

BOGEN[®]

INSTRUCTION MANUAL

MODEL RM300

AM/FM MONO
RECEIVER

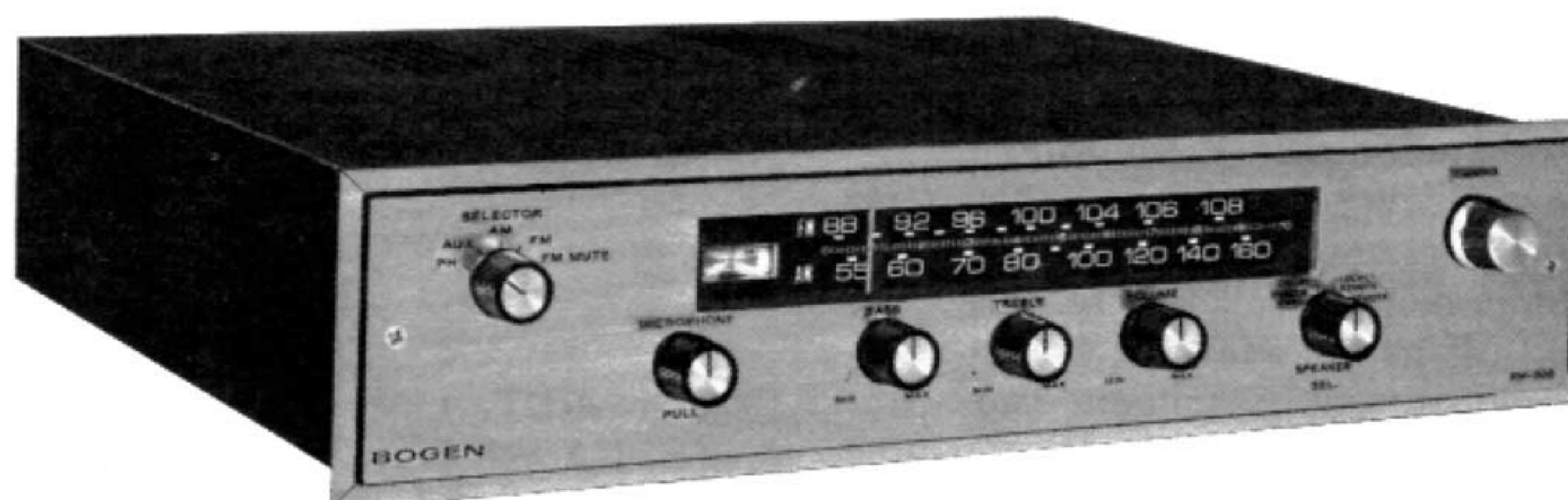


Figure 1 – Model RM300 AM/FM Mono Receiver

OPERATING INSTRUCTIONS

POWER

The power on-off switch is part of the SPEAKER SEL switch. To turn the receiver off, set switch to POWER OFF. The receiver is turned on in all other positions.

SPEAKER SELECTION

Rotate SPEAKER SEL switch to LOCAL or REMOTE, depending on which speakers you wish to use. If you want all speakers to operate, set switch to LOCAL-REMOTE.

AM RECEPTION

Set SELECTOR switch to AM. Turn TUNING knob until pointer indicates desired station on AM (bottom) dial. Adjust TUNING knob until needle on tuning meter shows maximum deflection to right.

FM RECEPTION

Set SELECTOR switch to FM MUTE. Turn TUNING knob until pointer indicates desired station on FM (top) dial. Carefully adjust TUNING knob until needle on tuning meter is at the center of the tuning dial, exactly on the circle above the letters "FM."

NOTE

Muting removes the annoying noise between FM stations. The muting circuitry may not distinguish a very weak signal from interstation noise. To tune in very weak stations, defeat the mute circuit by rotating the SELECTOR switch to FM.

AUDIO SELECTION

Set SELECTOR switch to either PH or AUX. The PH position selects the magnetic phono cartridge connected to the PHONO MAG jack on the rear of the unit. The AUX position selects the component (tape recorder, TV, etc.) connected to the AUX/INPUT jack.

VOLUME

The Volume control is used for all program sources *except* microphone.

To increase volume, rotate control clockwise towards MAX position. To decrease volume, rotate toward MIN position.

TONE

The BASS and TREBLE controls determine the overall tonal balance. With the controls in the mid position (black marker straight up), the audio response is normal or "flat". To increase or decrease bass response, rotate BASS control toward MAX or MIN, respectively. To increase or decrease treble response, rotate TREBLE control toward MAX or MIN, respectively.

MICROPHONE

When not using a microphone, leave MICROPHONE control at the in position. To use a microphone, pull out the control. Rotate the control clockwise to increase microphone volume or counterclockwise to decrease microphone volume.

NOTE

It is not necessary to touch any other controls when using a local microphone. Pulling out the MICROPHONE control or closing an external mic precedence switch automatically mutes all other program inputs.

INSTALLATION

UNPACKING

Inspect the shipping container for indications of improper handling. The Model RM300 was carefully checked before leaving the factory. Carefully unpack the carton and inspect the unit for damage. If it is damaged, make an immediate claim to the dealer or distributor from whom it was purchased. If the unit was shipped to you, notify the shipping carrier without delay and place your claim.

POWER

LINE CORD. The receiver has an ac line cord terminated in a three-prong plug. Connect the plug to a three-wire grounded outlet providing a nominal 120 vac, 60 Hz power source. If only a two-wire outlet is available, use an adapter (such as Leviton No. 5017) to convert the outlet for use with three-wire plugs.

AUXILIARY POWER RECEPTACLE. The rear of the Model RM300 has an ac receptacle for supplying power to another component in the system. This receptacle is controlled by the power switch and any component connected to this receptacle can be turned on and off by the POWER switch on the Model RM300. *Do not connect any component that requires more than 575 watts to this receptacle.*

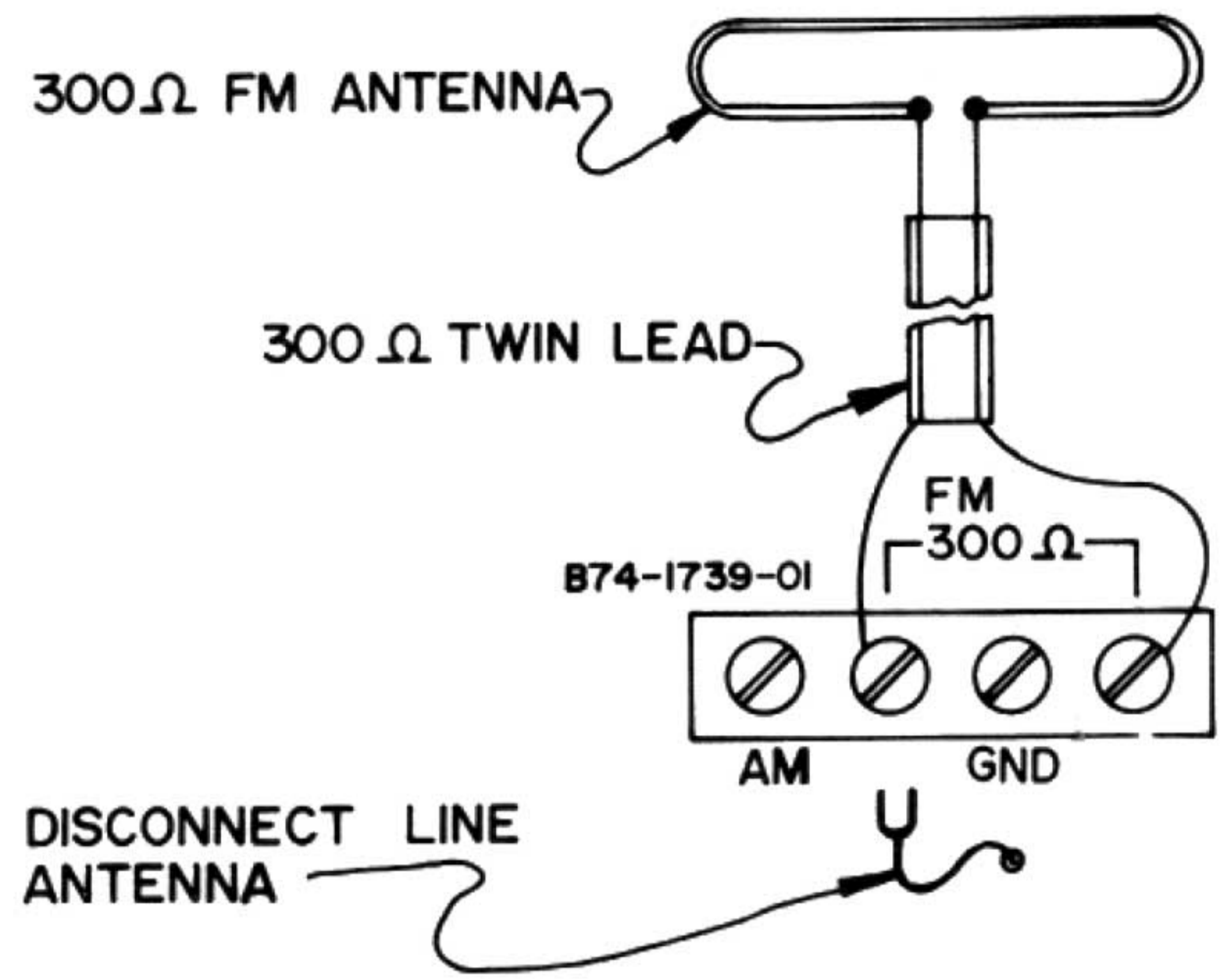


Figure 2 — Connecting 300-Ohm FM Antenna

ANTENNAS

FM LINE ANTENNA. The RM300 is shipped with the FM line antenna connected to the FM terminal of the insulated antenna strip on the rear of the unit. This antenna is adequate for normal or strong signal areas. For best reception, completely unwind the line cord, placing as much of it as possible in a horizontal position away from metallic objects.

EXTERNAL FM ANTENNA

IMPORTANT

Always disconnect the FM Line Antenna when using an external FM antenna.

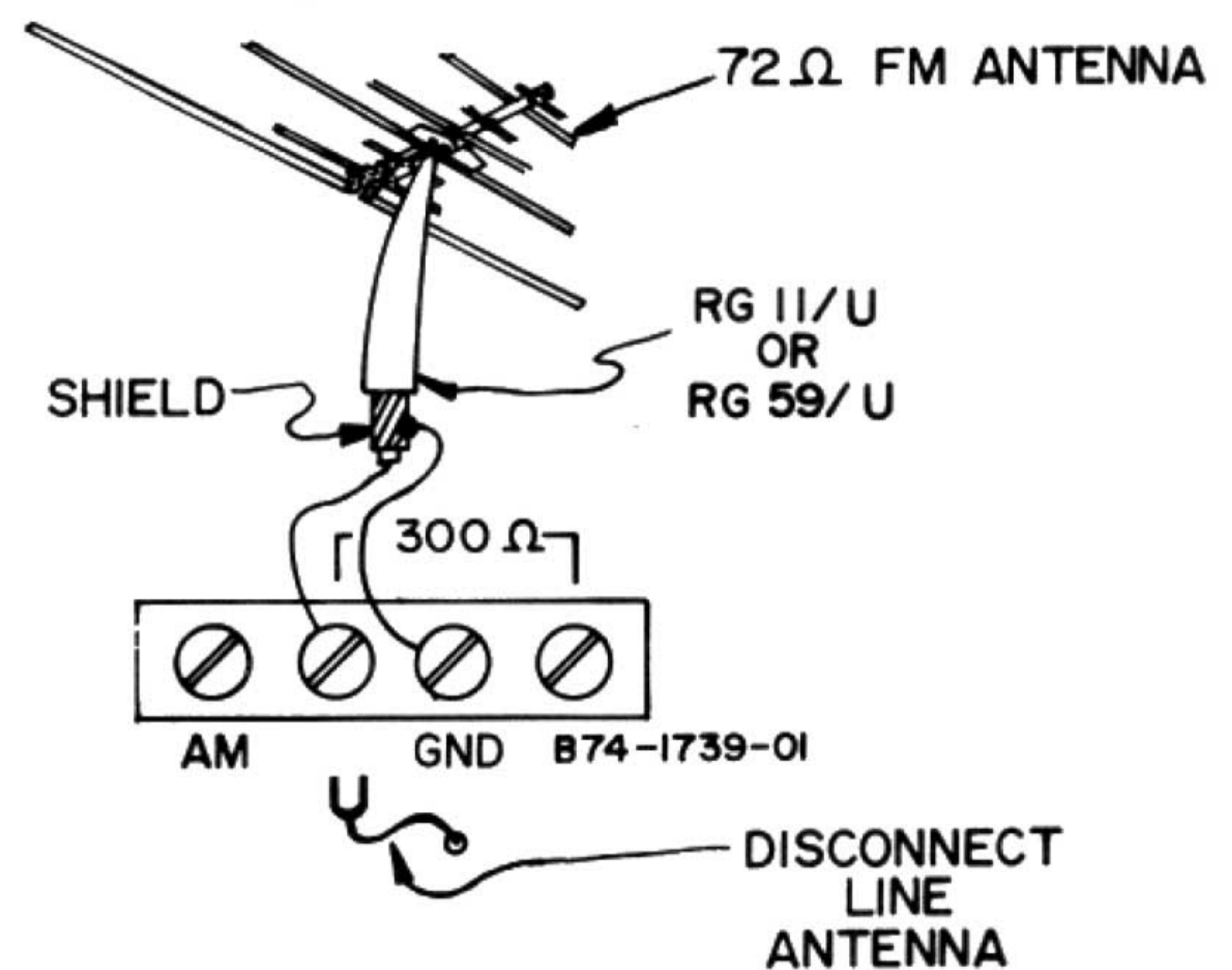


Figure 3 — Connecting 72-Ohm FM Antenna

For improved reception, particularly in weak signal areas or for receivers mounted in racks, installation of an outdoor FM or "T" antenna is necessary. If you are installing a standard 300-ohm antenna system, connect the twin-lead transmission line as shown in figure 2. If conditions require use of a coaxial transmission line, such as RG-11/U or RG-59/U, connect the cable as shown in figure 3. Coaxial cable must be used when the transmission line is run in conduit.

For optimum performance, a separate FM antenna is recommended. If a TV antenna must be used for both FM and TV reception, install an FM signal splitter at the end of the transmission line, as shown in figure 4.

AM ANTENNA. A high-Q, ferrite loopstick antenna is located on the chassis for receiving normal or strong AM signals. No connections are necessary for AM reception with this antenna. For weak signal areas or for receivers enclosed in a metal rack, connect a standard outdoor antenna to the AM terminal, as shown in figure 5.

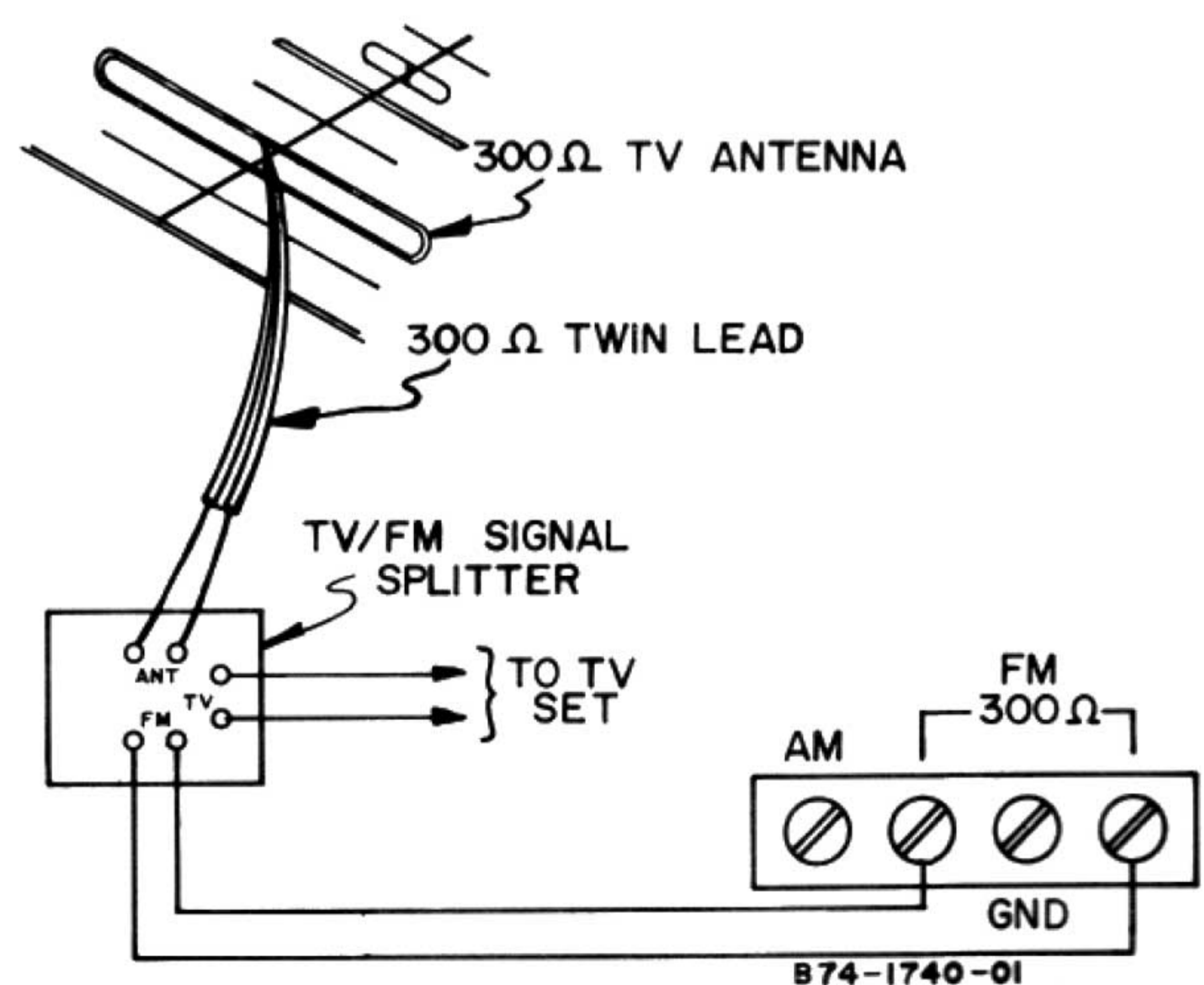


Figure 4 — Connecting TV Antenna

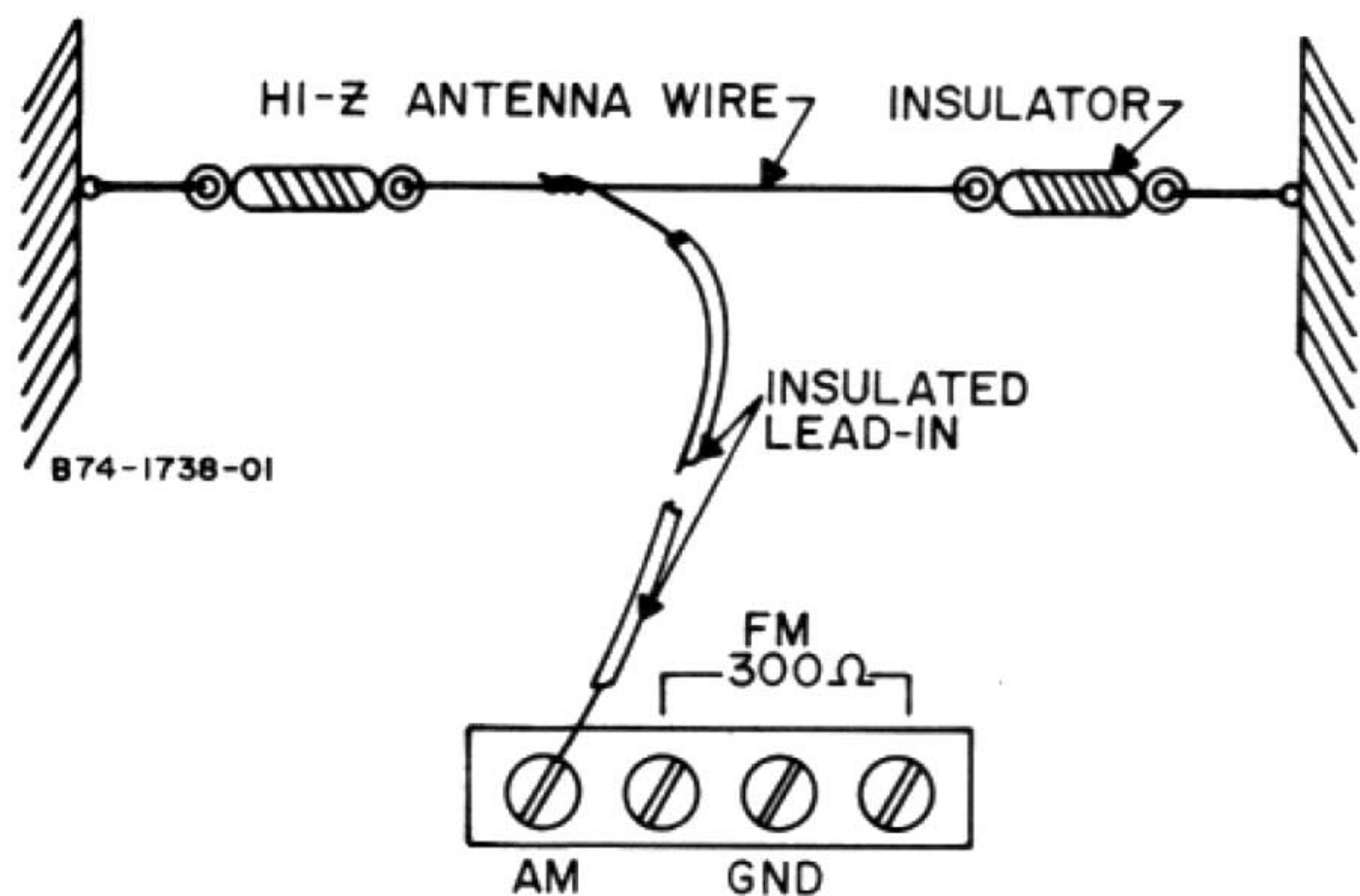


Figure 5 — Connecting External AM Antenna

AUDIO INPUTS

NOTE

Connect inputs monophonically to the Model RM300.

PHONO MAG. The PHONO MAG jack is designed to accommodate the low-level output from a magnetic phono-graph cartridge. Use a single-conductor, low-capacity, shielded cable terminated in a standard phono plug (Bogen 85-1005-01, or equivalent).

AUX INPUT. This jack is designed to receive an input from a high-level (0.5V), source such as a tape recorder having a built-in preamplifier or the sound section of a TV receiver. Use a single-conductor shielded cable terminated in a standard phono plug (Bogen 85-1005-01, or equivalent).

HI Z MICROPHONE. Any high-impedance dynamic microphone may be connected directly to the MIC INPUT connection on the rear panel. Refer to figure 6a.

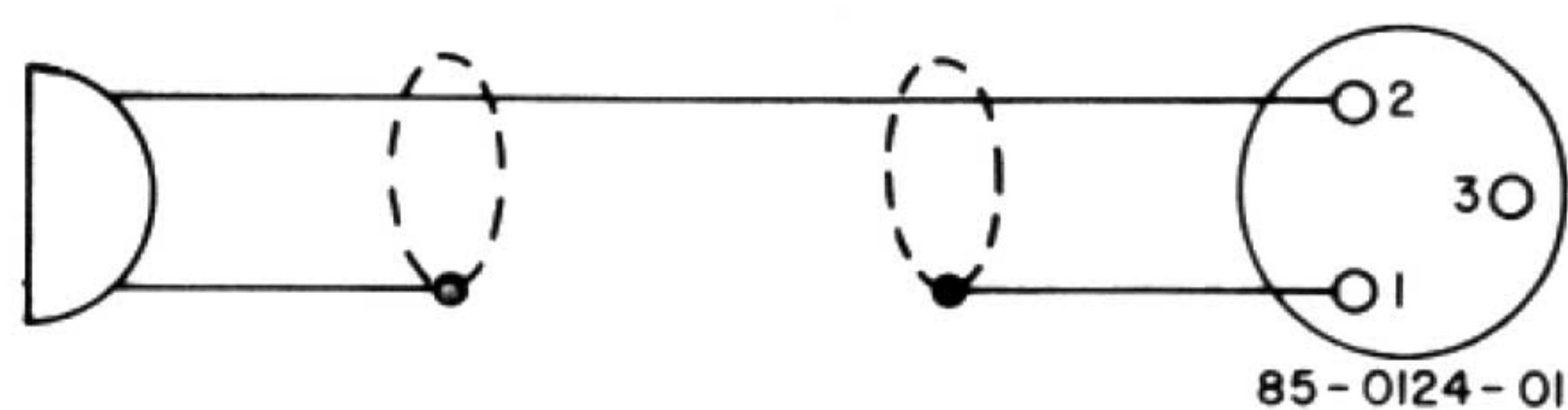


Figure 6a — Connecting Hi-Z Microphone

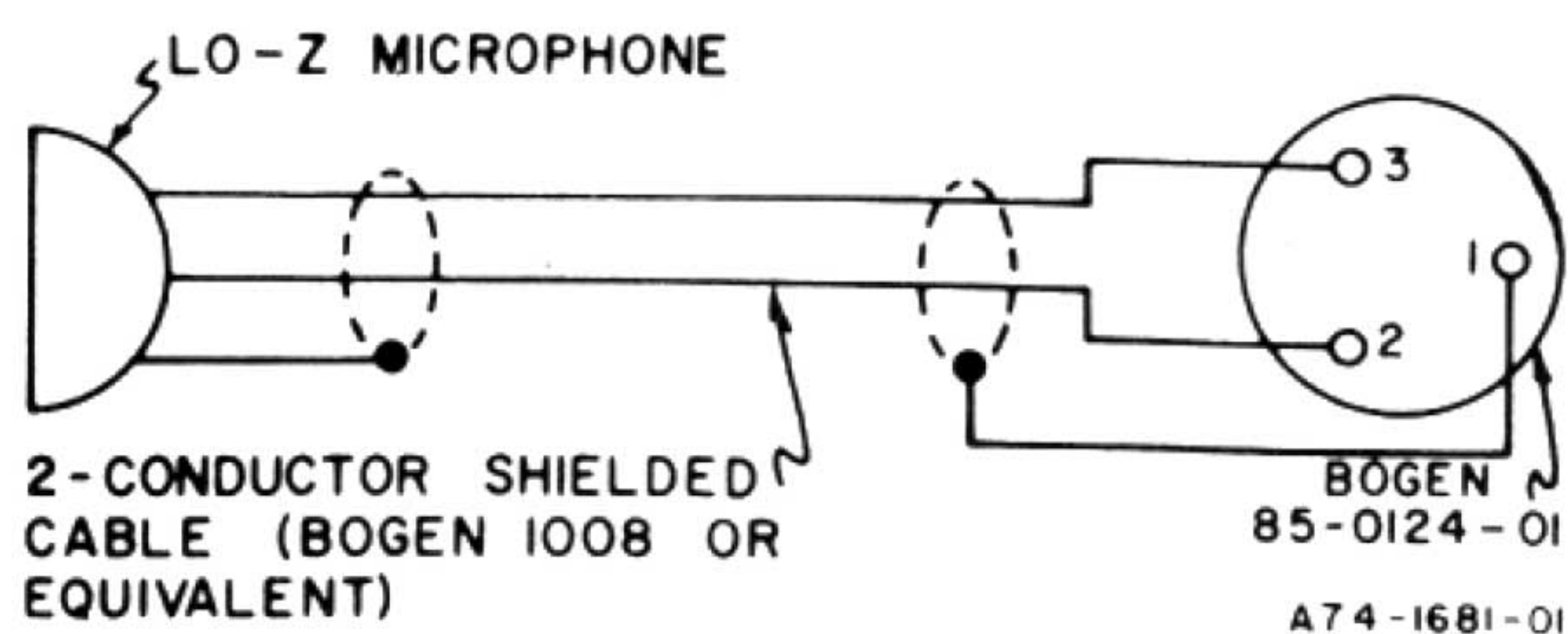


Figure 6b — Connecting Lo-Z Microphone

LO Z MICROPHONE. A low-impedance microphone may be connected to the receiver by installing a Bogen low-impedance microphone transformer (available as an optional accessory). Transformers available are the Model TM500 (500Ω), TM200 (200Ω), and TM50 (50Ω). Install the transformer as follows:

WARNING

Removing the cover presents an electrical shock hazard. Only a qualified technician should perform this installation.

- 1) Remove receiver cover.
- 2) Remove jumper between pins 7 and 8 of transformer socket on preamp board A2.
- 3) Install TM microphone transformer in socket.
- 4) Connect microphone as shown in figure 6b.

MICROPHONE PRECEDENCE. The microphone program can take precedence locally, by pulling out the MICROPHONE switch, or remotely by operating a switch connected across the MIC PREC SWITCH terminals on the rear of the Model RM300. The switch on the microphone may be used if it is a double-pole type or if an extra pair of leads for controlling an external circuit is available (such as on the Shure 450 microphone).

PAGING INPUT. The TQ/TSL INPUT jack on the rear panel may be used to permit paging from TQ/TSL telephones or from IE/IM intercoms. The telephone and intercom systems are available from Bogen as optional accessories. To connect any of these systems, remove the internal jumper as directed below and then refer to the applicable installation instructions and drawing.

Removing Internal Jumper

WARNING

Removing the cover presents an electrical shock hazard. Only a qualified technician should perform this installation.

Remove RM300 cover and cut the wire jumper between the TAPE OUT and the TQ/TSL jacks (see figure 7). Replace cover and connect cables as shown in figure 8 or figure 9.

TQ/TSL PHONE. The use of a TQ-6A or TQ-12A phone requires installation of a Bogen TRA Paging Adapter (see figure 8a). The TSL-8 or TSL-16 phone requires a TRC Adapter (see figure 8b). These adapters permit the telephone page to override all other inputs to the RM300.

IE/IM INTERCOM. The use of a Series IE-7, IE-13, IM-9, or IM-17 intercom requires installation of a Bogen TBR-1 Paging Relay which allows the intercom page to override all other inputs to the RM300. After removing the jumper in the RM300, connect the RM300 to the TBR-1, as shown in figure 8c. If desired, one or more speakers may be wired

to provide page replies back to the intercom system. These speakers must present an impedance of approximately 500Ω across the SPKR and COM terminals of the TBR-1, as shown in the figure. Speakers wired for page reply will receive pages from any intercom master but will not receive program output from the RM300.

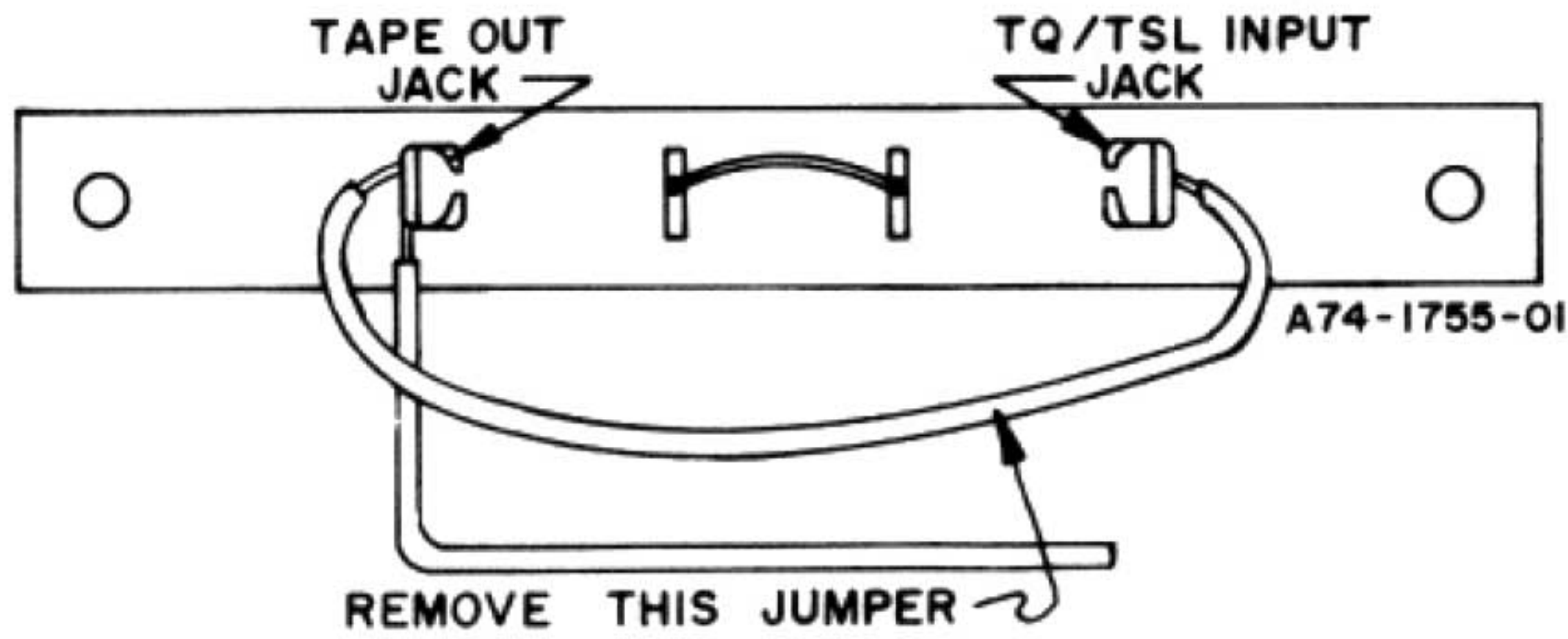


Figure 7 — Modifying RM300 for Telephone or Intercom Paging

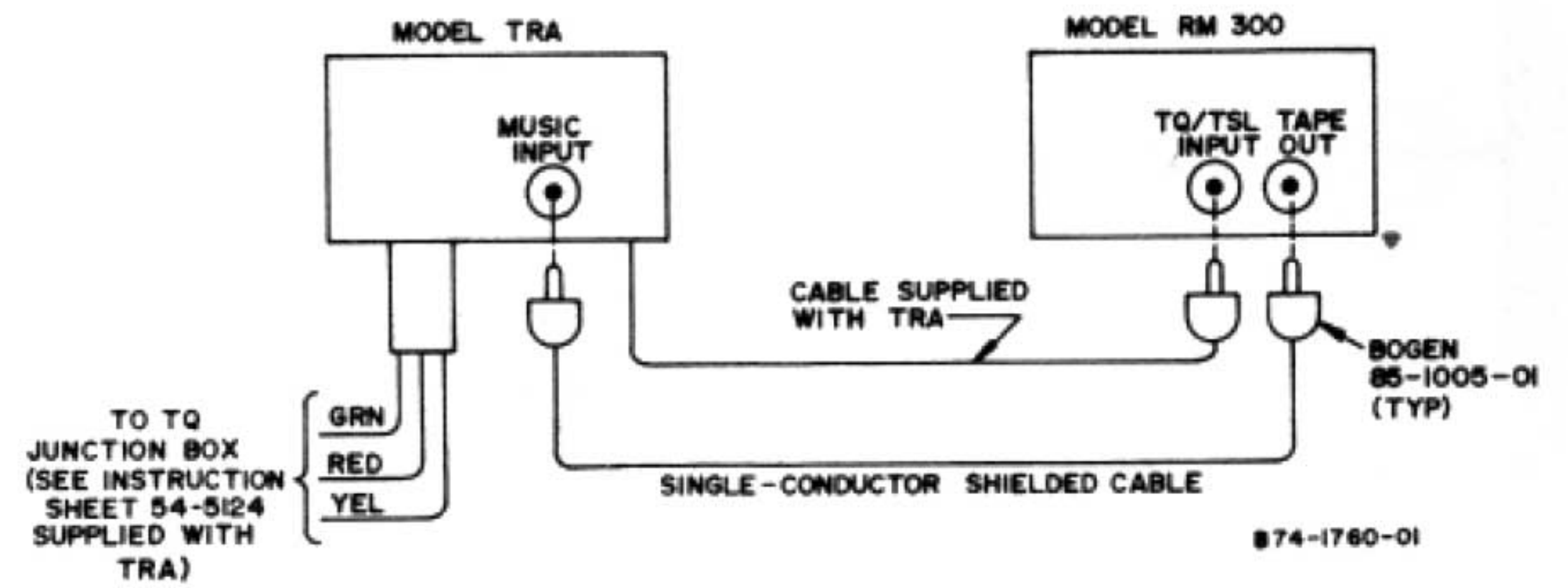


Figure 8a — Connecting to TQ-6A/TQ-12A Telephone System

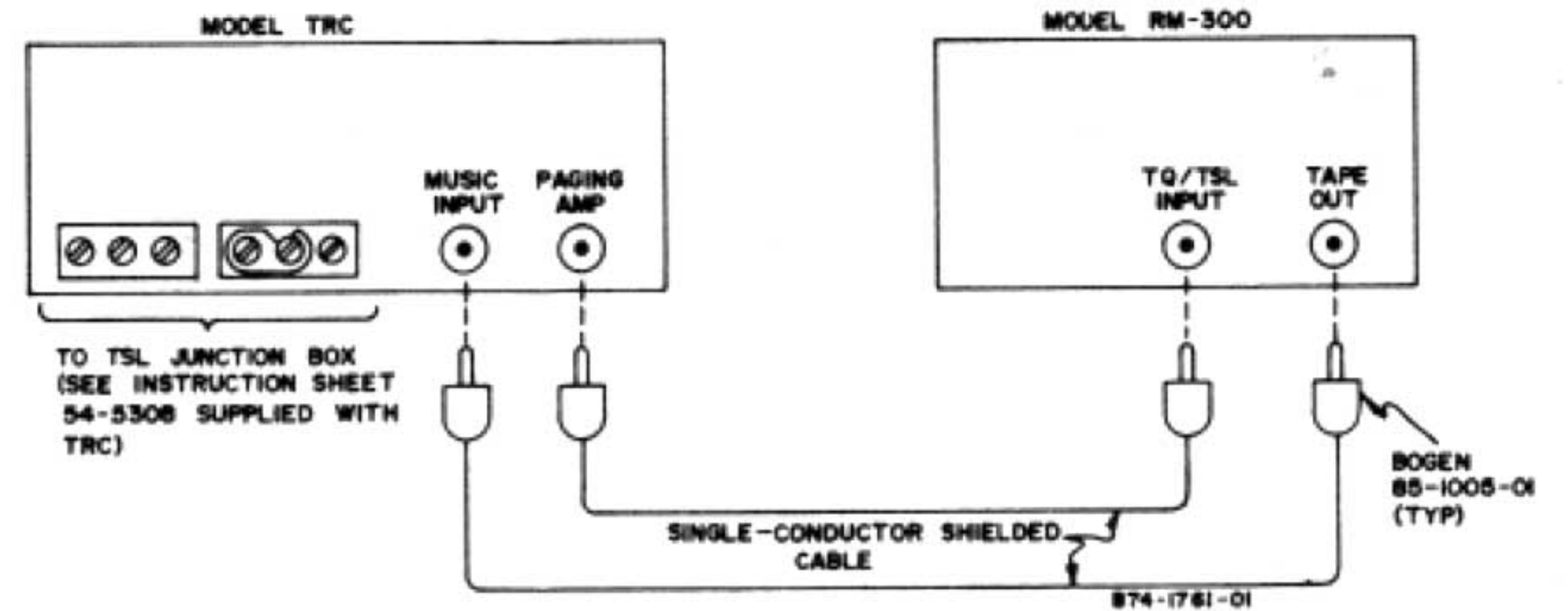


Figure 8b — Connecting to TSL-8/TSL-16 Telephone System

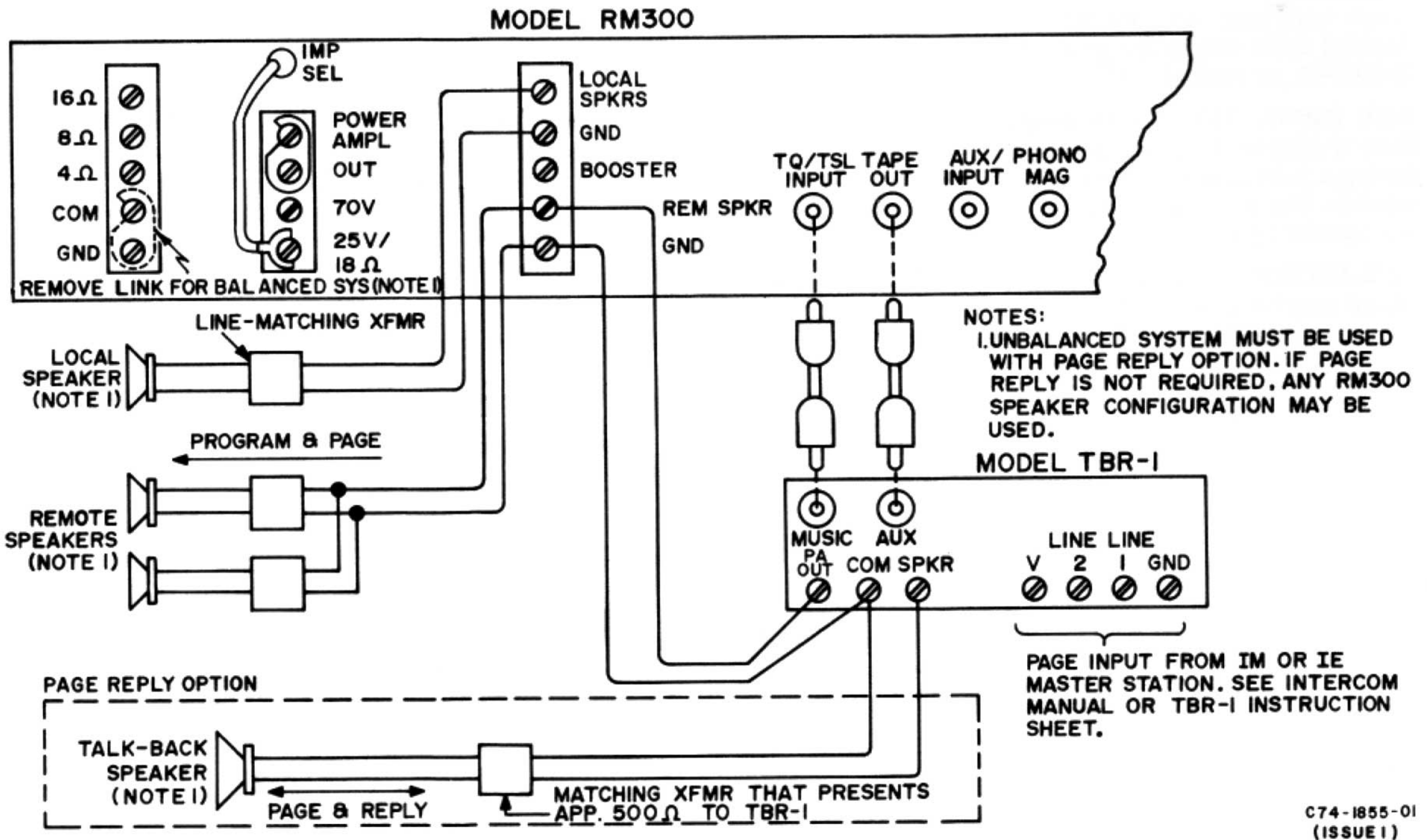


Figure 8c — Connecting RM300 to Model TBR-1 for Intercom Paging

AUDIO OUTPUTS

CABLES. Low-impedance speakers may be connected with flexible line cord (zip cord) for distances up to 100 feet, or with unshielded twisted pair (Bogen Type 1401S, or equivalent)

SPEAKERS. There are three terminal strips on the rear of the Model RM300 that permit connections to conventional 4, 8, or 16-ohm speakers, or to 25 V or 70 V constant-voltage distribution systems. Refer to the paragraph applicable to your application.

4, 8, 16 Ω Speakers

1) Connect IMP SEL lead to terminal of left-hand strip that corresponds to impedance of your speaker. Figure 9 shows the impedance connection for a 4 Ω speaker and figure 10 shows the connection for an 8 Ω speaker.

2) Connect one speaker lead to either LOC or REM terminals on the second strip. This depends upon whether you want the speaker to operate from the LOCAL or REMOTE position of the speaker selector switch. Connect the other speaker lead to GND. Figure 9 shows a 4 Ω speaker connected for local operation, while figure 10 shows an 8 Ω speaker connected for remote operation.

3) Note the shorting strap between the COM and GND terminals in figures 9 and 10. This is the standard condition for unbalanced lines with one line grounded. If you wish to use two-conductor shielded cable, remove the straps and connect the cable shield to GND. In this case, connect the speaker wire to COM, not to GND.

25 V or 70 V Systems

NOTE

Refer to the "SPEAKER INSTALLATION" sheet (Bogen Publication 54-5001) for further details on constant-voltage systems.

1) Figure 11 shows how to connect to a 25 V constant-voltage system. The speaker leads may be connected to REM or LOC, as required.

2) Figure 12 shows how to connect to a 70 V constant-voltage system. The speaker lead may be connected to REM or LOC, as required.

Direct Output

For special applications where extremely low distortion is required, the audio power may be tapped before the output transformer. To do this, remove the link between the top two terminals of the PWR AMPL OUT terminal strip. Connect a low-impedance speaker (4-8 ohms) having adequate power handling capability between the two top terminals.

TAPE OUTPUT. The TAPE OUT jack may be used to record programs from the receiver. To do this, connect the input of a tape recorder to the jack, using a single-conductor shielded cable terminating in a standard phono plug.

BOOSTER OUTPUT. If more output power is required than the 35 watts delivered by the RM300, the booster output may be applied to the auxiliary input of a standard PA amplifier or the Hi-Z input of a booster amplifier. The booster output is under control of the tone (Bass/Treble) controls and the Volume Control and will provide a maximum of 5V to a high-impedance input.

To use the booster output, connect a single-conductor shielded cable from the Booster terminal of TS103 (see figure 17) to the PA or booster amplifier. Ground the cable shield to one of the GND terminals on the strip. With this arrangement, the RM300 may continue to be loaded to its full power and the booster amplifier may also be simultaneously loaded to its rated output.

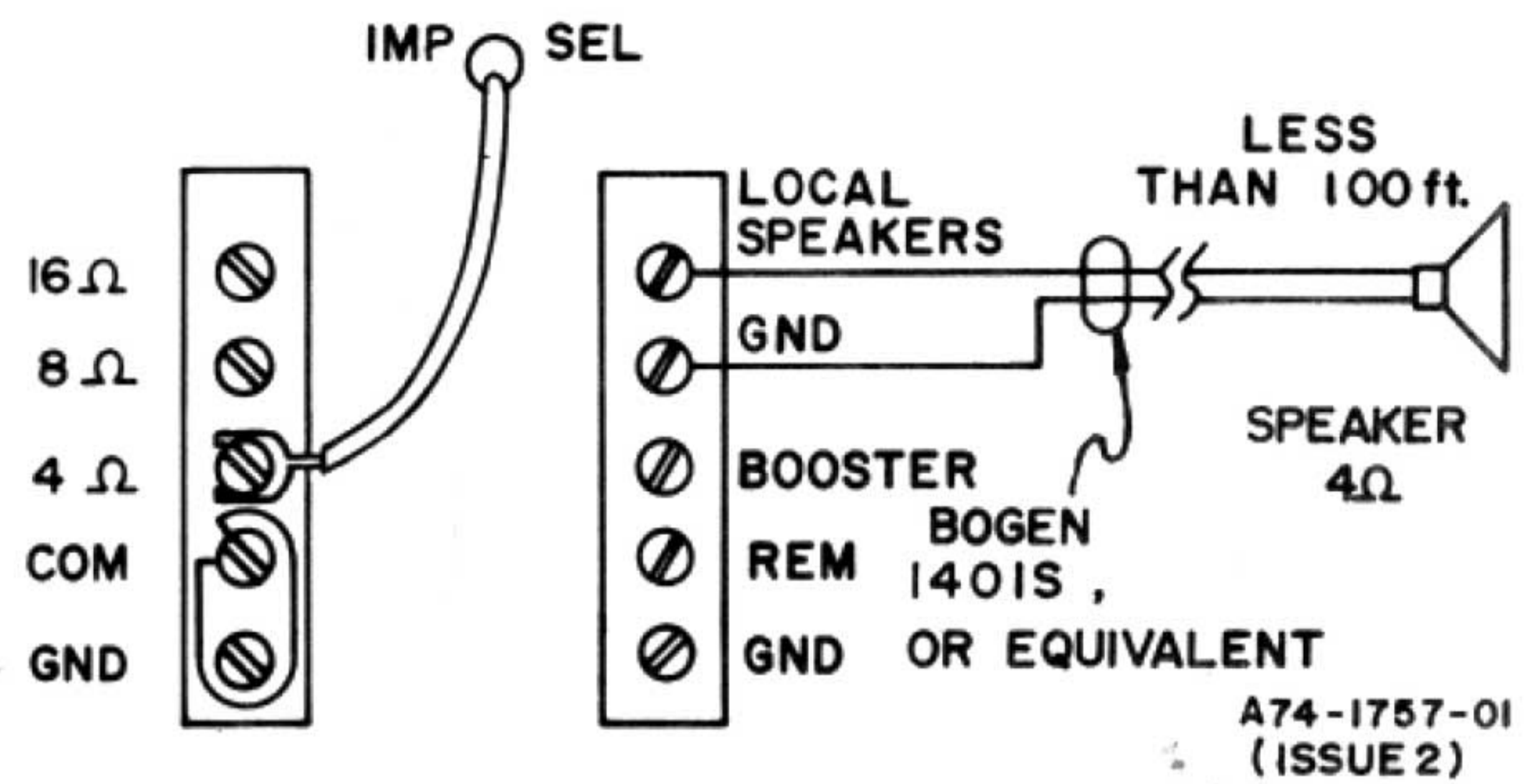


Figure 9 — Matching 4Ω Local Speaker

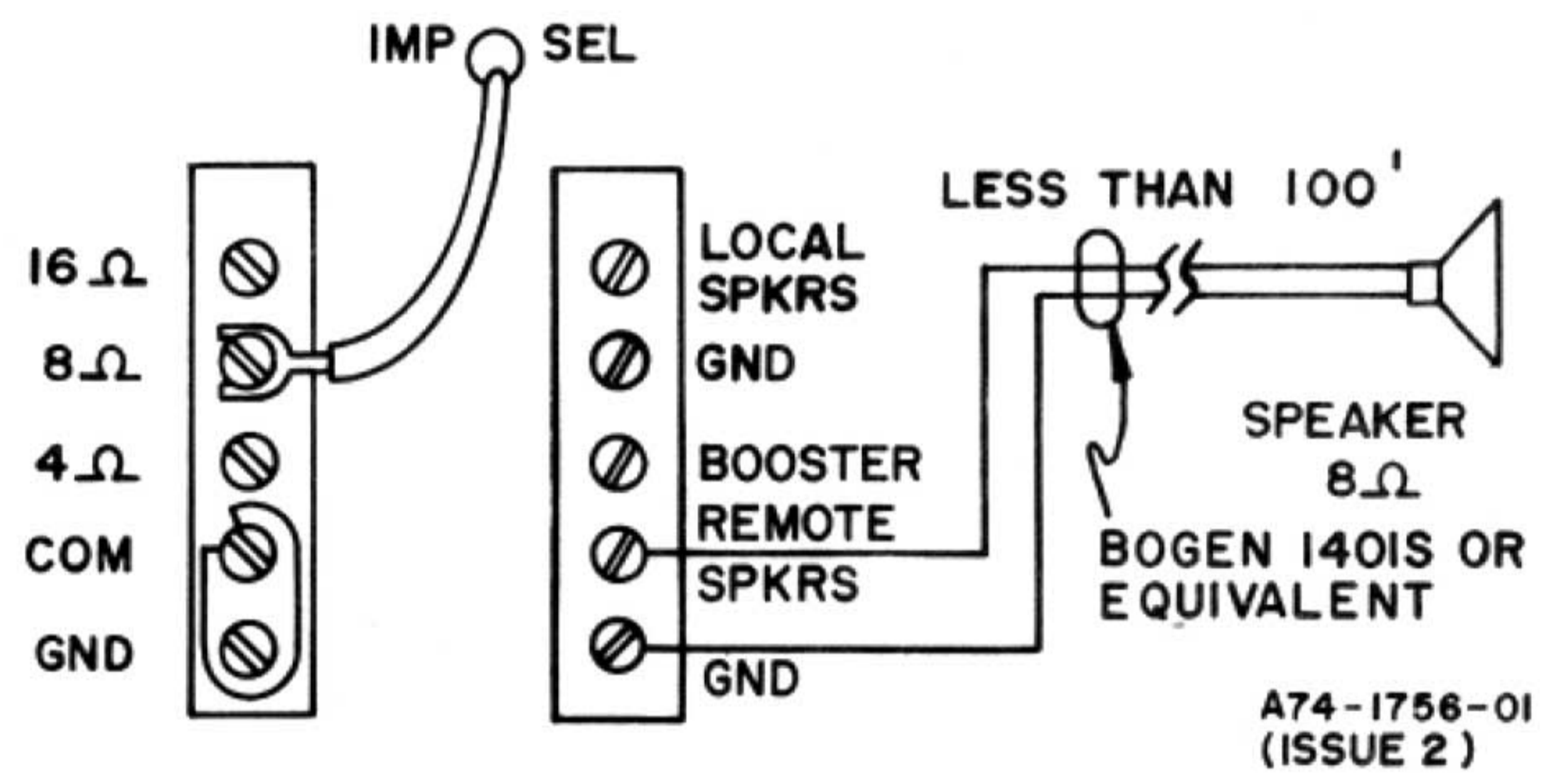


Figure 10 — Matching 8Ω Remote Speaker

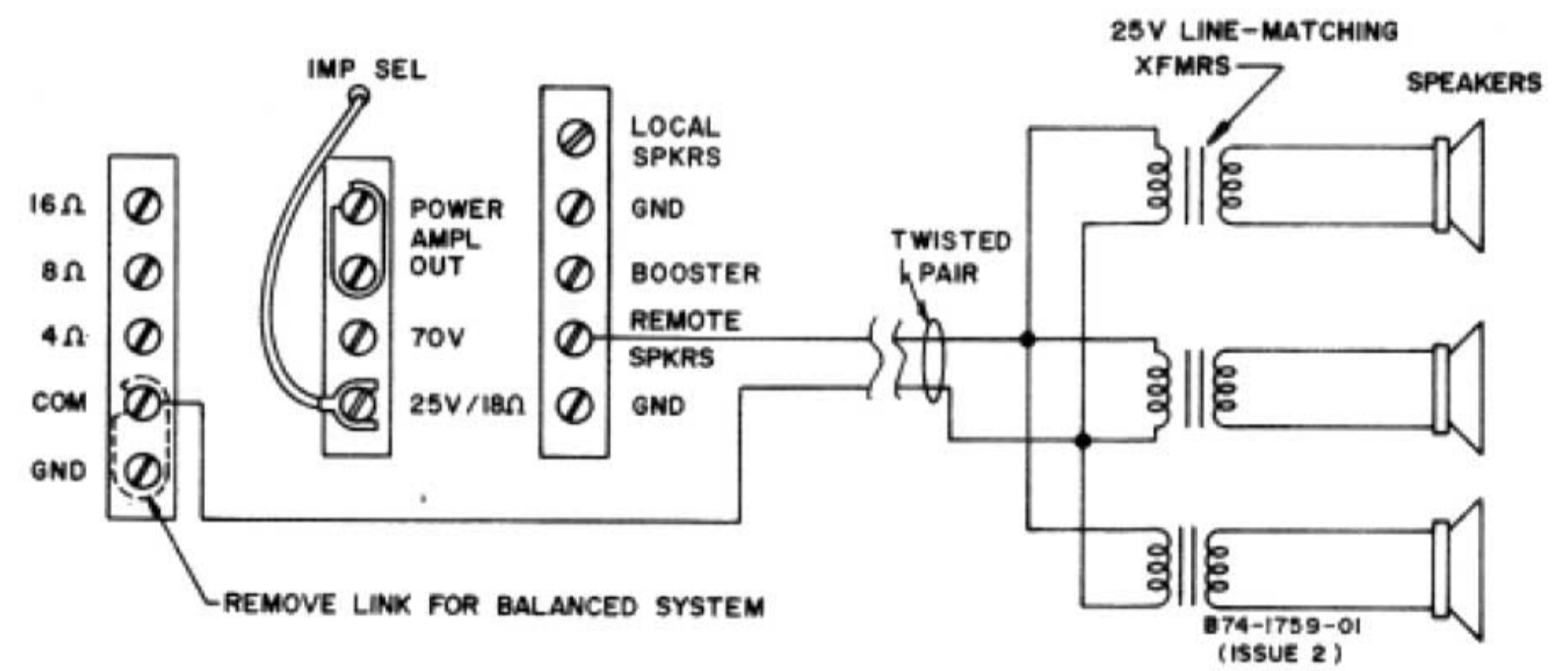


Figure 11 — Matching 25V Constant-Voltage System

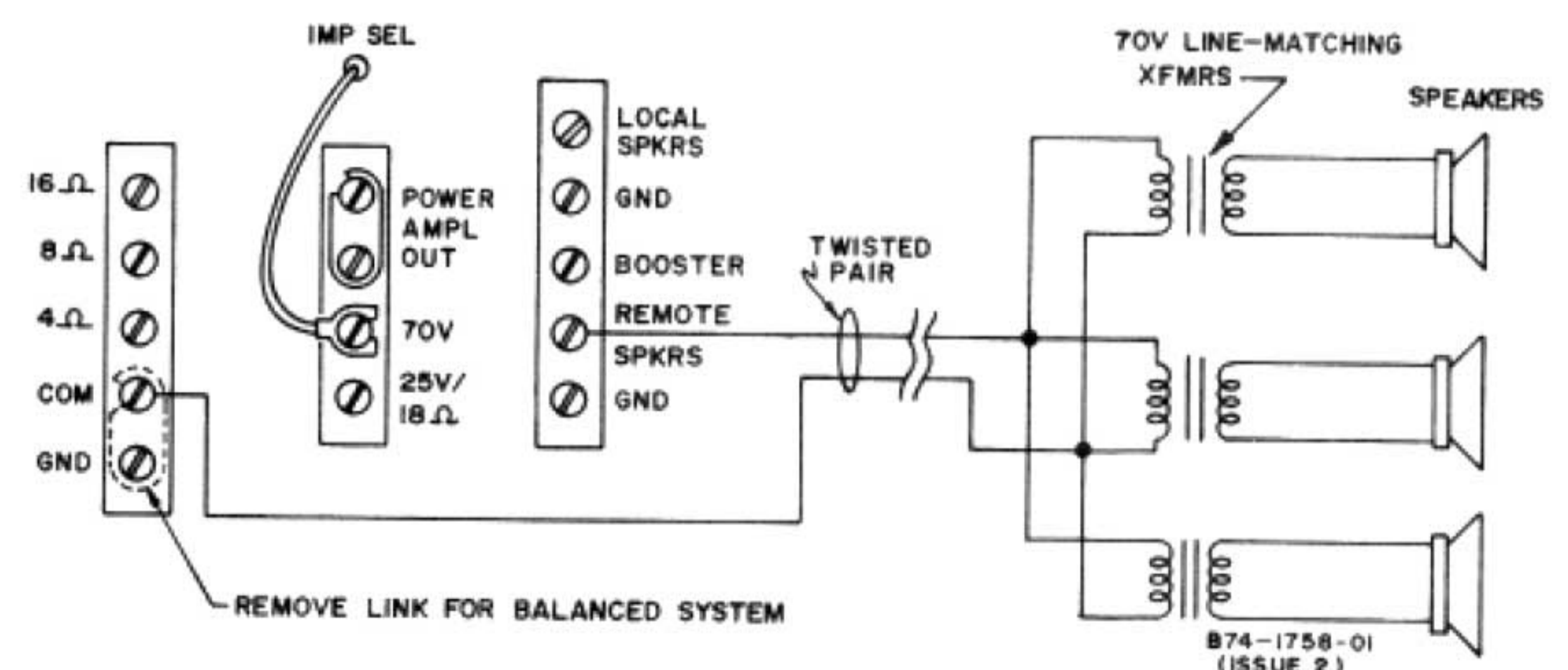


Figure 12 — Matching 70V Constant-Voltage System

MAINTENANCE

WARNING

There are no user serviceable parts inside the unit and removal of the dust cover presents an electrical shock hazard. Interior servicing should be attempted only by a qualified technician.

ROUTINE SERVICE

FUSE REPLACEMENT. 1-ampere and 2-ampere slo-blo fuses are mounted on the rear panel. If the dial lamps are lighted but there is no power amplifier output, check the 1-ampere fuse. If the receiver is dead but there is power at the auxiliary output on the rear of the unit, check the 2-ampere fuse. Use the proper rated fuse for replacement. If a replacement fuse blows, have an experienced technician or Bogen representative check the unit.

REPLACING DIAL LAMPS. Remove front panel by pulling off all knobs and removing two Phillips-head screws. Replace lamps with 6.3 V No. 12 bulb (Bogen Part No. 94-0175-01).

DIAL CORD RESTRINGING. Refer to figure 13 and proceed as follows:

- Remove front panel by pulling off knobs and removing two Phillips-head screws.
- Connect dial cord at drum hook marked **START** in diagram.
- String dial around nylon pulleys and tuning shaft to drum hook marked **FINISH** in diagram. Make certain cord winds around tuning shaft from rear toward front, as shown.
- Attach end of cord with tension spring, making certain

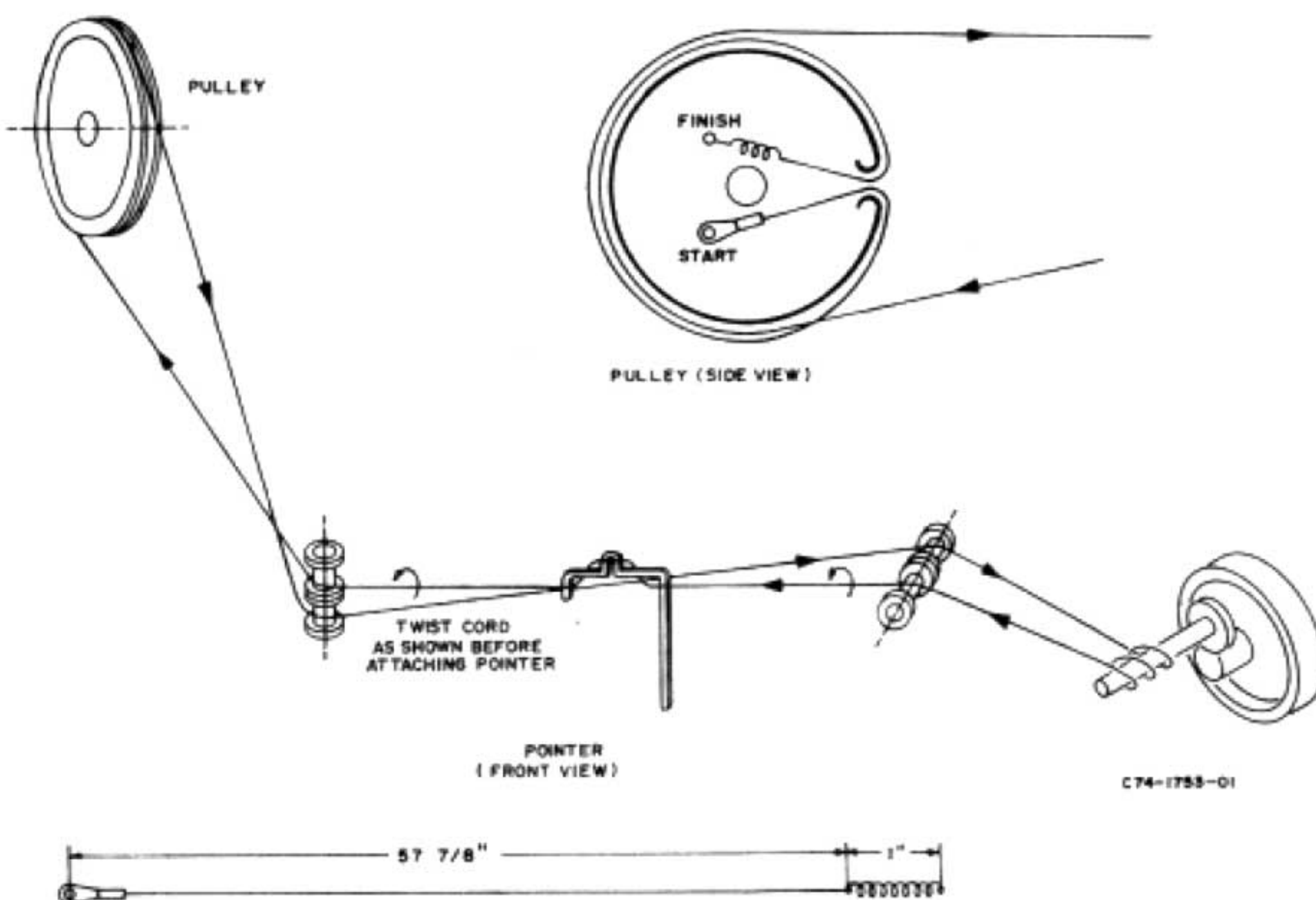


Figure 13 — Dial Stringing Diagram

that spring applies enough pressure to prevent cord from slipping.

- Tune in a known station and attach dial pointer at proper position. Before securing pointer, twist cord as shown in diagram so cord will exert a slight pressure toward panel bracket and away from dial glass.

ALIGNMENT

The following instruments (or equivalent) are required for a complete alignment of the receiver.

DC VTVM, RCA WV98-C

AC VTVM, HP 400D

AM Signal Generator, Measurements Corp 65-B

FM Sweep Generator, Measurements Corp 88 or Boonton Radio Corp 202H

AM Alignment

To completely align the AM section, start with the last AM IF transformer and work back toward the antenna. In order to limit the effect of the AGC circuit, continually reduce the generator signal level to the minimum required for an output indication. Make the adjustments listed in Table I. See figure 16 for location of alignment adjustments.

FM Alignment

To align the FM section, connect the dummy antenna as shown in figure 14 and follow the procedure given in Table II. See figure 16 for location of adjustments.

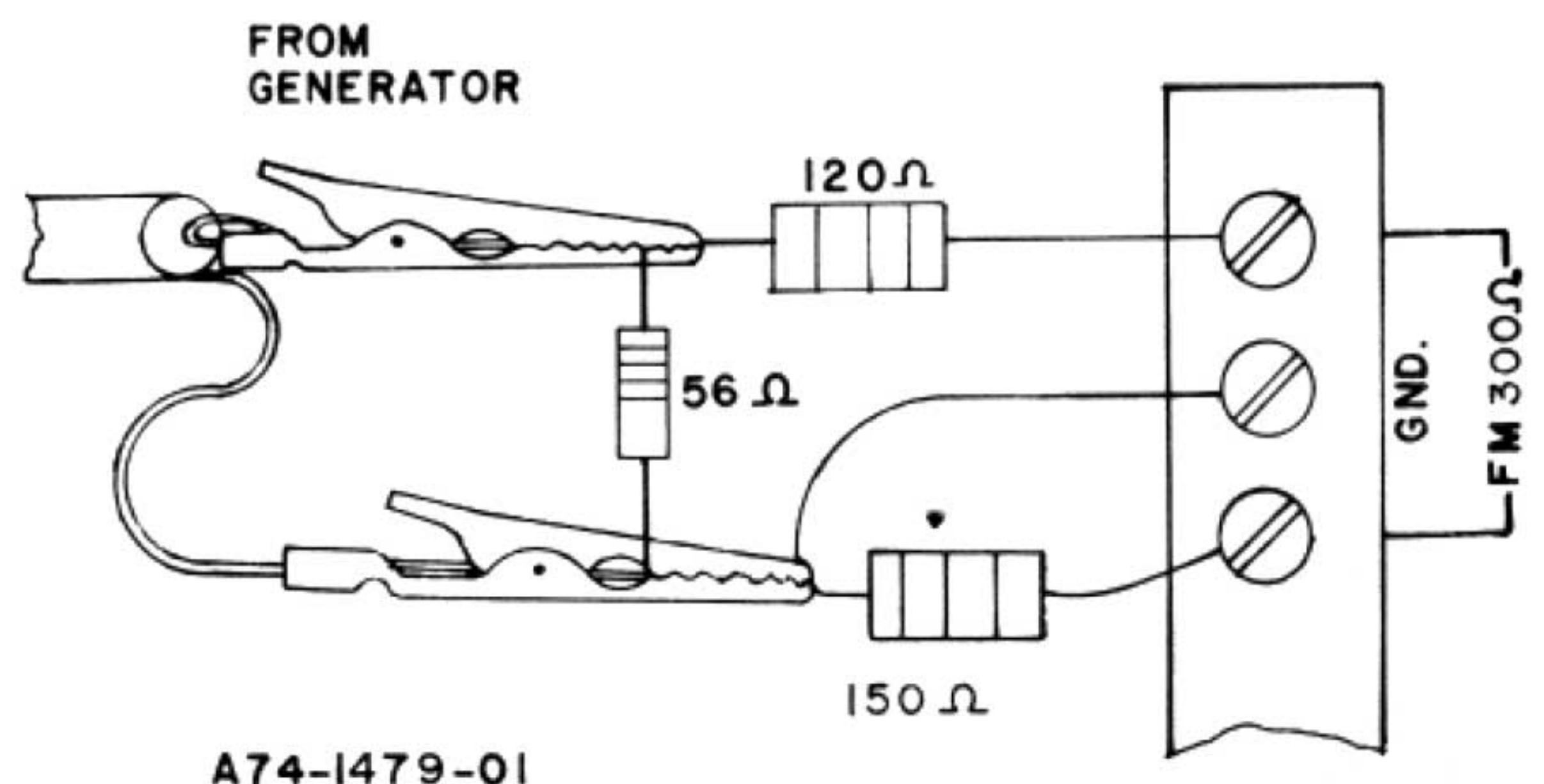


Figure 14 — Dummy Antenna for FM Alignment

TABLE I – AM ALIGNMENT CHART (See Figure 16)

Step	Band & Dial Setting	Generator	Signal Input	Indicator & Connection	Adjustment
1	Pointer at extreme right end of dial.	Freq. 455 kHz 30% mod at 400 Hz Output level 5 uV max.	Thru .05uF capacitor to pin 22.	dc VTVM & oscilloscope at pin 2.	Adjust T2, T3, & FL-3 for max indication on meter. As a gain check, input should be less than 4 uV for an output 0.5 Vdc above noise.
2	Same as Step 1.	Freq. 1640 kHz 30% mod at 400 Hz. Output level 500 uV max.	AM EXT ANT terminals.	Same as above.	Adjust AM OSC TRIM for max indication on meter. Keep dc output level 0.5 V above noise by reducing generator output level.
3	Pointer at extreme left end of dial.	Freq. 535 kHz 30% mod at 400 Hz. Output level 500 uV max.	Same as Step 2.	Same as above.	Adjust T1 for max indication on meter. Keep dc output level 0.5 V above noise.
4	Repeat Steps 2 & 3 above, until all outputs are peaked at the proper freq.				
5	Pointer at 1420 kHz.	Freq. 1420 kHz 30% mod at 400 Hz. Output level 500 uV max.	Same as Step 2	Same as above.	Adjust AM ANT TRIM for max indication on meter. Keep output level 0.5 Vdc above noise.
6.	Pointer at 600 kHz.	Freq. 600 kHz 30% mod at 400 Hz. Output level 500 uV max.	Same as Step 2.	Same as above.	Adjust AM ANT coil (L103) for max indication on meter. Keep output level 0.5 Vdc noise.
7	Repeat Steps 5 & 6 above, until there is satisfactory tracking at both frequencies.				

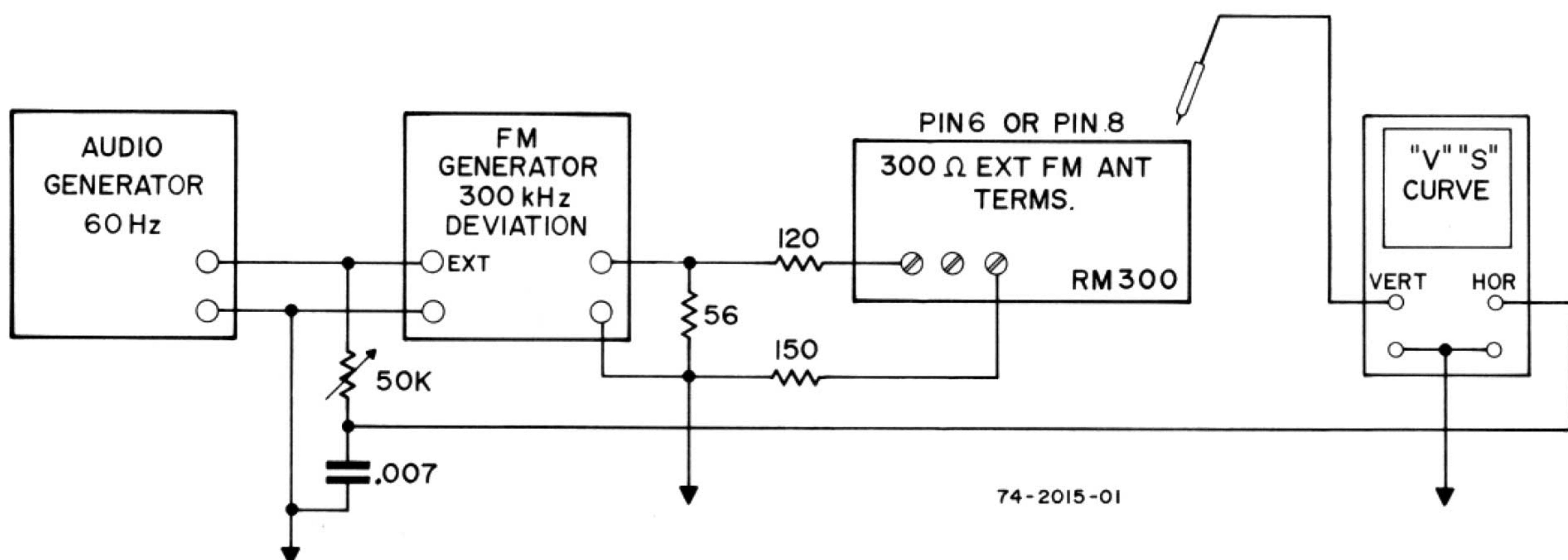


Figure 15 – Test Equipment Connections for FM Alignment

TABLE II – FM ALIGNMENT CHART (See Figure 16)

Step	Band & Dial Setting	Generator	Signal Input	Indicator & Connection	Adjustment
1	Pointer at extreme left end of dial.	Freq. 87.5 MHz FM mod at 60 Hz Deviation 300 kHz Generator output 10 uV (See figure 15)	Thru dummy ant. (figure 14) to FM 300 Ω.	Oscilloscope at pin 6.	Adjust T4 & FM IF XFMR (in tuner) for max gain and symmetry but not over peak V curve.
2	Same as above.	Same as above.	Same as above.	Oscilloscope at pin 8.	Adjust T5 top slug for max symmetry S curve. (Readjust T4 for symmetry if necessary.) Adjust T5 bottom slug for max linearity.
3	Off station.	OuV	Same as above.	Same as above.	Meter should read zero at noise level. If not, adjust T5 top slug for zero reading.
4	Repeat Steps 1 thru 3 until all are properly aligned.				
5	Pointer at extreme left end of dial.	Freq. 87.5 MHz FM mod at 60 Hz Deviation 300 kHz Generator output 10 uV.	Same as above.	Oscilloscope at pin 6.	Adjust FM OSC coil for max gain (peak V curve).
6	Pointer at extreme right end of dial.	Freq. 108 MHz FM mod at 60 Hz Deviation 300 kHz Generator output 10 uV.	Same as above.	Same as above.	Adjust FM RF TRIM for max gain (peak V curve).
7	Repeat Steps 4 thru 5 until both ends are properly tuned.				
8	Pointer at 106 MHz.	Freq. 106 MHz FM mod at 60 Hz Deviation 300 kHz Generator output 10 uV.	Same as above.	Same as above.	Adjust FM ANT TRIM & RF TRIM for max gain.
9	Pointer at 90 MHz.	Freq. 90 MHz FM mod at 60 Hz Deviation 300 kHz Generator output 10 uV.	Same as above.	Same as above.	Adjust FM ANT coil & RF coil for max gain.
10	Repeat Steps 8 & 9 until there is satisfactory tracking at both frequencies.				
<u>FM MUTING CHECK</u>					
11	Pointer at 90 MHz.	Freq. 90 MHz FM mod at 75 kHz Deviation at 400 Hz Generator output 20 uV.	Same as above.	ac VTVM and oscilloscope at TP 6.	Record ac output level on VTVM.
12.	Same as Step 11.	Same as Step 11.	Same as Step 11.	Same as Step 11.	Set Selector to FM MUTE. Reading at TP6 should drop about 3 db. If required, adjust MUTE ADJ (R90) for proper reading.

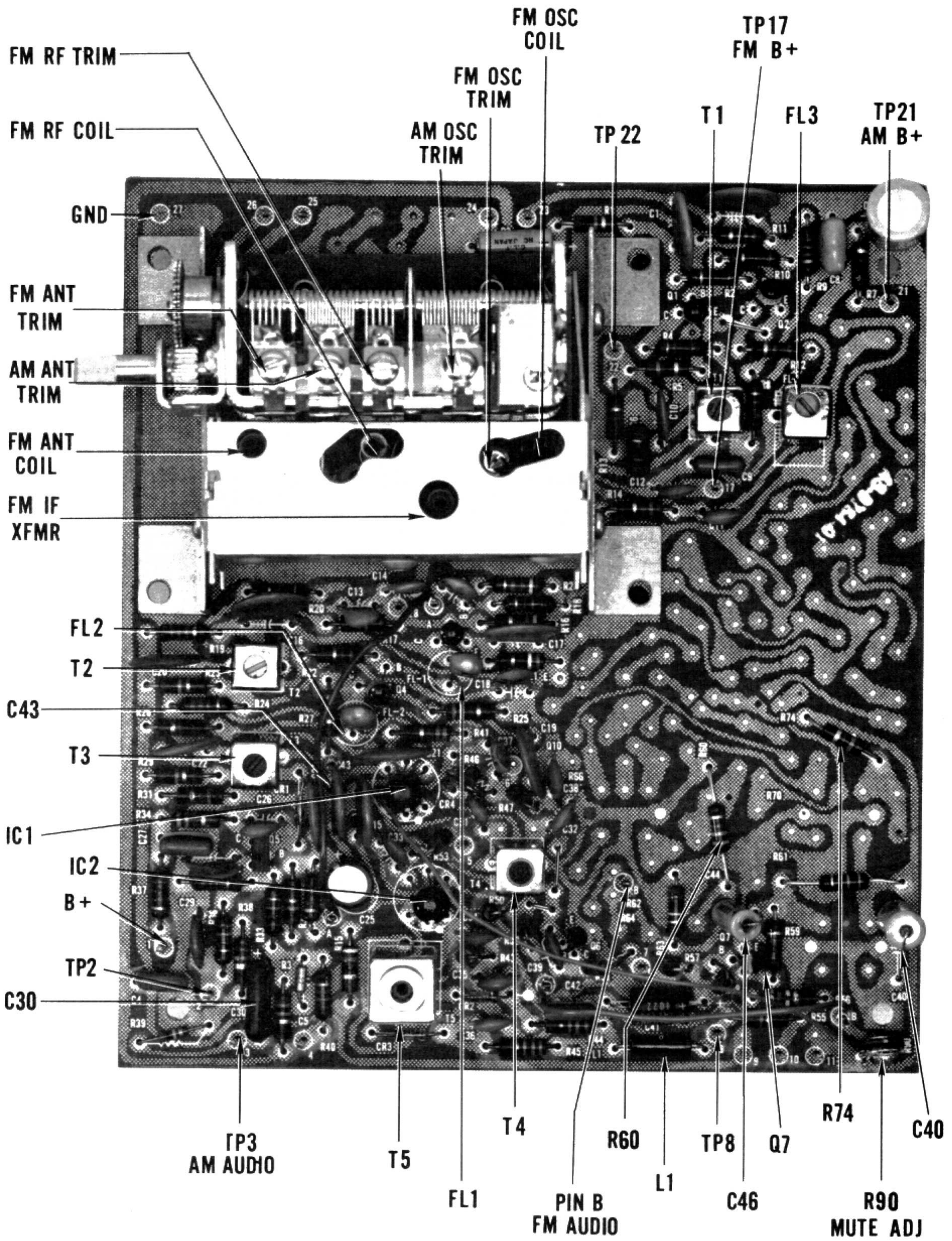
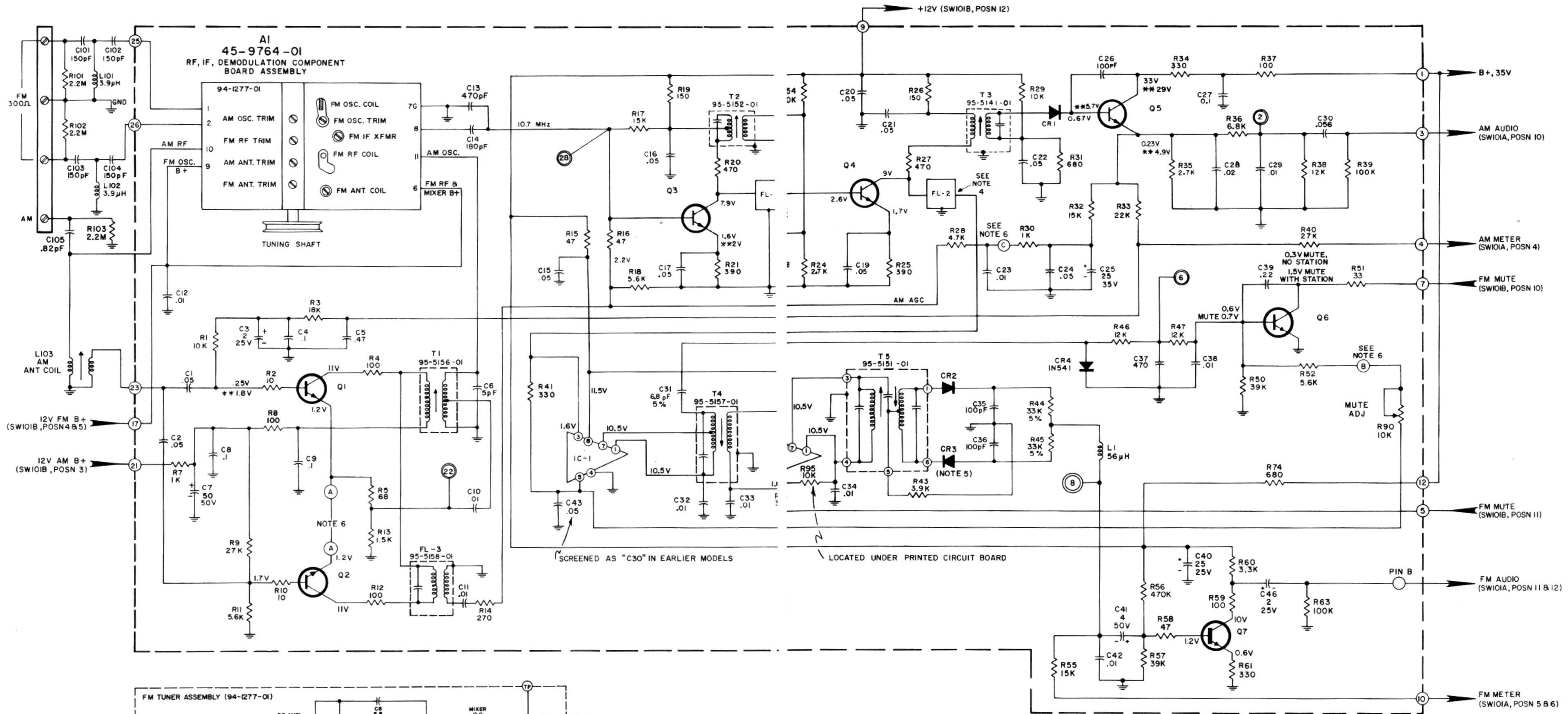


Figure 16 – Alignment Adjustments and Test Points



- NOTES**
- UNLESS OTHERWISE SPECIFIED
- 1.) ALL RESISTORS ARE 1/2W, ±10%. ALL CAPACITORS ARE IN MFD.
 - 2.) ALL VOLTAGES ARE +DC REFERRED TO CHASSIS GROUND WITH NO SIGNAL.
* INDICATES VOLTAGES WHEN SET IS RECEIVING FM BROADCAST.
** INDICATES VOLTAGES WHEN SET IS RECEIVING AM BROADCAST.
 - 3.) ALL Ⓞ REPRESENT TEST POINTS.
 - 4.) CERAMIC FILTER, FREQUENCY (MHz) AS PER THE FOLLOWING COLOR CODE:
BLACK (10.64), RED (10.70), ORANGE (10.73), YELLOW (10.80), GREEN (10.60), BLUE (10.67), WHITE (10.75).
 - 5.) CR2 AND CR3 ARE A MATCHED PAIR.
 - 6.) JUMPER WIRES ON BOARD.

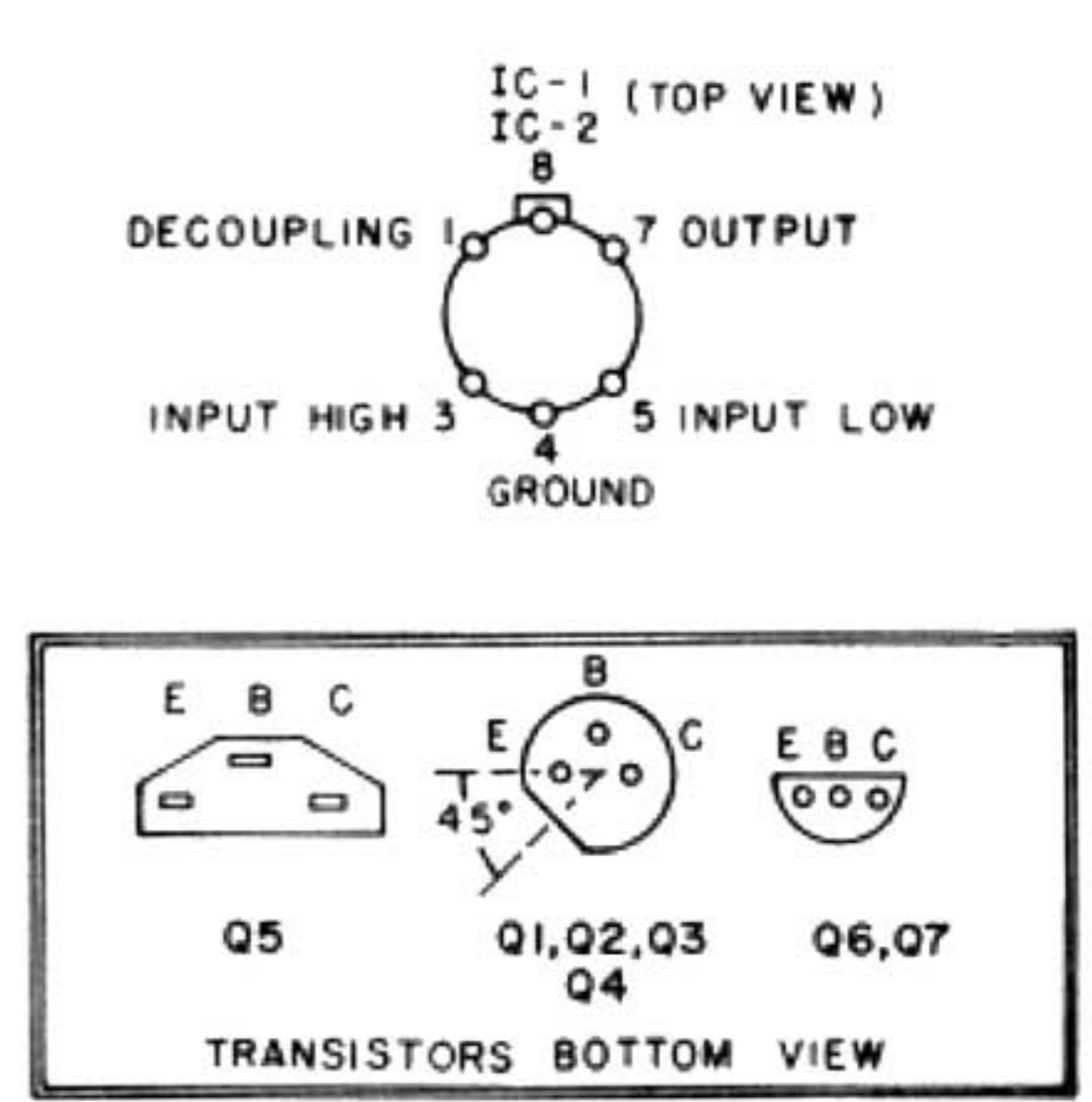


Figure 17 - Model RM300 RF, IF Section, Schematic Diagram

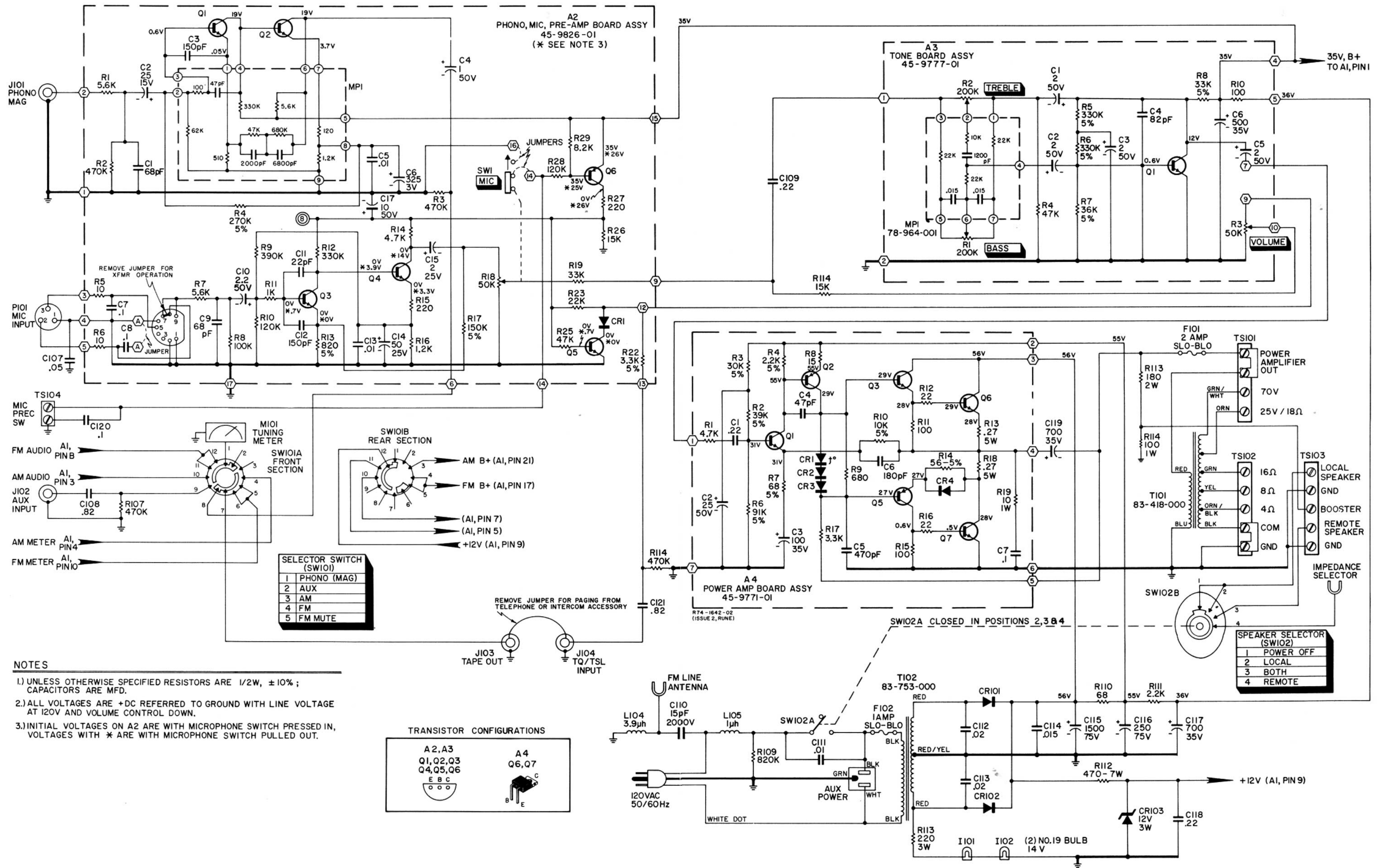


Figure 18 - Model RM300, Audio and Power Supply Section, Schematic Diagram

REPLACEMENT PARTS

Most components used in the Model RM300 are available through all reputable parts jobbers. The parts listed here are available from Bogen distributors, service agencies or directly from the factory. When replacing transistors use those supplied by the specified manufacturer. Replacements from other suppliers may not give satisfactory performance.

When ordering parts from Bogen, specify the part number and description, as listed below. Also give the Model RM300 and the Series designation, which is a letter followed by numbers stamped or screened on rear of the chassis. When ordering a part for the PC Board, also give the PC Board component number (45-).

Ref. No.	Part No.	Description
A1	45-9764-01	RF, IF Component Board Assy, Complete
C3	79-005-044	Capacitor, Electrolytic, 2 μ F, 25 V
C6	78-209-001	Capacitor, 5pF, 500 V
C7	79-008-057	Capacitor, 50 μ F, 50 V
C13	78-221-121	Capacitor, 470pF
C14	78-221-116	Capacitor, 180pF
C25	79-008-051	Capacitor, 25 μ F, 35 V
C26	78-221-113	Capacitor, 100pF
C30	78-014.154	Capacitor, .056 μ F, 250 V
C31	78-201-099	Capacitor, 6.8pF, 5%
C35, 36		(Same as C26)
C37		(Same as C13)
C40	79-005-049	Capacitor, Electrolytic, 25 μ F, 25 V
C41	79-005-055	Capacitor, Electrolytic, 4 μ F, 50 V
C46		(Same as C3)
CR1, 4	96-5093-02	Diode, 1N541
CR2, 3	96-5093-01	Diode, 1N542, Matched Pair
FL-1, 2	78-959-001	Ceramic Filter, FM IF (Specify Color Code)
FL-3	95-5158-01	Mechanical Filter, 455 kHz
IC-1	96-5238-02	Integrated Circuit, 1st FM IF
IC-2	96-5238-01	Integrated Circuit, 2nd FM IF
L1	95-5146-01	Coil, Choke, 56 μ H
MP1	94-1277-01	FM Tuner Assembly
Q1, 2	96-5221-01	Transistor, 2N5127
Q3, 4	96-5334-01	Transistor, (Fairchild)
Q5	96-5237-01	Transistor, BC147B (Telefunken)
Q6, 7	96-5213-01	Transistor, 2N5089 (Motorola)
R90	77-008-007	Control, Mute Adj., 10 K
T1	95-5156-01	Transformer, AM Oscillator
T2	95-5152-01	Transformer, 1st AM IF
T3	96-5153-01	Transformer, 2nd AM IF
T4	96-5157-01	Transformer, FM IF
T5	96-5151-01	Transformer, FM Discriminator
A2	45-9772-01	Phono, Mic, Preamp Component Board Assy
C2	79-008-037	Capacitor, Electrolytic, 25 μ F, 15 V
C6	79-008-011	Capacitor, Electrolytic, 325 μ F, 3 V
C10	79-008-054	Capacitor, 2 or 2.2 μ F, 50 V

Ref. No.	Part No.	Description
C14	79-008-048	Capacitor, Electrolytic, 50 μ F, 25 V
C15,	79-008-043	Capacitor, Electrolytic, 2 μ F, 25 V
C17	79-008-050	Capacitor, Electrolytic, 10 μ F, 50 V
CR1	96-5242-01	Diode, Stabistor
MP1	78-963-001	Preamp Pac
Q1-Q5	96-5213-01	Transistor, MPS1201/2N5089 (Motorola)
Q6	96-5215-01	Transistor, 2N5087 (Motorola)
		or
	96-5176-01	Transistor, MPS6518 (Motorola)
R18	77-001-708	Volume Control w/mic switch, 50 K Ω
A3	45-9777-01	Tone Component Board Assy
C1-C3	79-008-054	Capacitor, Electrolytic, 2 μ F, 50 V
C4	78-221-112	Capacitor, 82pF
C5		(Same as C1)
C6	79-008-049	Capacitor, Electrolytic, 500 μ F, 35 V
MP1	78-964-001	Tone Pac Unit
Q1	96-5213-01	Transistor, 2N5089 (Motorola)
R1, R2	77-001-695	Bass/Treble Control, 200 K Ω
R3	77-001-697	Master Control, 50 K Ω
A4	45-9771-01	Power Amplifier Component Board Assy.
C2	79-008-056	Capacitor, Electrolytic, 25 μ F, 50 V
C3	79-008-053	Capacitor, Electrolytic, 100 μ F, 35 V
CR1	96-5242-01	Diode, Stabistor
CR2, CR3	96-5022-01	Diode, 50 PIV at 750mA
CR4		(Same as CR1)
Q1	96-5298-01	Transistor, 2N3568 (Motorola)
Q2, Q5	96-5283-01	Transistor, MPS A55 (Motorola)
Q3	96-5290-01	Transistor, MPS A05 (Motorola)
Q6, Q7	96-5232-01	Transistor
R13, R18	76-113-099	Resistor, 0.27 ohms, 5 W

CHASSIS ELECTRICAL PARTS

C105	78-301-104	Capacitor, .82pF,
C110	78-200-100	Capacitor, 15pF, 1400 V
C115	79-009-068	Capacitor, Electrolytic, 1000 μ F, 75 V
C116	79-009-069	Capacitor, Electrolytic, 250 μ F, 75 V
C117, C119	79-005-054	Capacitor, Electrolytic, 700 μ F, 35 V
CR101 CR102	96-5241-01	Diode, 300 PIV, 3A
CR103	96-5250-01	Diode, Zener, 12 V, 3 W
F101	94-0001-06	Fuse, Slo-Blo, 2 A
F102	94-0001-04	Fuse, Slo-Blo, 1 A
I101, I102	94-0197-01	Dial Lamp, No. 19

Ref. No.	Part No.	Description
L101, L102	95-5148-01	Choke, 3.9 μ H
L103	95-5136-02	AM Loopstick Assembly
L104		(Same as L101)
L105	95-5015-01	Choke, 1 μ H
M101	94-1309-01	Meter, Tuning
R112	75-742-741	Resistor, 470 Ω \pm 10%, 7 W
SW101	81-001-631	Switch, Selector, Rotary, 5-Position
SW102	81-001-632	Switch, Speaker Sel., Rotary, 4-Position w/ac switch
T101	83-418-000	Transformer, Output

Ref. No.	Part No.	Description
T102	83-753-000	Transformer, Power
MECHANICAL PARTS		
—	22-5235-01	Cage Assembly
—	12-4503-01	Dial Cord
—	12-4165-01	Dial Glass
—	70-9268-01	Dial Pointer
—	02-9003-08	Dial Spring
—	14-9064-01	Foot, Cage Assembly
—	03-0629-02	Knob, Tuning
—	03-0635-01	Knob

BOGEN SERVICE

We are interested in your Bogen receiver for as long as you have it. If trouble ever develops with your unit, please do not hesitate to ask our advice or assistance. Write to Service Department, Bogen Division, Lear Siegler, Inc., P.O. Box 500, Paramus, New Jersey 07652.

When communicating with us, give the model number and Series designation of your unit. Describe the difficulty encountered and the effects of each operating control has upon the trouble symptoms. Include details on electrical connec-

tions to associated equipment, and list such equipment.

When we receive this information, we will send you service information if the trouble appears to be simple. If the trouble requires servicing, we will send you the name and address of the nearest Bogen authorized service agency to which you can send your unit for repairs.

If shipping your unit, pack it carefully using the original shipping carton, or a similar container and filler material, to prevent damage in transit. Send the unit, fully insured and prepaid, via railway express or United Parcel. *Do not ship via parcel post unless so instructed.*

OWNER'S WARRANTY

Bogen solid state sound and intercom equipment is guaranteed against defects in material and workmanship for one year from the date of sale to the original purchaser, provided that the equipment has not been subjected to abuse or accident or altered in any way. Any part of the equipment covered by this warranty which, with normal installation and use, becomes defective will be repaired or replaced by Bogen, provided the equipment is delivered or shipped prepaid and insured to our authorized service station or to the Bogen Factory Service Department, Route 4 and Forest Avenue, Paramus, New Jersey 07652. The equipment may be picked up by you personally or will be returned to you freight prepaid.

Models containing vacuum tubes carry the same warranty as above, except that it does not apply to the vacuum tubes, which are guaranteed for 90 days.

The registration card enclosed with the equipment must be completed and mailed within five days of purchase to place the warranty in effect.