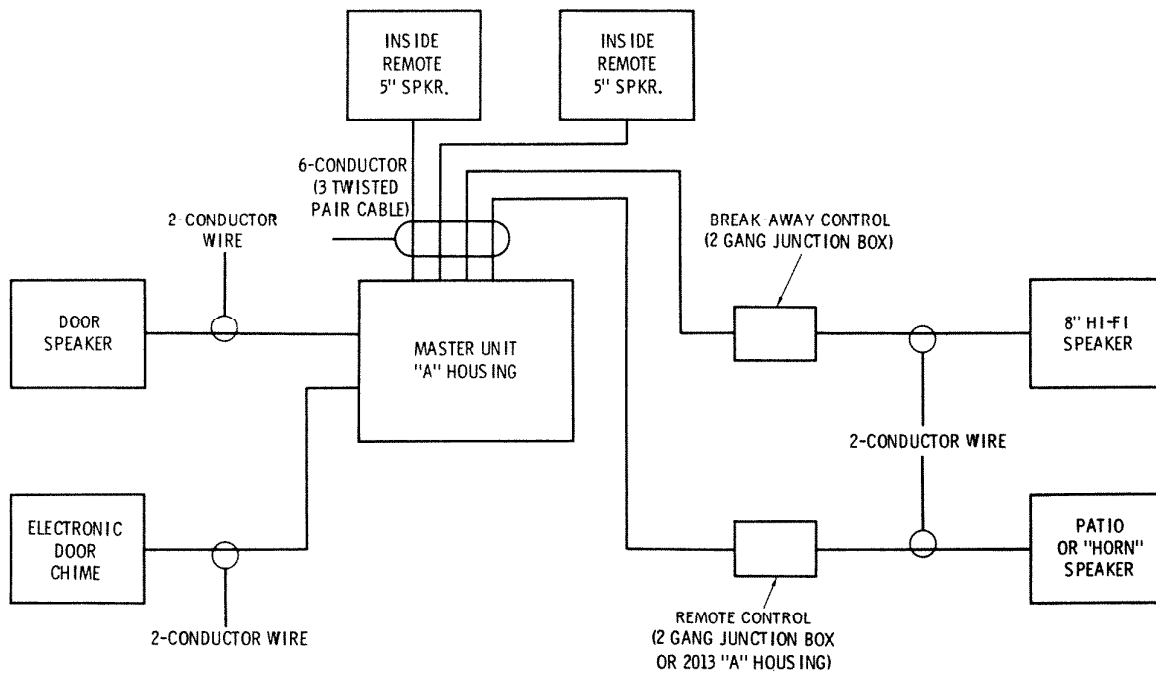


Fig. 3. Auxiliary Transformer.



NOTE: 1. AS AN ALTERNATE, DOOR SPEAKER WIRING MAY BE TERMINATED AT ANY REMOTE LOCATION.
 2. USE (3) TWISTED PAIR CABLE (6-CONDUCTOR WIRE) ONLY.

Fig. 4. Radio-Intercom System Block Diagram.

TROUBLESHOOTING

The following trouble chart is useful in isolating the more common troubles. Remembering that common circuitry is connected to perform several different operations of the Radio-Intercom System, one source of trouble may appear in several functions of operation. As the Master unit is completely transistorized, extreme caution must be taken during servicing procedures to avoid accidental damage to the transistors. Turn power to Master unit OFF whenever performing and soldering. Use low wattage soldering equipment and solder and unsolder components as fast as possible.

A VTVM, with a DC scale of 0 to 1.5 volts, will be required to measure most transistor base and emitter voltages. Components should be removed from the circuit when making resistance measurements to avoid incorrect polarity battery voltage of the ohmmeter being applied to a transistor. It is also important that circuit components are not inadvertently shorted during service function.

TROUBLE CHART

Trouble	Suggested Check Points
System dead.	Check power being supplied by the transformer. Check OFF-ON switch M3 on volume control. Check selector switch M1 for AM or FM position. Check diodes D8, D9, D10, D11, and associated circuitry. Check output transformer T9 and check speaker.
No FM radio. Other operations normal.	Check selector switch M1. Check circuitry associated with FM tuner assembly. Check T2, T3, T4, and associated circuitry. Check FM alignment.
No AM radio. Other operations normal.	Check selector switch M1. Check L6, L7, and other associated circuitry. Check AM detector D4. Check AM alignment.
No intercom. Other operations normal.	Check input transformer T8. Check TR9 and other associated circuitry. Check Talk-Listen switch M2.
One or more remote stations inoperative in transmission, reception, or both.	Check for inoperative remote station. Check speaker, switch, and volume in remote station. Check for defective wiring and connections at remote speaker and at master unit.

ALIGNMENT INSTRUCTIONS

Prealignment Instructions

Output of signal generator should be no higher than necessary to obtain an output reading.
 Volume control should be at minimum position.
 Alignment tools--Standard hex and slotted type.

AM RF and IF Alignment

Set Selector Switch to AM position.						
Dummy Antenna	AM Signal Generator Coupling	Signal Generator Frequency	Radio Dial Setting	Connect VTVM	Adjust	Remarks
1.	.01mfd High side to point A. Low side to chassis.	455KC (400 cycle mod.)	Mid Scale	DC probe to point B. Common to chassis.	A1, A2, A3.	Adjust for maximum deflection. Keep generator output at minimum to obtain output reading.
2.	.01mfd High side to point A. Low side to chassis.	1620KC (400 cycle mod.)	Tuning gang fully open.	DC probe to point B. Common to chassis.	A4	Adjust for maximum deflection.
3.	.01mfd High side to point A. Low side to chassis.	537KC (400 cycle mod.)	Tuning gang fully closed.	DB probe to point B. Common to chassis.	A5	Adjust for maximum deflection. Repeat Steps 2 and 3.
4.	50mmf High side to point C. Low side to chassis.	1400KC (400 cycle mod.)	1400KC	DC probe to point B. Common to chassis.	A6	Adjust for maximum deflection.
5.	50mmf High side to point C. Low side to chassis.	600KC (400 cycle mod.)	600KC	DC probe to point B. Common to chassis.	A7	Adjust for maximum deflection. Repeat Steps 4 and 5.

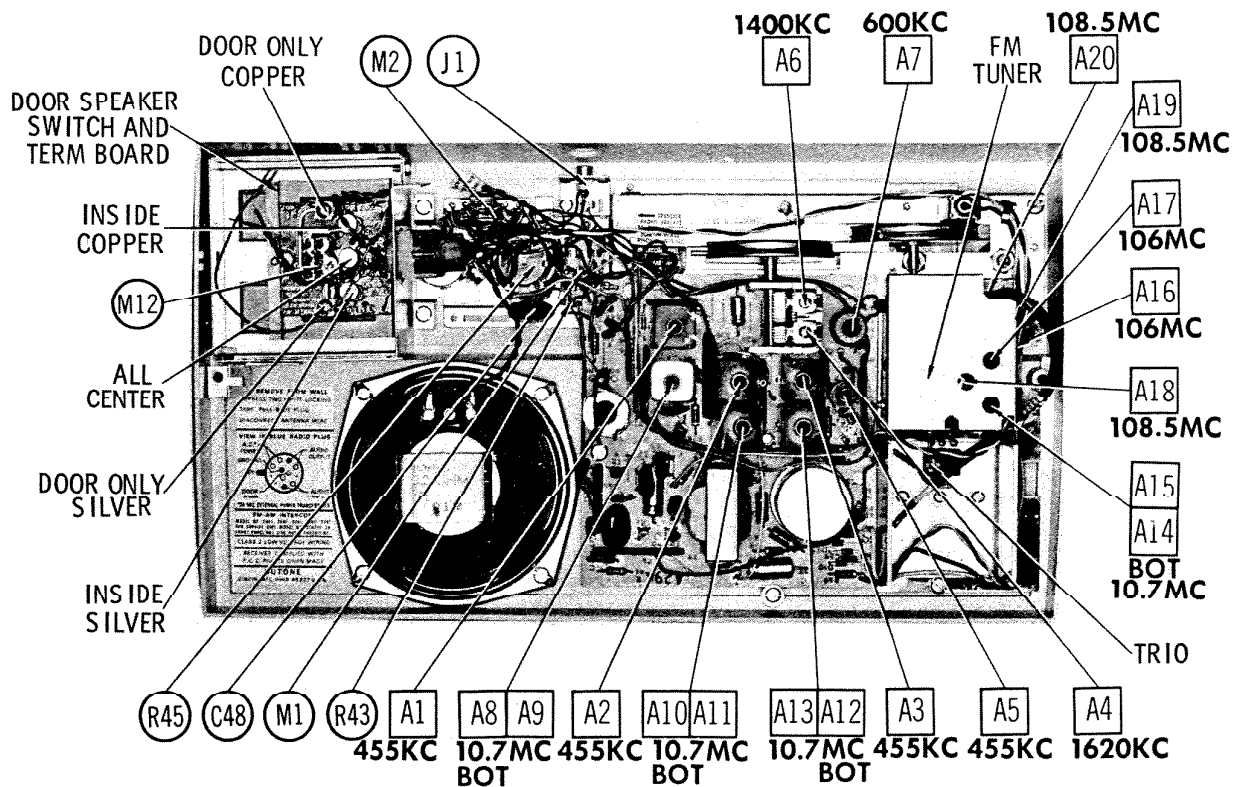


Fig. 5. Chassis Rear View – Component Location, Alignment Points – Models 2063-B, 2064-B.

ALIGNMENT INSTRUCTIONS(Cont'd.)

FM IF Alignment

Set Selector Switch to FM position.
Use frequency modulated signal with 450KC sweep.
Use 60 cycle sawtooth voltage in scope for horizontal deflection.

Dummy Antenna	FM Signal Generator Coupling	Signal Generator Frequency	Radio Dial Setting	Connect Scope	Adjust	Remarks
6. .01mfd	High side to point D. Low side to chassis.	10.7MC (200-300KC sweep)	Point of non-interference	Vert. Amp. to point E. Low side to chassis.	A8, A9	Adjust for symmetrical "S" curve (Fig. B).
7. .01mfd	High side to point A. Low side to chassis.	10.7MC (200-300KC sweep)	Point of non-interference.	Vert. Amp. to point F. Low side to chassis.	A10, A11,	Adjust for curve of maximum amplitude and symmetry (Fig. A).
8. .01mfd	High side to point G. Low side to chassis.	10.7MC (200-300KC sweep)	Point of non-interference	Vert. Amp. to point F. Low side to chassis.	A14, A15	Adjust for curve of maximum amplitude and symmetry (Fig. A).

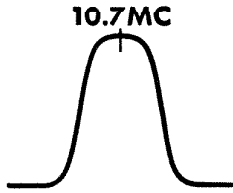


Fig. A

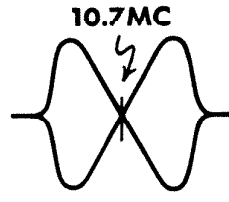


Fig. B

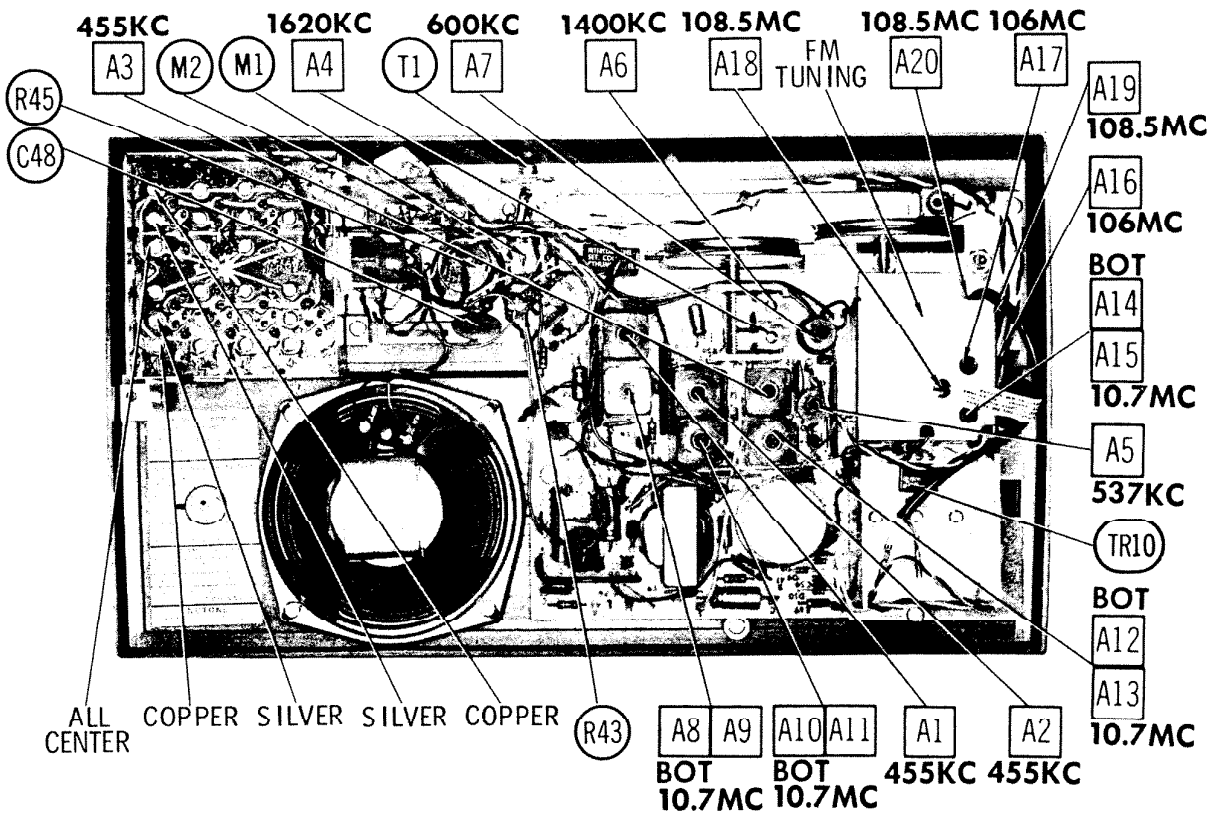


Fig. 6. Chassis Rear View - Component Location, Alignment Points - 2090-B, 2091-B.

ALIGNMENT INSTRUCTIONS (Cont'd.)

FM RF Alignment

	Dummy Antenna	FM Signal Generator Coupling	Signal Generator Frequency	Radio Dial Setting	Connect Scope	Adjust	Remarks
9.	270 ohm resistor	High side to point G. Low side to chassis.	106MC	106MC	Vert. Amp. to point E. Low side to chassis.	A14, A15, A16, A17	Adjust for symmetrical "S" curve (Fig. B). Reduce sweep width if necessary.
Only make following adjustment if unit will not track properly.							
10.	270 ohm resistor	High side to point G. Low side to chassis.	108.5MC	108.5MC	Vert. Amp. to point E. Low side to chassis.	A18, A19, A20	Adjust for symmetrical "S" curve (Fig. B).
11.	270 ohm resistor	High side to point G. Low side to chassis.	87.5MC	87.5MC	Vert. Amp. to point E. Low side to chassis.	L4	Expand or compress coil for symmetrical "S" curve (Fig. B). Reduce sweep width if necessary. Repeat Steps 10 and 11 until no further improvement is noted. Repeat Steps 7, 8, and 9.

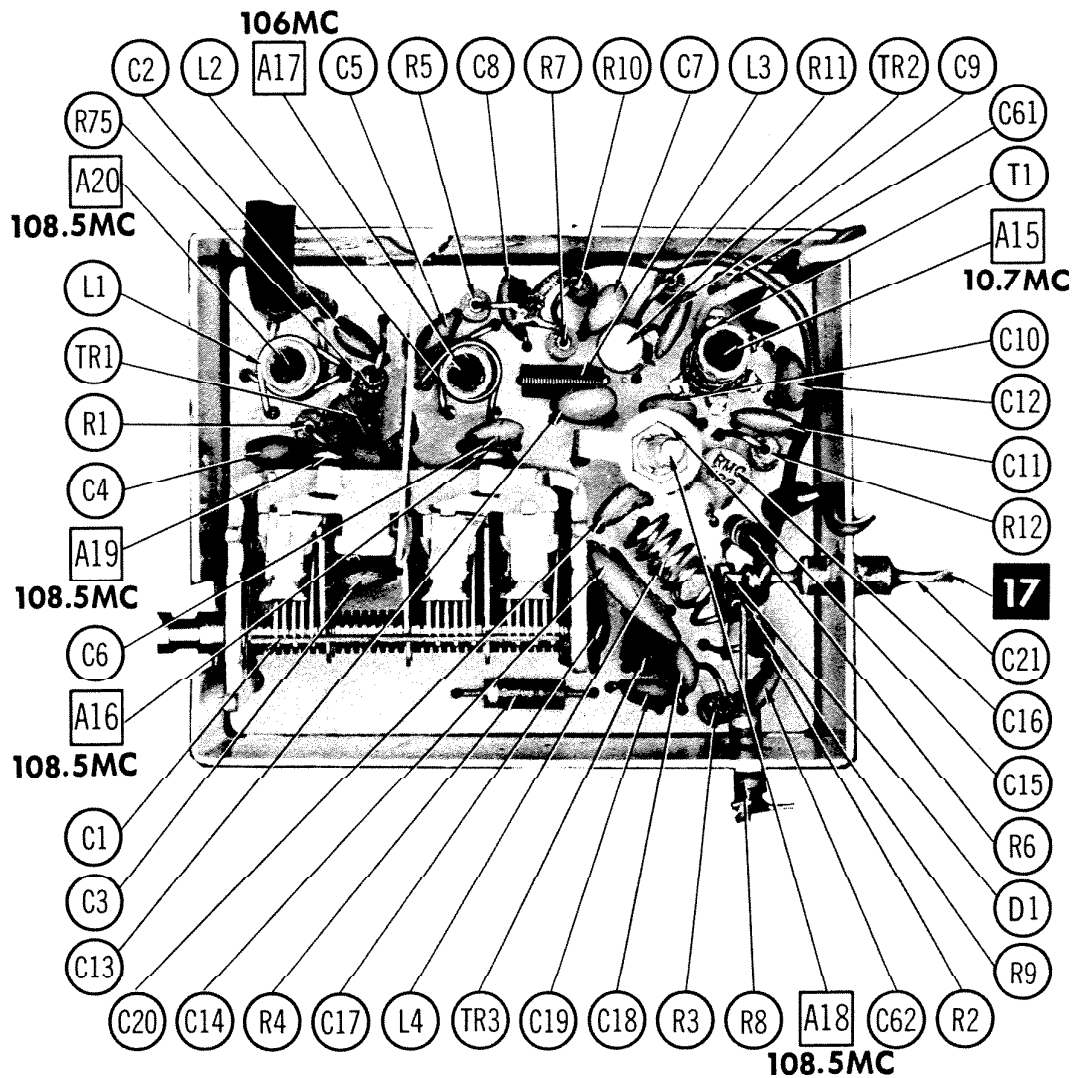


Fig. 7. Tuner Chassis Top View – Component Location, Alignment Points.

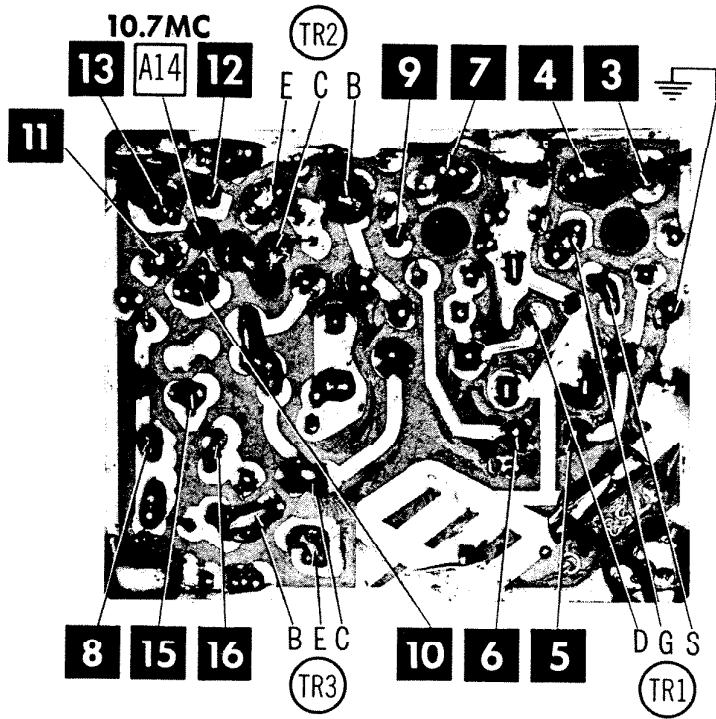


Fig. 8. Tuner Chassis Bottom View –
CircuitTrace Points.

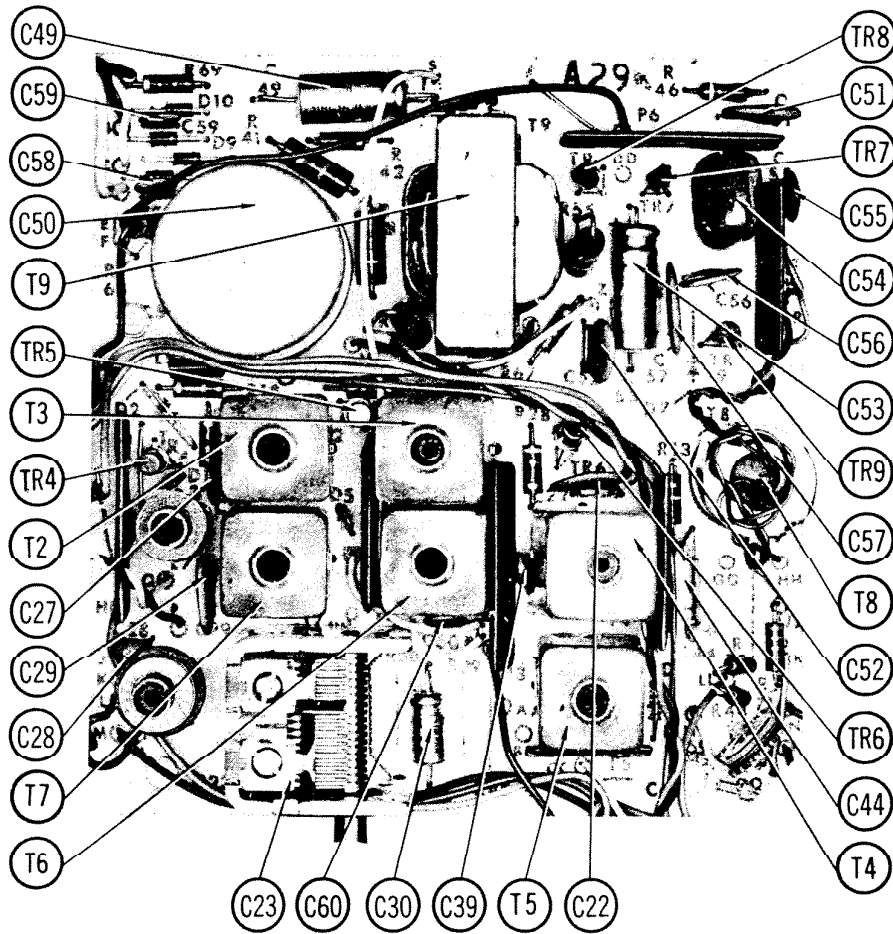


Fig. 9. *IF Printed Board Top View – Component Location.

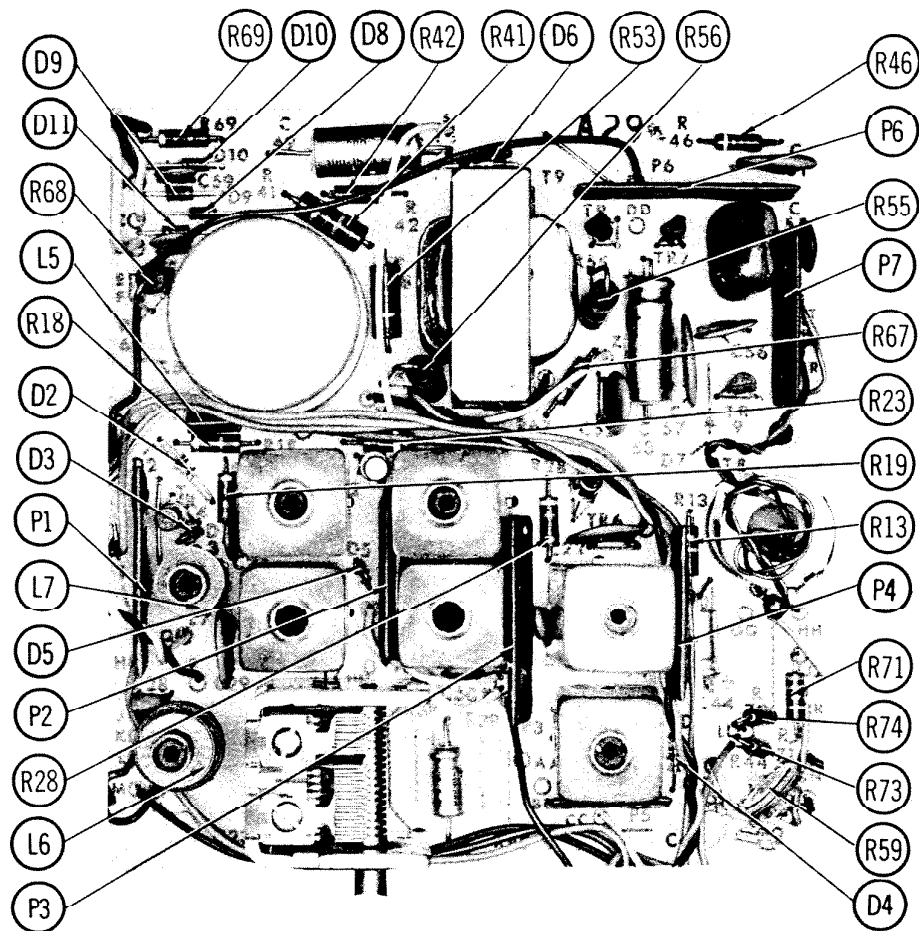


Fig. 10. IF Printed Board Top View – Component Location.

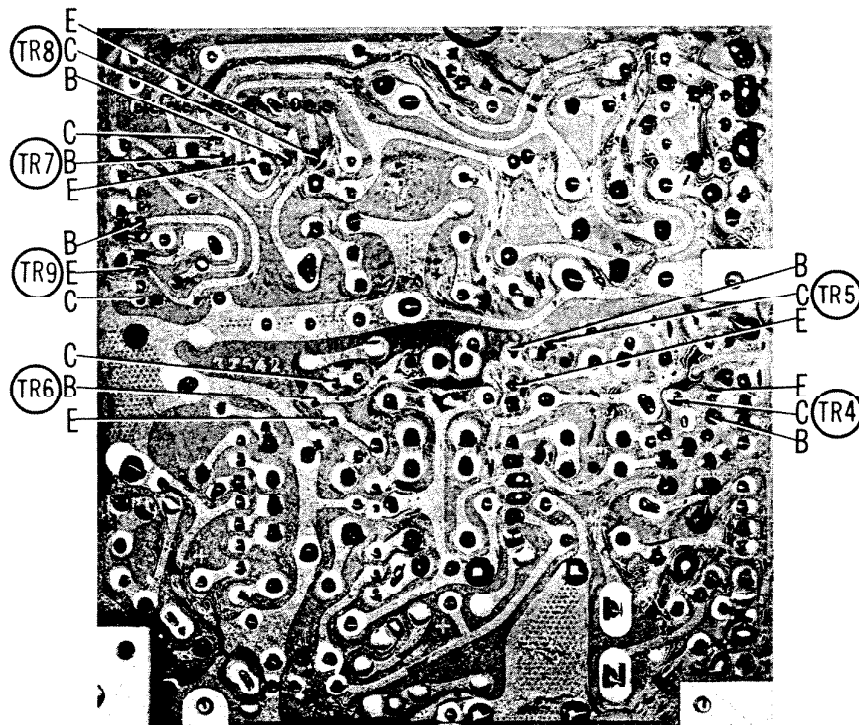


Fig. 11. IF Printed Board Bottom View – Transistor Circuit Trace Points.

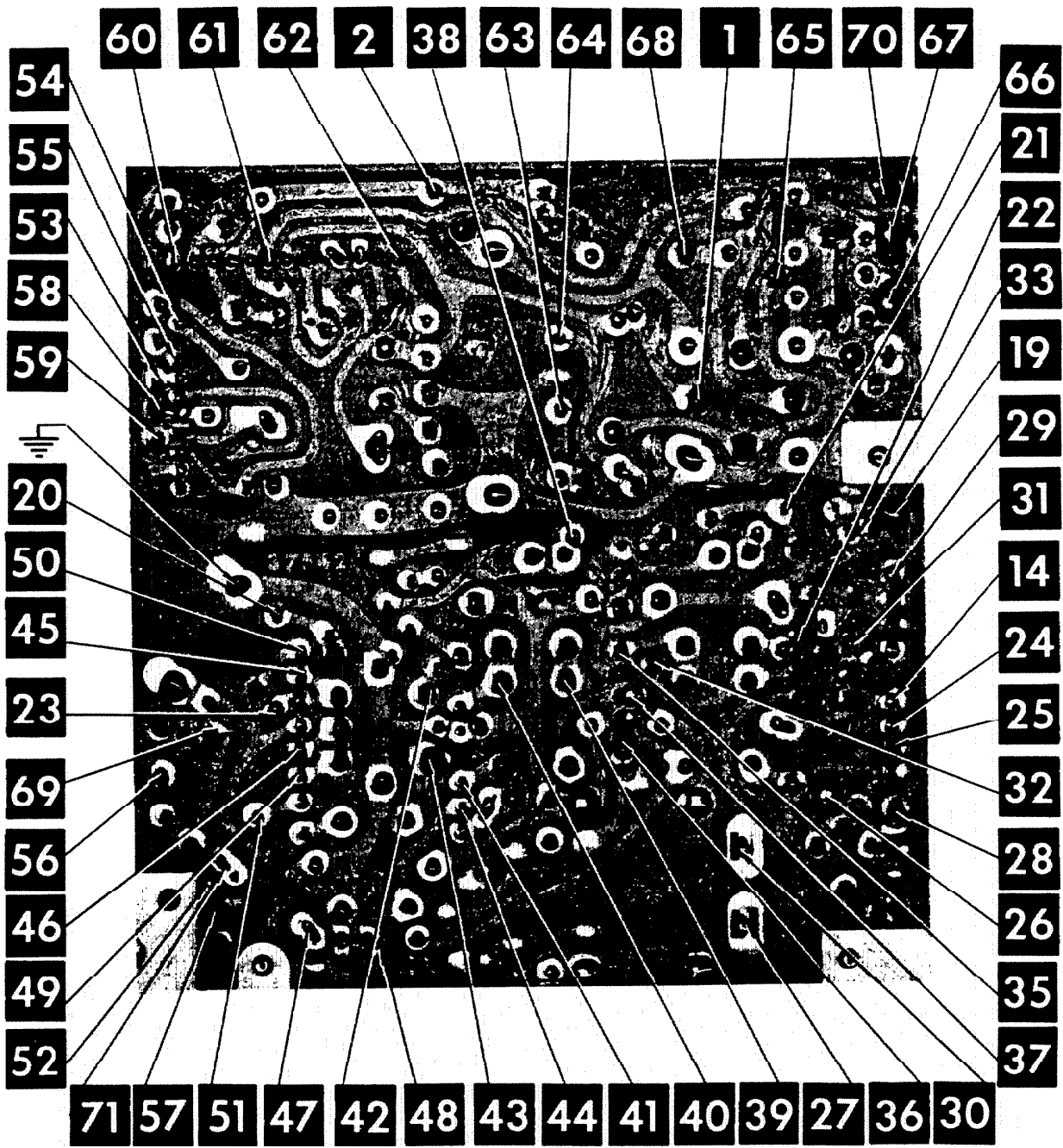
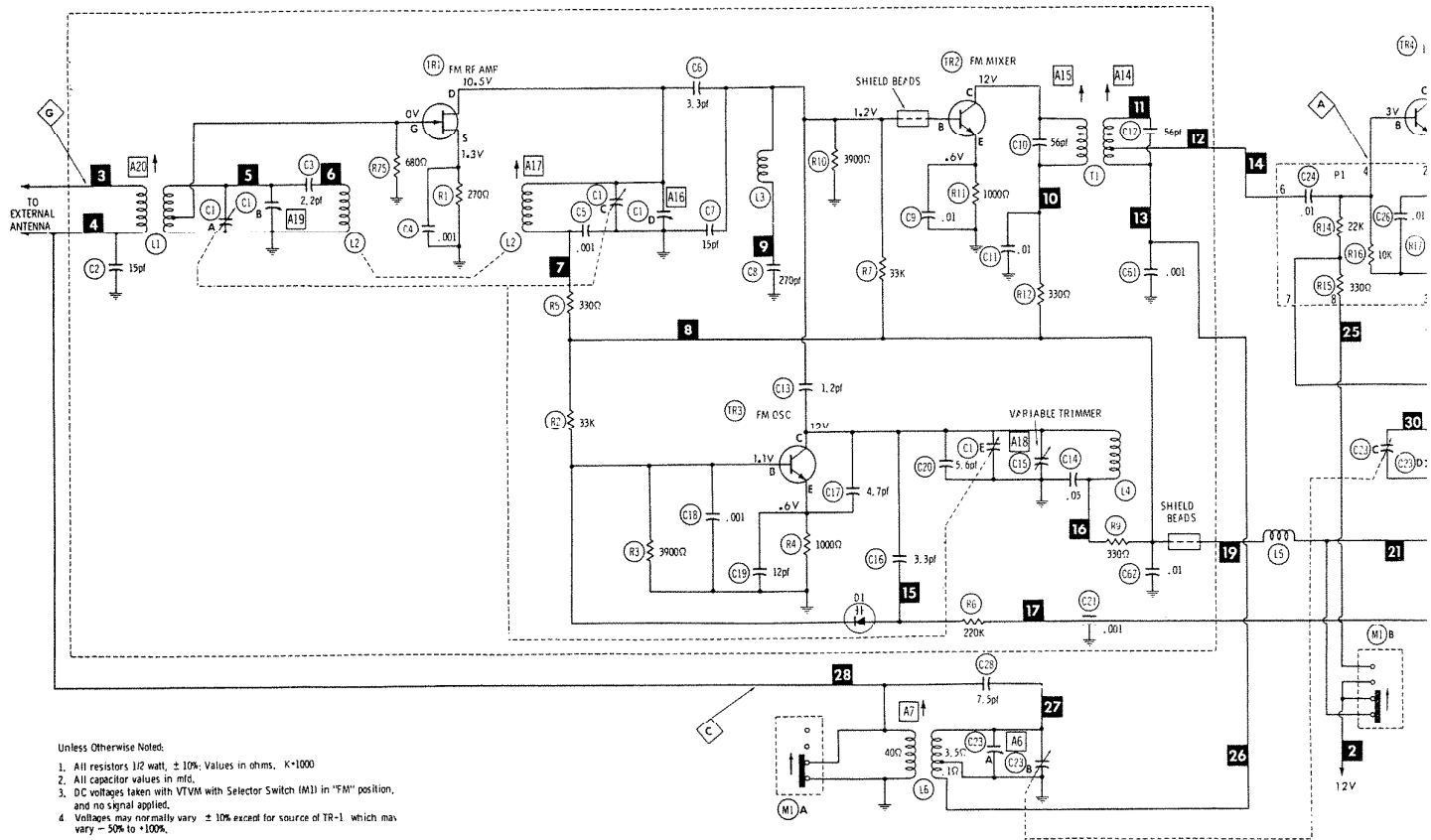
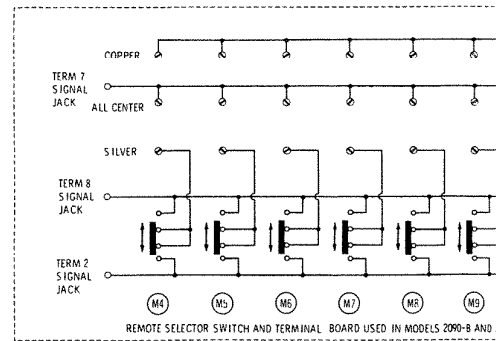
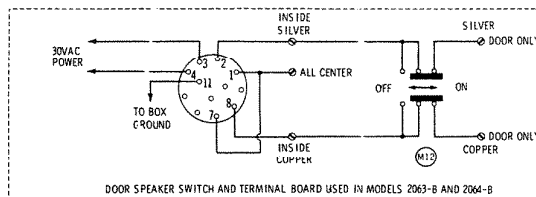
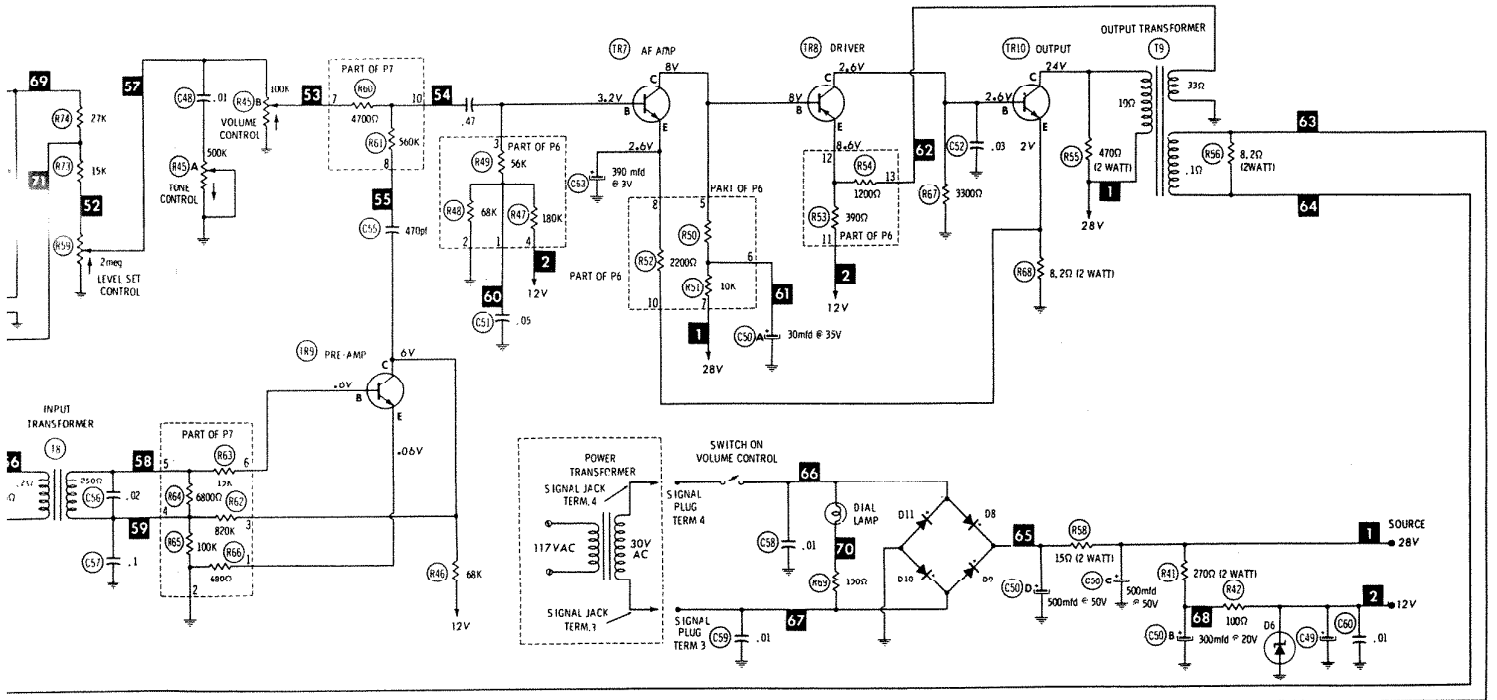
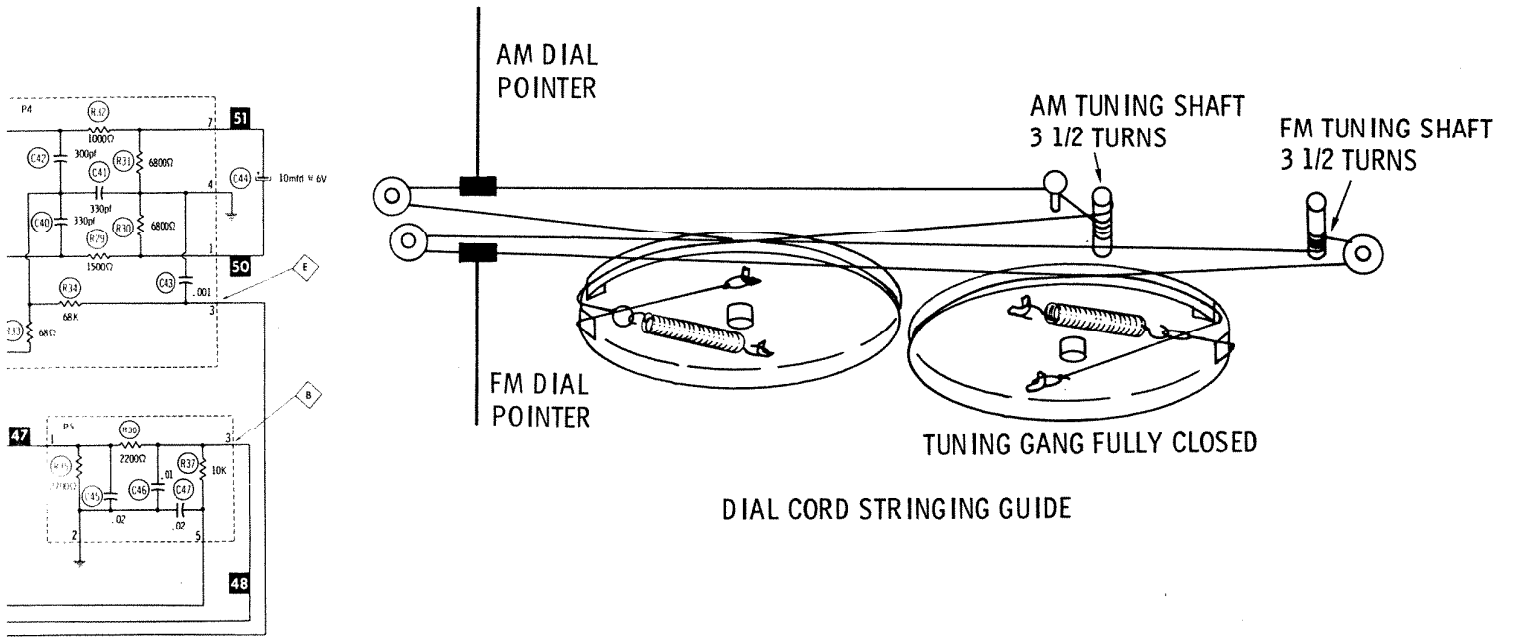


Fig. 12. IF Printed Board Bottom View – CircuiTrace Points.



Selector switch (M1) shown in FM position.





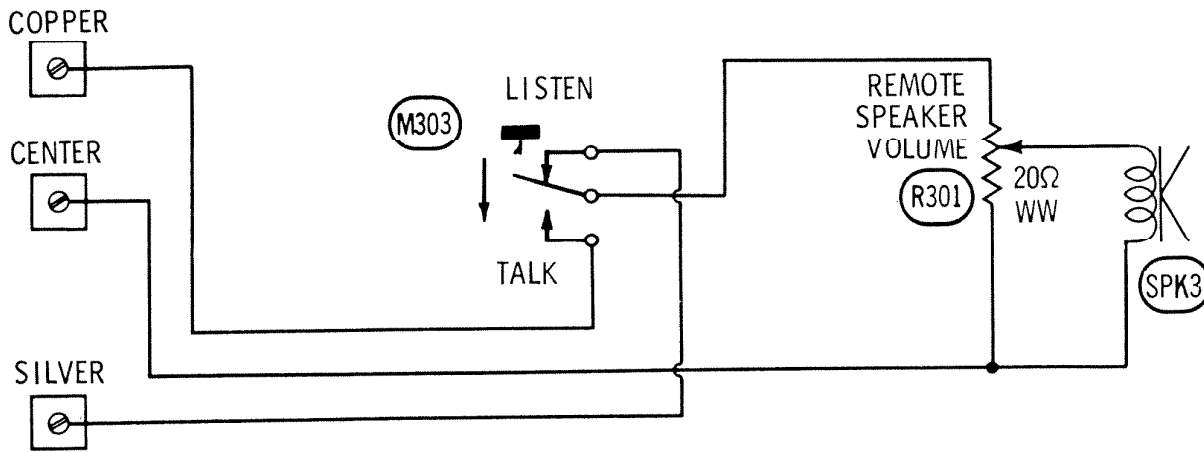


Fig. 14. Schematic – Models N2027-B, N2028-B Remote Speaker Station.

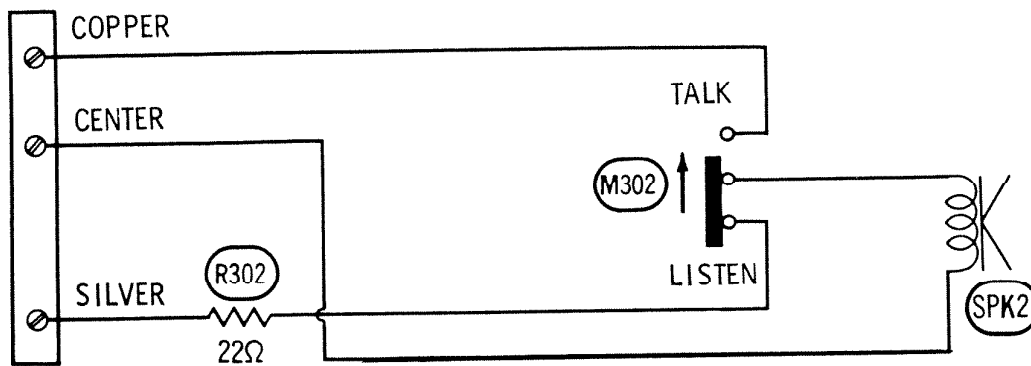


Fig. 15. Schematic – Models N2006, N2008 Remote Speaker Station.

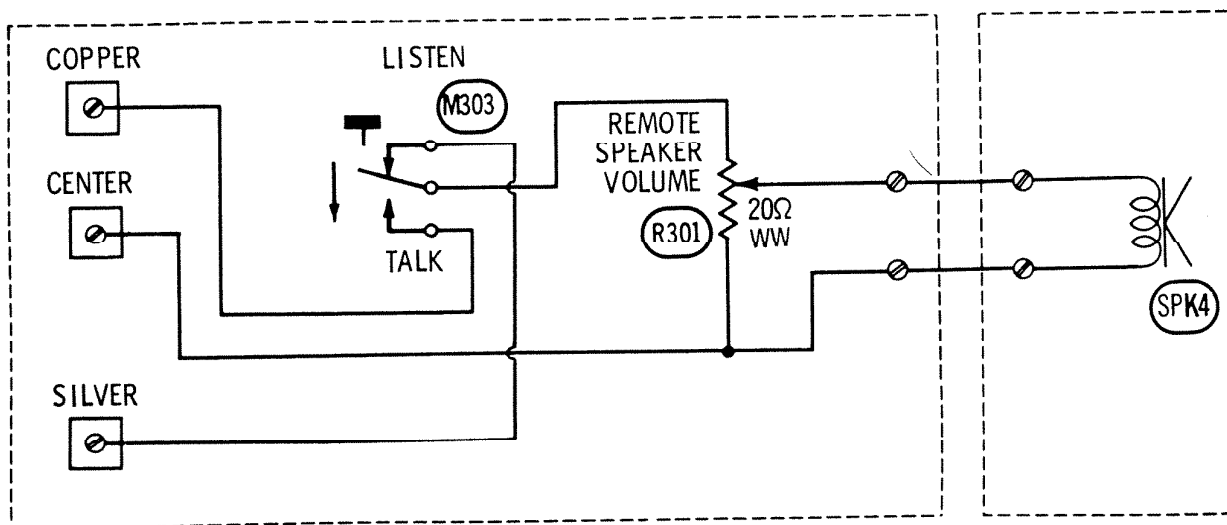


Fig. 16. Schematic – Models N2014, N2021 Remote Speaker Station.

PARTS LIST

Ref. No.	Part No.	Description
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TRANSISTORS

TR1	36582	FM RF
TR2	36578	FM Mixer - FMIF
TR3	36581	FM Osc.
TR4	36578	FM IF - AM Conv.
TR5	36578	AM-FM IF
TR6	36578	AM-FM IF
TR7	36580	AF AMF
TR8	36577	Intercom Preamp
TR9	36580	Driver
TR10	36579	Audio Output

DIODES AND RECTIFIERS

D1	35019	AFC
D2	36508	FM Overload
D3	36508	FM Overload
D4	36508	AM Detector
D5	36508	AM Overload
D6	36539	Zener Power Regulator
D8	36564	Silicon Rectifier
D9	36564	Silicon Rectifier
D10	36564	Silicon Rectifier
D11	36564	Silicon Rectifier

CAPACITORS

C1	35081	FM Tuning Gang, 3 Section
C2	35101-130	15pf NPO Ceramic Disc
C3	35101-127	2.2pf NPO Ceramic Disc
C4	35100-120	0.001mfd @ 25V Ceramic Disc
C5	35100-120	0.001mfd @ 25V Ceramic Disc
C6	35101-134	3.3pf NPO Ceramic Disc
C7	35101-130	15pf NPO Ceramic Disc
C8	35100-124	270pf @ 25V Ceramic Disc
C9	35100-139	0.01mfd @ 50V Ceramic Disc
C10	35100-144	56pf NPO Ceramic Disc
C11	35100-139	0.01mfd @ 50V Ceramic Disc
C12	35100-144	56pf NPO Ceramic Disc
C13	35101-126	1.2pf @ 1000V Ceramic Disc
C14	35100-141	0.05mfd @ 50V Ceramic Disc
C15	35078	Trimmer, Tubular
C16	35101-134	3.3pf NPO Ceramic Disc
C17	35101-129	4.7pf @ 1000V Ceramic Disc
C18	35100-120	0.001mfd @ 25V Ceramic Disc
C19	35101-132	12pf N330 Ceramic Disc
C20	35101-137	5.6pf N756 Ceramic Disc
C21	35061	Feed-Thru, Ceramic
C22	35100-141	.05mfd @ 50V Ceramic Disc
C23	35079	AM Tuning Gang, 2 Section
C27	35100-139	0.01mfd @ 25V Ceramic Disc
C28	35101-135	7.5pf @ 1000V Ceramic Disc
C29	35100-141	0.05mfd @ 50V Ceramic Disc
C30	35068-108	10mfd @ 6V Electrolytic
C39	35100-142	330pf @ 25V Ceramic Disc
C44	35068-108	10mfd @ 6V Electrolytic
C48	35100-152	0.01mfd @ 50V Ceramic Disc
C49	35068-103	100mfd @ 15V Electrolytic
C50A	35080	30mfd @ 35V Electrolytic
C50B		300mfd @ 20V Electrolytic
C50C		500mfd @ 50V Electrolytic
C50D		500mfd @ 50V Electrolytic
C51	35100-141	0.05mfd @ 50V Ceramic Disc
C52	35100-153	0.03mfd @ 50V Ceramic Disc
C53	35068-111	390mfd @ 3V Electrolytic
C54	35024	0.47mfd @ 75V Polyester Film
C55	35100-134	470pf @ 1000V Ceramic Disc
C56	35100-140	0.02mfd @ 50V Ceramic Disc
C57	35100-127	0.1mfd @ 100V Ceramic Disc
C58	35100-139	.01mfd @ 25V Ceramic Disc
C59	35100-139	.01mfd @ 25V Ceramic Disc
C60	35100-139	.01mfd @ 25V Ceramic Disc
C61	35100-120	.01mfd @ 25V Ceramic Disc

CONTROLS AND RESISTORS

R1	33101-271	270Ω, 5%, 1/2 Watt, Carbon
R2	33101-333	33K, 5%, 1/2 Watt, Carbon
R3	33101-392	3900Ω, 10%, 1/2 Watt, Carbon
R4	33101-102	1000Ω, 10%, 1/2 Watt, Carbon

Ref. No.	Part No.	Description
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CONTROLS AND RESISTORS (Cont'd.)

R5	33101-331	330Ω, 10%, 1/2 Watt, Carbon
R6	33101-224	220K, 10%, 1/2 Watt, Carbon
R7	33101-333	33K, 5%, 1/2 Watt, Carbon
R8	33101-333	33K, 10%, 1/2 Watt, Carbon
R9	33101-331	330Ω, 10%, 1/2 Watt, Carbon
R10	33101-392	3900Ω, 10%, 1/2 Watt, Carbon
R11	33101-102	1000Ω, 10%, 1/2 Watt, Carbon
R12	33101-331	330Ω, 10%, 1/2 Watt, Carbon
R13	33101-104	100K, 10%, 1/2 Watt, Carbon
R18	33101-271	270Ω, 10%, 1/2 Watt, Carbon
R19	33101-331	330Ω, 10%, 1/2 Watt, Carbon
R23	33101-271	270Ω, 10%, 1/2 Watt, Carbon
R28	33101-471	470Ω, 10%, 1/2 Watt, Carbon
R41	33028-271	270Ω, 10%, 2 Watt, Wire Wound
R42	33101-101	100Ω, 10%, 1/2 Watt, Carbon
R43	33101-394	390Ω, 10%, 1/2 Watt, Carbon
R45A		300K, Tone Control
R45B	34038	100K, Systems Volume Control
R46	33040-683	68K, 5%, 1/2 Watt, Film
R55	33028-471	470Ω, 10%, 2 Watt, Wire Wound
R56	33028-082	8.2Ω, 10%, 2 Watt, Wire Wound
R58	33028-150	15Ω, 10%, 2 Watt, Wire Wound
R59	34023	2 meg, Level Set Control
R67	33101-332	3300Ω, 10%, 1/2 Watt, Carbon
R68	33028-082	8.2Ω, 10%, 2 Watt, Wire Wound
R69	33101-151	150Ω, 10%, 1/2 Watt, Carbon
R71	33101-033	3.3Ω, 5%, 1/2 Watt, Carbon
R73	33101-153	15K, 10%, 1/2 Watt, Carbon
R74	33101-273	27K, 10%, 1/2 Watt, Carbon
R75	33101-681	680Ω, 10%, 1/2 Watt, Carbon
R76	34029	20Ω Master Speaker Volume Control

COMPONENT COMBINATIONS

P1	37541	AM Comp. 1st FM IF Couplate - (3) .01mfd, 22K, 330Ω, 10K, 1500Ω
P2	37538	2nd FM - 1st AM IF Couplate - (3) .01mfd, .005mfd, 470Ω, 90K, 10K, 1200Ω
P3	37539	3rd FM - 2nd AM IF Couplate - .01mfd, (2) .02mfd, .005mfd, 560Ω, 2200Ω, 15K, 330Ω
P4	37511	FM Ratio Detector Couplate - (2) 330pf, 300pf, .001mfd, 1500Ω, 1000Ω, (2) 6800Ω, 68Ω, 68K
P5	37546	AM Audio Detector Couplate - .01mfd, (2) .02 mfd, 2700Ω, 2200Ω, 10K
P6	33031	Audio Couplate - 180K, (2) 68K, 56K, 2200Ω, 10K, 390, 1200Ω
P7	33032	Intercom Couplate - 4700Ω, 560K, 820K, 6800Ω, 100K, 15K, 680Ω

TRANSFORMERS

T1	30524	1st FM IF
T2	30567	2nd FM IF
T3	30567	3rd FM IF
T4	30574	Ratio Detector
T5	30541	3rd AM IF
T6	30540	2nd AM IF
T7	30542	1st AM IF
T8	30547	Intercom Input
T9	30575	Audio Output

COILS

L1	30068	FM Ant Primary
	30069	FM Ant
L2	30070	FM Ant Top
	30071	FM Mixer
L3	30062	10.7mc Trap
L4	30063	FM Oscillator
L5	30072	Neutralizing
L6	30573	AM Ant
L7	30067	AM Oscillator

REMOTE SPEAKERS

		Model N2027
		Model 2028
		Model N2021
		Model 2014
		Model N2006
		Model 2008

PARTS LIST (CONTINUED)

Ref. No.	Part No.	Description
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Ref. No.	Part No.	Description
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MISCELLANEOUS

M1	34581	AM-PHONO - FM, 3 Position Slide Switch
M2	34547	Talk-Listen, 3 Position Lever Switch
M3		OFF-ON Switch on R45
M4 thru M11	34577	Remote Selector 3 Position Slide Switch used in Models 2090-B, 2091-B
M12	34578	Door, 2 Position Slide Switch used in Models 2063-B, 2064-B
	36025	Speaker, 5" 3.2Ω
J1	40776	Phono Connector Ass'y.
	31913	Dial Lamp (G. E. 1819)
	31882	Dial Pointer (AM-FM)
	40738	Front Panel Ass'y. used in Model 2090-B
	40737	Front Panel Ass'y. used in Model 2091-B
	40739	Front Panel Ass'y. used in Model 2063-B
	40741	Front Panel Ass'y. used in Model 2064-B
	32385	Front Panel used in Model 2090-B

MISCELLANEOUS (Cont'd.)

	32384	Front Panel used in Model 2091-B
	32386	Front Panel used in Model 2063-B
	32388	Front Panel used in Model 2064-B
	31889	Knob, AM-FM Tuning used in Models 2090-B, 2091-B
	31891	Knob, AM-FM Tuning used in Models 2063-B, 2064-B
	31888	Knob, Speaker used in Models 2090-B, 2091-B
	31892	Knob, Speaker used in Models 2063-B, 2064-B
	31887	Knob, Volume used in Models 2090-B, 2091-B
	31890	Knob, Volume used in Models 2063-B, 2064-B
	31651	Knob, Talk-Listen Lever Switch
	31604	Knob, Tone
	40752	Switch Box Ass'y. Complete used in Models 2090-B, 2091-B
	40760	Switch Box Ass'y. Complete used in Models 2063-B, 2064-B
	31886	Lampholder
	40614	Power Transformer

NuTone

Madison & Red Bank Roads, Cincinnati, Ohio 45227

PART NO. 45461

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