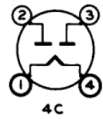


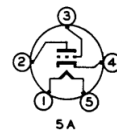
80 tube,
subs are 5Z3



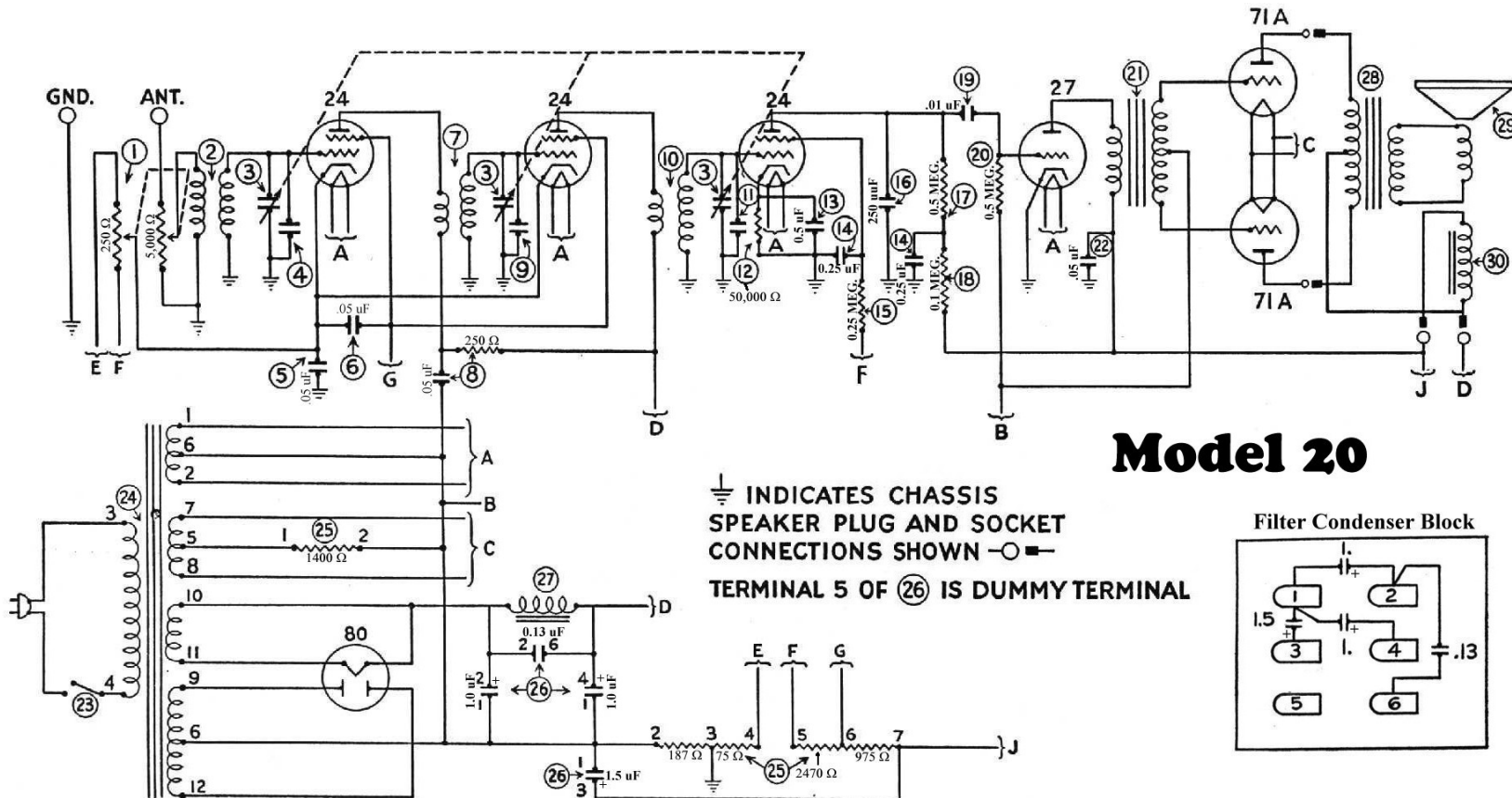
24 tube, subs
are 35 & 51



27 tube,
sub is 56



71A tube,



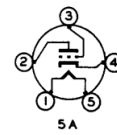
80 tube, subs
are 5Z3 & 83



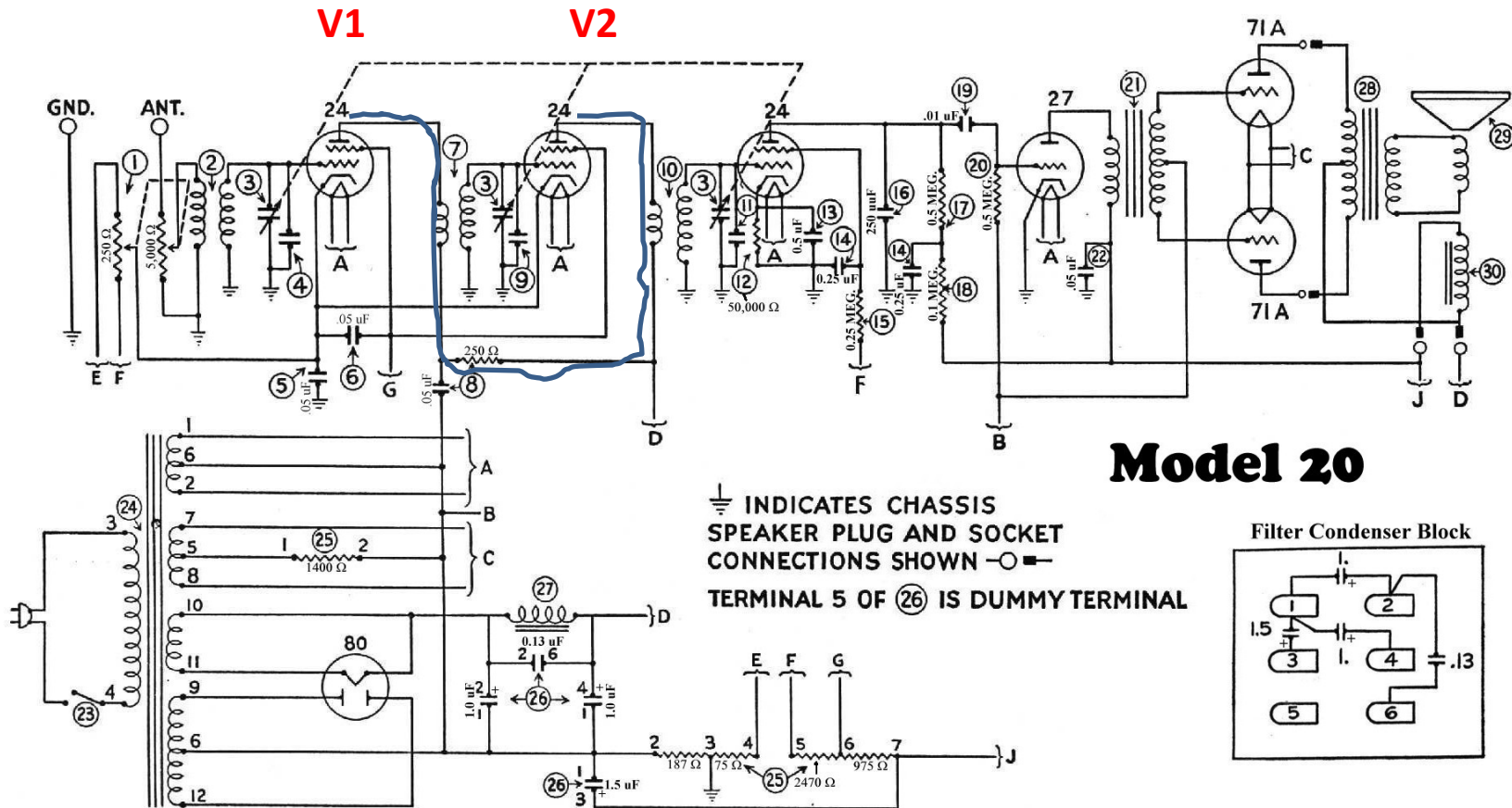
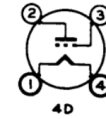
24 tube, subs
are 35 & 51



27 tube,
sub is 56

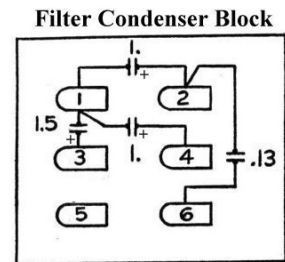


71A tube,



Model 20

⊥ INDICATES CHASSIS
SPEAKER PLUG AND SOCKET
CONNECTIONS SHOWN —○—
TERMINAL 5 OF (26) IS DUMMY TERMINAL



1 Pre-power Up Resistive Test

1.1 Input Tests

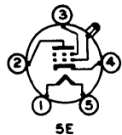
| Condition and comments | From | To | Expected value | Results | Pass Fail | Repaired Value If Required |
|---------------------------|--------------------------|----------------------------|----------------|---------|-----------|----------------------------|
| Volume control set to MAX | Antenna input | Chassis ground | >10Ω <30Ω | 24.5Ω | | |
| Volume control set to MIN | Antenna input | Chassis ground | >1Ω | ∞ | X | |
| N/A | Antenna Ground Input | Chassis ground | >1Ω | 0.5Ω | | |
| ON/OFF switch set to ON | One side of the AC input | Chassis ground | >1MΩ | ∞ | | |
| ON/OFF switch set to OFF | One side of the AC input | Other side of the AC input | >1MΩ | ∞ | | |
| ON/OFF switch set to ON | One side of the AC input | Other side of the AC input | < 100 Ω | 5.6Ω | | |

1.2 RF Amplifier Tests

1.2.1 For this test remove all tubes from their sockets. All references to tubes (V) refer to the tube's corresponding socket.

1.2.2 All grid cap readings will be very low and will mask a shorted resonating capacitor. These are shown in the original schematics as numbers 3, 4, 9 and 11.

24 tube, subs
are 35 & 51



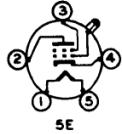
| Condition and comments | From | To | Calculated value | Measured Value | Pass Fail | Repaired Value If Required |
|---------------------------|--------------------|--------------------|----------------------------|----------------|-----------|----------------------------|
| Plate circuit | V1 tube socket - 2 | V2 tube socket - 2 | 250 Ω | ∞ | X | |
| Plate circuit | V1 tube socket - 2 | V7 tube socket - 1 | Slightly higher than 250 Ω | ∞ | X | |
| Plate circuit | V1 tube socket - 2 | V7 tube socket - 4 | Slightly higher than 250 Ω | ∞ | X | |
| Volume control set to MIN | V1 - 4 | Chassis ground | 75Ω | 72.9Ω | | |
| Volume control set to MAX | V1 - 4 | Chassis ground | 325Ω | 343Ω | | |

| Condition and comments | From | To | Calculated value | Measured Value | Pass Fail | Repaired Value If Required |
|---------------------------------|----------|--|------------------|----------------|-----------|----------------------------|
| Volume control set to MIN | V2 - 4 | Chassis ground | 75Ω | 72.9Ω | | |
| Volume control set to MAX | V2 - 4 | Chassis ground | 325Ω | 343Ω | | |
| V1 screen grid | V1 - 3 | Pin 6 of the large wire wound resistor | >1Ω | 0.2Ω | | |
| V1 RF Amp tube filament circuit | V1 - 1 | Power transformer - 1 or 2 | <1Ω | 0.1Ω | | |
| V1 RF Amp tube filament circuit | V1 - 4 | Power transformer - 1 or 2 | <1Ω | 0.1Ω | | |
| V1 RF Amp tube filament circuit | V1 - 1 | V1 - 5 | <1Ω | 0.3Ω | | |
| V2 RF Amp tube filament circuit | V2 - 1 | Power transformer - 1 or 2 | <1Ω | 0.1Ω | | |
| V1 control grid | V1 – cap | Chassis ground | >2.5Ω <5Ω | 4.5Ω | | |
| V2 control grid | V2 – cap | Chassis ground | >2.5Ω <5Ω | 3.8Ω | | |
| V3 control grid | V3 – cap | Chassis ground | >2.5Ω <5Ω | 4.0Ω | | |
| V2 RF Amp tube filament circuit | V2 - 4 | Power transformer - 1 or 2 | <1Ω | 0.1Ω | | |
| V2 RF Amp tube filament circuit | V2 - 1 | V2 - 5 | <1Ω | 0.1Ω | | |
| V3 RF Amp tube filament circuit | V3 - 1 | Power transformer - 1 or 2 | <1Ω | 0.1Ω | | |
| V3 RF Amp tube filament circuit | V3 - 4 | Power transformer - 1 or 2 | <1Ω | 0.1Ω | | |

| Condition and comments | From | To | Calculated value | Measured Value | Pass Fail | Repaired Value If Required |
|---|-----------------------|----------------|------------------|----------------|-----------|----------------------------|
| V3 RF Amp tube filament circuit | V3 - 1 | V1 - 5 | <1Ω | 0.1Ω | | |
| Coupling circuit from the RF amps to the detector stage | V3 - 2 | V4 - 2 | 0.6MΩ ±10% | 850K | X | |
| Bypass cap test | Junction of 17,14 &18 | Chassis ground | 103KΩ ±5% | 131.6K | X | |
| V3 plate circuit bypass | V3 - 2 | Chassis ground | 603KΩ ±5% | 863K | X | |
| V3 cathode resistor and bypass cap | V3 - 4 | Chassis ground | 50KΩ ±10% | | | |
| V3 screen grid volume control set a MAX | V3 - 3 | Chassis ground | 250.075KΩ ±10% | 289K | | |
| V3 screen grid volume control set a MIN | V3 - 3 | Chassis ground | 250.325KΩ ±10% | 292.4K | | |

1.3 Detector and Audio Driver Tests

24 tube, subs
are 35 & 51



27 tube,
sub is 56



| Condition and comments | From | To | Calculated value | Measured Value | Pass Fail | Repaired Value If Required |
|---|--------|----------------------------|------------------|----------------|-----------|----------------------------|
| V4 detector tube type 27 plate circuit | V4 - 2 | Speaker socket - 4 | TBD | 911K | | |
| V4 detector tube type 27 grid circuit | V4 - 3 | GND | 500KΩ ±200Ω | 650K | | |
| V4 detector tube type 27 cathode circuit | V4 - 4 | GND | <1Ω | 2.7Ω | X | |
| V4 detector tube coupling capacitor test | V4 - 3 | U3 - 2 | >0.6MΩ | 855K | | |
| V4 detector tube filament circuit. Chose the lowest value | V4 - 1 | Power transformer - 1 or 2 | <1Ω | 0.1Ω | | |
| V4 detector tube filament circuit. Chose the lowest value | V4 - 4 | Power transformer - 1 or 2 | <1Ω | 0.1Ω | | |

| Condition and comments | From | To | Calculated value | Measured Value | Pass Fail | Repaired Value If Required |
|---|--------|--------|------------------|----------------|-----------|----------------------------|
| V4 detector tube filament circuit. Chose the lowest value | V4 - 1 | V4 - 5 | <1Ω | 0.1Ω | | |

1.4 Audio Circuit Tests

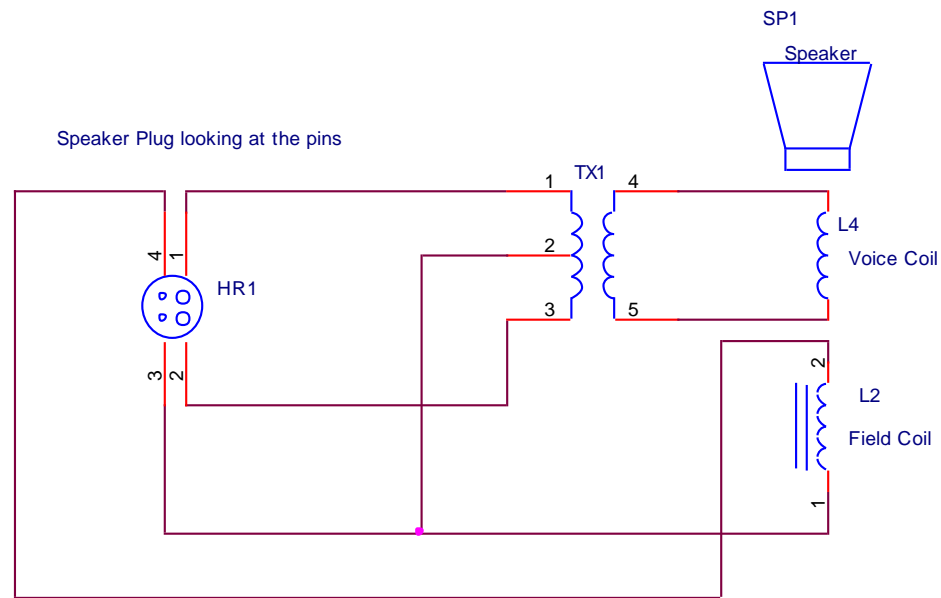
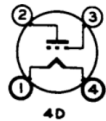


Figure 1. Speaker Circuit

| Condition and comments | From | To | Calculated value | Measured Value | Pass Fail | Repaired Value If Required |
|---|----------------------------|------------------------------|------------------|----------------|-----------|----------------------------|
| Speaker unplugged form chassis Field Coil | Speaker plug - 3 | Speaker plug - 4 | 3100Ω | | | |
| | One side of the voice coil | Other side of the voice coil | 0.7Ω | | | |
| Output Audio Transformer Primary Resistance | Speaker plug - 1 | Speaker plug - 2 | 500Ω | | | |

71A tube,



| Condition and comments | From | To | Calculated value | Measured Value | Pass Fail | Repaired Value If Required |
|----------------------------|--------|------------------------------------|------------------|----------------|-----------|----------------------------|
| Push pull plate circuit | V5 - 2 | V6 - 2 | < 100Ω | 5K | ? | |
| V5 and V6 filament circuit | V5 - 1 | V6 - 1 | < 1Ω | 0.1Ω | | |
| V5 and V6 filament circuit | V5 - 4 | V6 - 4 | <1Ω | 0.1Ω | | |
| V5 and V6 filament circuit | V5 - 1 | Pin 2 of large wire wound resistor | 1.4K | 1.39K | | |
| Push pull driver | V5 - 1 | GND | 1.587K | 1.700K | | |

| transformer | | | | | | |
|------------------------------|--------|--------|--------------------------|----------------|-----------|----------------------------|
| Condition and comments | From | To | Calculated value | Measured Value | Pass Fail | Repaired Value If Required |
| Push pull driver transformer | V5 - 3 | V6 - 3 | $5K\Omega \pm 100\Omega$ | 5K | | |
| Push pull driver transformer | V5 - 1 | GND | $2.4kK\Omega \pm 10\%$ | 1.39K | | |
| Push pull driver transformer | V5 - 3 | GND | $2.4kK\Omega \pm 10\%$ | 2.32K | | |

1.5 Power Transformer Pre-turn On Tests

| Condition and comments | From | To | Calculated value | Measured Value | Pass Fail | Repaired Value If Required |
|--------------------------|------|----------------|----------------------|----------------|-----------|----------------------------|
| AC filament winding | T1-1 | T1-2 | TBD | 0.2 Ω | | |
| | T1-1 | Chassis ground | >187 Ω | 2.3 Ω | X | |
| | T1-2 | Chassis ground | >187 Ω | 2.5 Ω | X | |
| | T1-6 | Chassis ground | $187\Omega \pm 10\%$ | 1.8 Ω | X | |
| DC filament circuit | T1-7 | T1-8 | TBD | 0.3 Ω | | |
| Chose the lowest reading | T1-7 | V5-1 or V5-4 | <1 Ω | 0.2 Ω | | |
| Chose the lowest reading | T1-8 | V5-1 or V5-4 | <1 Ω | 0.2 Ω | | |

| Condition and comments | From | To | Calculated value | Measured Value | Pass Fail | Repaired Value If Required |
|--------------------------|-------|---------------------------|------------------|----------------|-----------|----------------------------|
| | T1-5 | Filter condenser block -1 | 1400Ω ±10% | 1.39K | | |
| | T1-5 | Chassis ground | 187Ω ±10% | | | |
| Chose the lowest reading | T1-9 | V7-1 or V7-4 | <1Ω | | | |
| Chose the lowest reading | T1-12 | V7-1 or V7-4 | <1Ω | | | |
| | T1-6 | Chassis ground | 187Ω ±10% | | | |

1.6 Filter Condenser Block

1.6.1 These tests are only looking for shorts. The filter condenser will be completely rebuilt and should be retested for value and shorts before remounting it to the chassis.

| Condition and comments | From | To | Calculated value | Measured Value | Pass Fail | Repaired Value If Required |
|------------------------|---------------------------|---------------------------|------------------|----------------|-----------|----------------------------|
| 1.0μF | Filter condenser block -1 | Filter condenser block -2 | >1MΩ | | | |
| 1.0μF | Filter condenser block -1 | Filter condenser block -4 | >1MΩ | | | |
| 1.3μF | Filter condenser block -4 | Filter condenser block -2 | TBD | | | |

| Condition and comments | From | To | Calculated value | Measured Value | Pass Fail | Repaired Value If Required |
|-------------------------------|---------------------------|--|-------------------------------|-----------------------|------------------|-----------------------------------|
| 1.5 μ F | Filter condenser block -1 | Chassis ground | =/ $>187\Omega$ $\pm 10\%$ | | | |
| 1.5 μ F | Filter condenser block -3 | To large wire wound resistor end tap (J) on the original schematic | $<1\Omega$ | | | |