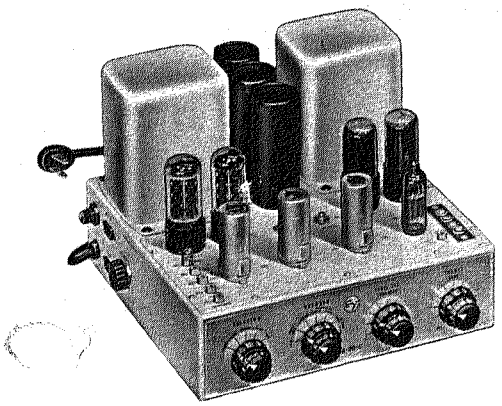
Electro-Voice®

ELECTRO-VOICE, INC. • BUCHANAN, MICHIGAN

Specifications and Instructions Model A 20C Amplifier

20-watt Circlotron High Fidelity Amplifier with Controls



General Description—The Electro-Voice Model A 20C amplifier is a compact, high quality 20-watt unit with all necessary controls for handling a complete high fidelity installation. Provision is made for two different types of phonograph cartridge inputs, for microphone input, and for tape and tuner or TV inputs. A high-level output connector is also available to feed a tape machine if desired. This permits the tone and level controls to assist in the recording process.

Features—The A20C employs the new Wiggins CIRCLOTRON circuit.* All DC is removed from the output transformer, allowing class B operation of output tubes. All switching transients are eliminated, and unusually efficient utilization of the output tubes is realized, resulting in cool optimum operation with less distortion than conventional amplifiers. This primary impedance of the output transformer is one quarter of that found in conventional amplifier output circuits, affording vastly extended range response at full rated powers.

A damping factor control permits the particular loudspeaker system employed to be perfectly coupled to the amplifier output, eliminating loss of bass from over-damping, or override due to under-damping. For the first time optimum amplifier operation matches the variable impedance of the speaker load.

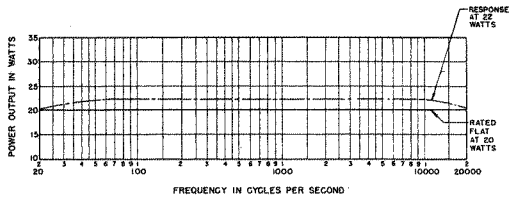


Fig. 1 — Power vs. Frequency

SPECIFICATIONS

Power Output:	20 watts rated, 40 watts on peaks See Fig. 1 "Power vs. Frequency"
Frequency Response:	Line Amplifier Section ± .1 db 20 to 70,000 cps at full 20 watts. Overall ± 1 db 20 to 20,000 cps at full 20 watts Fig. 4 flat position indicates overall response.
Harmonic Distortion:	Less than 0.5% at maximum rated output
Intermodulation Distortion:	Less than 0.3% at 5 watts Less than 1% at 20 watts See Fig. 2 "Power vs. Intermodulation Distortion"
Hum and Noise:	70 db below rated output; magnetic phono—55 db
Speaker Outputs:	4 ohms, 8 ohms, 16 ohms unbalanced; 600-ohm balanced available inside chassis
Plug-in Connection for Tape Machine Recording Input:	1.5-volt maximum output through volume control, preamplifier, and compensation controls; to work into a minimum load of 250,000 ohms for flat response down to 20 cycles

*Electro-Voice patents pending.

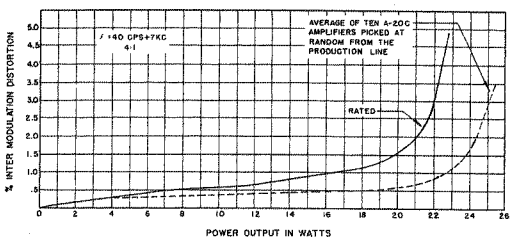
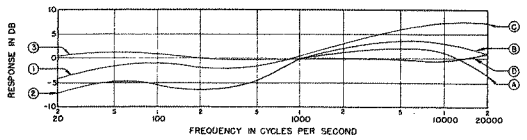


Fig. 2 — Power vs. Intermodulation Distortion



KEY:
3-D = FLAT
1-B = ORTHO-RIAA
1-A = NAB
1-C = EUROPEAN 500X CROSSOVER
2-C = EUROPEAN 300X CROSSOVER
1-A = 78—500X CROSSOVER
2-A = 78—300X CROSSOVER

Fig. 3 — Phono-Equalizer Positions

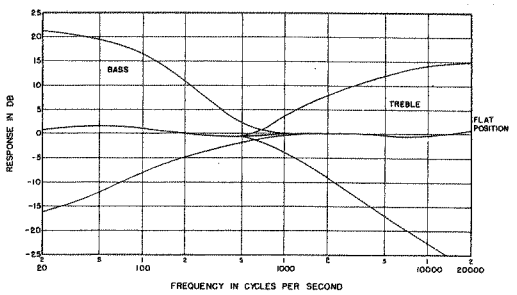


Fig. 4 — Tone Control Curves

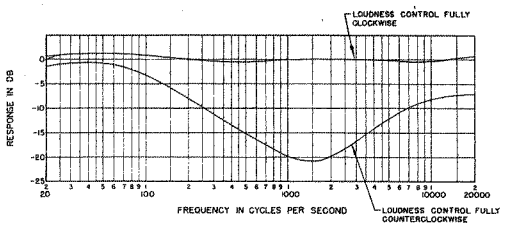


Fig. 5 — Maximum Loudness Compensation Record Position

Feedback:	Loop feedback: 16 db negative Drive plate: 2 db positive Output circuit: 19 db negative Total 33 db negative
Damping Factor:	Adjustable between 0.1 and 15 See table for critical damping factors of all **E-V speakers.**
Inputs:	1 High-impedance phono 1 Magnetic phono 1 Tuner or TV 1 Tape or TV 1 High-impedance microphone

Sensitivity and Input Impedances:

Input	Sensitivity	Impedance	Max. Input
Ceramic Phono	0.5 V	9 Meg	4 V
Mag. Phono	12 MV at 1 KC	47 K	200 MV at 1 KC
Tuner or TV	0.5 V	240 K	4 V
Tape or TV	0.5 V	240 K	4 V
Mic	7 MV	470 K	80 MV

Controls:

Front Panel
a. Function Selector
b. Record Compensation
Flat
ORTHO-RIAA
NAB
European 500 cps crossover
European 300 cps crossover
78 rpm 500 cps crossover
78 rpm 300 cps crossover
See Fig. 3 "Phono-Equalizer Positions"
c. Level
d. Loudness
e. Bass—Power On-Off
f. Treble

Side of Chassis: Damping factor

Top of Chassis: Two hum adjustments

Tone Control Range: Treble: +15 db to —20 db at 10 kc
Bass: +20 db to —15 db at 50 cps
See Fig. 4 "Tone Control Curves"

Tubes: Total of 8 as follows:
3 12AX7
1 12BH7
2 6V6GT
2 5Y3GT
1 6V No. 1847 pilot light

Power Consumption: 117V 60 cycle AC at 1.15 amp. max.

Size: 10¾ in. wide x 11¼ in. deep x 7⅜ in. high

Weight: 20 lb net, 23 lb shipping

INSTRUCTIONS FOR SET-UP AND OPERATION

Immediately upon unpacking the amplifier, carefully inspect it for physical damage. If damage is evidenced, notify the dealer from whom the unit was purchased, or the transportation company if the unit was shipped to you. Responsibility for shipping damage lies with the carrier and claim should be made for recovery.

MOUNTING – The A 20C may be mounted either in an upright position or vertically, with the control panel at the top.

The amplifier is supplied with rubber feet to prevent marring of the surface on which it is placed. For mounting in a vertical position or for fixed upright mounting (see Fig. 6, "Affixing Mounting Brackets") remove these feet by removing the screws located in the center of each rubber foot. Install one mounting bracket in a suitable position with the hooks pointing up. Install the second mounting bracket on the lower end of the bottom plate with the hooks facing down. Place the amplifier so that the hooks engage the three cutouts on the bottom plate nearest the front panel, and fasten the second mounting bracket to the supporting wall or surface. Reasonable ventilation is required, and the unit should not be operated in small, completely enclosed spaces. Brackets may also be used for permanent horizontal mounting.

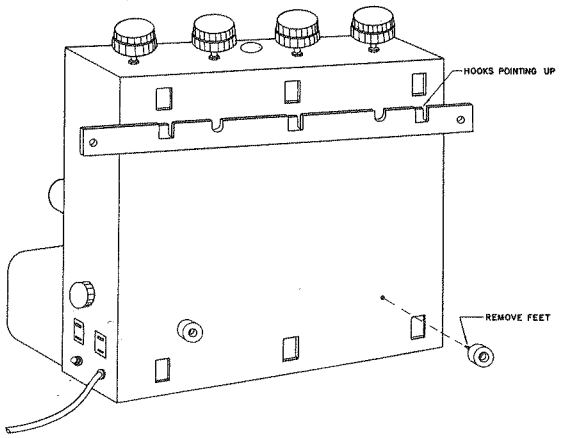


Fig. 6 — Affixing Mounting Brackets

PREPARATION FOR USE – Make certain that all tubes are firmly ...ed in the sockets. Connect the loudspeaker or other load to the amplifier. If the impedance of the load is between approximately 3 and 20 ohms, it may be connected to the terminal strip on the right front corner of the amplifier. Use the terminal marked "C" (common) and either "4", "8", or "16", whichever is nearer to the load impedance. **Do not externally ground terminal "C" to equipment since it is not a ground connection.** For special applications, such as feeding speakers over a very long distance, operating disc cutting heads etc., a 600-ohm output (balanced to ground) is available on a solder lug strip. Remove the bottom plate and connect load to terminals "A" and "B" shown in Fig. 7, "Connections for 600-ohm Balanced Line Operation."

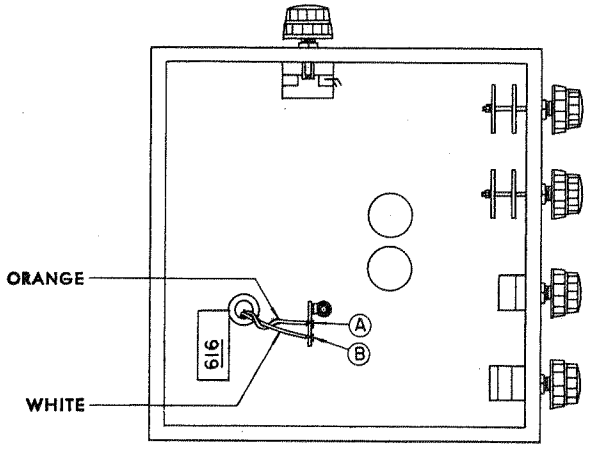


Fig. 7 — Connections for 600-Ohm Balanced Line

INPUT CONNECTIONS – Connect the input devices such as tuner, TV, tape machine, phonograph etc., to the appropriate jacks located in the left front corner of the amplifier. Necessary plugs are furnished with the A 20C. It is necessary to use shielded cable for this purpose. The permissible length of cable depends upon the input device, but it is good practice to make all leads as short as possible in order to reduce pickup from stray fields.

POWER LINE SERVICE FOR OTHER EQUIPMENT–Two line power outputs are provided on the left side of the amplifier. The one marked HOT supplies power whenever the amplifier is plugged in regardless of the power switch position. Such an outlet is commonly used for ...vices having their own on-off switch, such as a record changer, per...cting it to complete a change cycle before complete shutoff. The outlet marked SWITCHED is alive only when the amplifier is turned on and may be used to control the tuner, TV set etc.

PLAYING POSITIONS FOR VARIOUS MAKES OF RECORDS

Make	Position
American Recording Soc.	ORTHO-RIAA
Angel	ORTHO-RIAA
Atlantic	NAB
Blue Note Jazz	ORTHO-RIAA
Boston	NAB
Canyon	ORTHO-RIAA
Capitol	ORTHO-RIAA
Capitol-Cetra	ORTHO-RIAA
Cetra-Soria	NAB
Colosseum	ORTHO-RIAA
Columbia	NAB
Concert Hall Contemporary	ORTHO-RIAA
Cook Laboratories	ORTHO-RIAA
Decca	NAB
EMS	ORTHO-RIAA
Epic	NAB
Esoteric	ORTHO-RIAA
Good Time Jazz	ORTHO-RIAA
Haydn Society	NAB
London	ORTHO-RIAA
Mercury	ORTHO-RIAA
MGM	ORTHO-RIAA
Oceanic	NAB
Philharmonia	ORTHO-RIAA
Polymusic	NAB
RCA Victor	ORTHO-RIAA
Remington	NAB
Tempo	ORTHO-RIAA
Urania	NAB
Vanguard-Bach Guild	NAB
Vox	NAB
Westminster—New	ORTHO-RIAA
Westminster—Old	NAB

PROTECTIVE FUSE—The 1½ ampere fuse is the "slo-blo" 3AG type and in the event of a component failure should be replaced with an identical 1½ ampere type. The fuse will not blow in normal operation. In the event of repeated failure: (a) make certain amplifier is mounted and connected in accord with these instructions, (b) check tubes for possible shorts and replace if necessary, or (c) refer to the dealer from whom purchased for instructions.

SPEAKER DAMPING CONTROL—The damping control is located on the left side of chassis and is an E-V development designed to permit precise matching of the A 20C to any existing speaker system. Consult the table for correct settings for E-V speaker systems. Adjust for most pleasing sound if no data is available for other loads. For maximum damping (lowest internal impedance) turn knob completely clockwise. **When using 600-ohm tap, damping control must be set to full clockwise position as it does not operate on this impedance.**

SPECIAL LINE-LEVEL OUTPUT CONNECTION—An outlet is provided near the right front corner of the amplifier into which a tape recorder, auxiliary line amplifier, or any other high impedance device may be connected. It provides a high level 1.5 volts at full output. The load should be not less than 250K ohms to maintain flat frequency response to 20 cycles.

HUM ADJUSTMENTS—Two hum controls are available for screw driver adjustment from the top of the chassis. These were carefully adjusted at the factory for optimum operation under typical conditions. It should be remembered that these controls cannot reduce hum introduced by associated equipment or unshielded connecting wires. Upon replacement of 12AX7 tubes, or if hum is objectionable, it may be desirable to readjust these controls. There is a slight amount of interaction between the two adjustments. HUM 1 should be adjusted for minimum hum on the PHONO channel, HUM 2 on the MAGNETIC channel, and HUM 1 readjusted slightly for absolute minimum.

CRITICAL DAMPING FACTOR CONTROL SETTINGS

Model	Inf. Baffle	Skylark	Baronet	Aristocrat	Regency	Georgian	Patrician	Klipsch
SP8B	1.0	2.0	2.0					
SP8C	4.0	5.0	5.0					
SP12B	2.5			4.0				
12BW	2.5			4.0				
12TRX	1.0			2.0				
12TRXB	2.5			4.0				
SP12	1.0			2.0				
12W	1.0			2.0				
12WK								15.0
SP15	.5				1.0			
15TRX	.5				1.0			
15W	.5				1.0			
15WK						15.0		15.0
18W	1.0							
18WK							15.0	15.0

OPERATION AND ADJUSTMENT

1. Turn amplifier ON by rotating bass control clockwise to about medium position. Allow 30 seconds warm-up.
2. Set input selector knob to desired input channel.
3. **Phonograph Operation**—If selector knob is on PHONO or MAGNETIC input, adjust RECORDS knob to the desired curve. In the event that the curve is not known, adjust knob for the best musical balance in conjunction with tone controls. RECORDS knob does not affect the TUNER, TAPE, or MIC channels.

   Complete equalization for any magnetic phonograph cartridge is included in the A20C Amplifier. Therefore, no external load resistance should be placed across the cartridge terminals.
4. **Use of "LEVEL" and "LOUDNESS" Controls**—Note that the LOUDNESS and LEVEL SET controls are concentrically mounted on one shaft. Advance the LOUDNESS control completely clockwise. In this position, no loudness compensation is present. Turn up the LEVEL SET control until sound is reproduced at slightly more than the desired volume. Now turn LOUDNESS control counter-clockwise until the desired loudness compensation is obtained. If it is not desired to use LOUDNESS (Fletcher-Munson or "ear sensitivity") compensation, turn the LOUDNESS control completely clockwise and regulate level with the LEVEL SET control alone.
5. Note that the BASS and TREBLE tone controls are concentrically mounted about the same shaft. Adjust each control until the most pleasing balance is obtained. The "flat" position occurs with the pointer on each knob facing straight up. A clockwise rotation of either knob results in a *boost*, counter-clockwise rotation a reduction.
6. Seven phono-equalizer positions are provided to compensate for the recording characteristics of various records. See chart on preceding page for proper record compensation settings.

CAUTION NOTES

1. Do not operate the amplifier in an overload condition (with more than rated input voltages while LEVEL is completely clockwise) for a long period of time, as this will shorten the life of the output tubes.
2. The A20C Amplifier is designed for use on 105-125V, 60 cycle, AC power. Damage may result if an attempt is made to use any other type of power.
3. When using 600-ohm taps, damping control must be set to full clockwise position as it does not operate on this impedance.
4. Do not externally ground terminal "C" to equipment since it is not a ground connection.

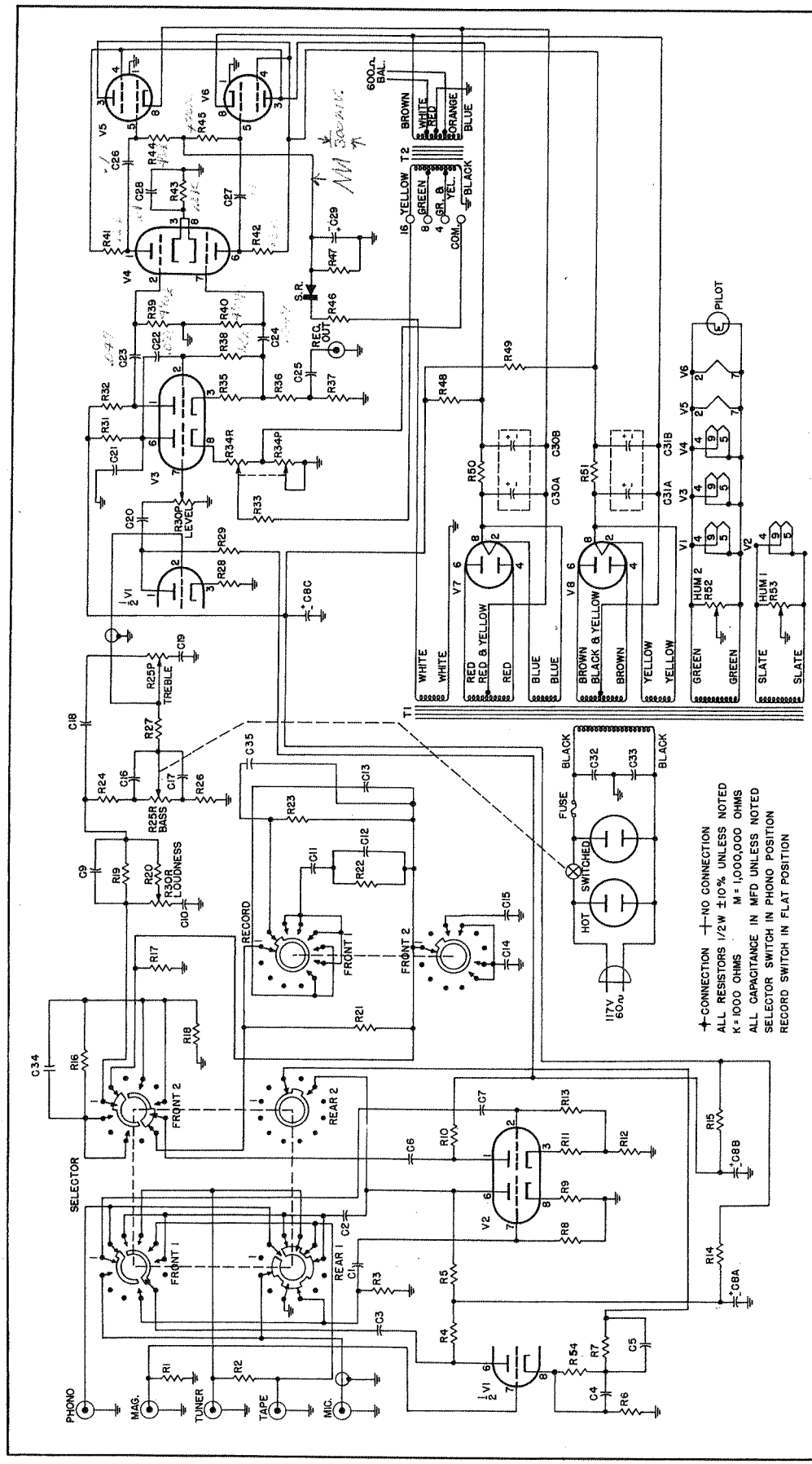
PARTS LIST

Key	Description	Part No.
C1	Capacitor, 0.01 MFD, 500V, Ceramic, GMV	4252
C2	Capacitor, 0.01 MFD, 500V, Ceramic, GMV	4252
C3	Capacitor, 0.01 MFD, 500V, Ceramic, GMV	4252
C4	Capacitor, 0.004 MFD, 400V, Plastic Tubular	4261
C5	Capacitor, 0.002 MFD, 500V, Ceramic, ±20%	4259
C6	Capacitor, 0.047 MFD, 400V, Plastic Tubular	4243
C7	Capacitor, 0.01 MFD, 500V, Ceramic, GMV	4252
C8A, C8B, C8C	Capacitor, 40-40-40 MFD, 375V, Electrolytic	4267
C9	Capacitor, 270 MMF, 500V, Ceramic, ±20%	4255
C10	Capacitor, 0.0068 MFD, 400V, Plastic Tubular	4262
C11	Capacitor, 0.01 MFD, 500V, Ceramic, ±20%	4257
C12	Capacitor, 800 MMF, 500V, Ceramic, ±20%	4253
C13	Capacitor, 0.001 MFD, 500V, Ceramic, ±20%	4258
C14	Capacitor, 0.0015 MFD. 500V, Ceramic, ±20%	4254
C15	Capacitor, 0.001 MFD, 500V, Ceramic, ±20%	4258
C16	Capacitor, 0.001 MFD, 500V, Ceramic, ±20%	4258
C17	Capacitor, 0.01 MFD, 500V, Ceramic, ±20%	4257
C18	Capacitor, 200 MMF, 500V, Ceramic, ±20%	4256
C19	Capacitor, 0.002 MFD, 500V, Ceramic, ±20%	4259
C20	Capacitor, 0.047 MFD, 400V, Plastic Tubular	4243
C21	Capacitor, 100 MMF, 500V, Ceramic, ±20%	4281
C22	Capacitor, 0.022 MFD, 400V, Plastic Tubular	4260
C23	Capacitor, 0.047 MFD, 400V, Plastic Tubular	4243
C24	Capacitor, 0.047 MFD, 400V, Plastic Tubular	4243
C25	Capacitor, 0.022 MFD, 400V, Plastic Tubular	4260
C26	Capacitor, 0.1 MFD, 600V, Plastic Tubular	4241
C27	Capacitor, 0.1 MFD, 600V, Plastic Tubular	4241
C28	Capacitor, 0.01 MFD, 500V, Ceramic, GMV	4252
C29	Capacitor, 50 MFD, 100V, Electrolytic	4242
C30A, C30B	Capacitor, 40-40 MFD, 500V, Electrolytic	4247
C31A, C31B	Capacitor, 40-40 MFD, 500V, Electrolytic	4247
C32	Capacitor, 0.047 MFD, 400V, Plastic Tubular	4243
C33	Capacitor, 0.047 MFD, 400V, Plastic Tubular	4243
C34	Capacitor, 200 MMF, 500V, Ceramic, ±20%	4256
C35	Capacitor, 100 MMF, 500V, Ceramic, ±20%	4281
R1	Resistor, 47K ½W, Carbon, ±10%	4668
R2	Resistor, 270K, ½W, Carbon, ±10%	4669
R3	Resistor, 470K, ½W, Carbon, ±10%	4650
R4	Resistor, 120K, ½W, Carbon, ±10%	4670
R5	Resistor, 120K ½W, Carbon, ±10%	4670
R6	Resistor, 2.2K, ½W, Carbon, ±10%	4676
R7	Resistor, 120K, ½W, Carbon, ±10%	4670
R8	Resistor, 12 MEG, ½W, Carbon, ±10%	4672
R9	Resistor, 180 OHM, ½W, Carbon, ±10%	4667
R10	Resistor, 47K, ½W, Carbon, ±10%	4668
R11	Resistor, 1.2K, ½W, Carbon, ±10%	4658
R12	Resistor, 4.7K, ½W, Carbon, ±10%	4675
R13	Resistor, 1.8 MEG, ½W, Carbon, ±10%	4673
R14	Resistor, 33K, ½W, Carbon, ±10%	4665
R15	Resistor, 33K, ½W, Carbon, ±10%	4665
R16	Resistor, 120K, ½W, Carbon, ±10%	4670
R17	Resistor, 47K, ½W, Carbon, ±10%	4668
R18	Resistor, 47K, ½W, Carbon, ±10%	4668
R19	Resistor, 1.2 MEG, ½W, Carbon, ±10%	4656
R20	Resistor, 27K, ½W, Carbon, ±10%	4651
R21	Resistor, 330K, ½W, Carbon, ±10%	4685
R22	Resistor, 270K, ½W, Carbon, ±10%	4669
R23	Resistor, 270K, ½W, Carbon, ±10%	4669
R24	Resistor, 120K, ½W, Carbon, ±10%	4670
R25	Potentiometer, 1 MEG, A Taper, w/SPST Switch	A4687
R26	Resistor, 12K, ½W, Carbon, ±10%	4649
R27	Resistor, 120K, ½W, Carbon, ±10%	4670
R28	Resistor, 1.8K, ½W, Carbon, ±10%	4677
R29	Resistor, 180K, ½W, Carbon, ±10%	4671
R30	Potentiometer, Dual, 250K, A Taper, ±30%	B4687
R31	Resistor, 270K, ½W, Carbon, ±10%	4669
R32	Resistor, 27K, ½W, Carbon, ±10%	4651
R33	Resistor, 27K, ½W, Carbon, ±10%	4651
R34P, R34R	Potentiometer, Dual { 1 OHM, 2W / 1800 OHM, 2W }	A4686
R35	Resistor, 470 OHM, ½W, Carbon, ±10%	4654
R36	Resistor, 22K, ½W, Carbon, ±10%	4678
R37	Resistor, 4.7K, ½W, Carbon, ±10%	4675
R38	Resistor, 1.2 MEG, ½W, Carbon, ±10%	4656
R39	Resistor, 470K, ½W, Carbon, ±10%	4650
R40	Resistor, 470K, ½W, Carbon, ±10%	4650
R41	Resistor, 12K, 2W, Carbon, ±10%	4679
R42	Resistor, 12K, 2W, Carbon, ±10%	4679
R43	Resistor, 1.2K, ½W, Carbon, ±10%	4658
R44	Resistor, 470K, ½W, Carbon, ±10%	4650
R45	Resistor, 470K, ½W, Carbon, ±10%	4650
R46	Resistor, 180 OHM, ½W, Carbon, ±10%	4667
R47	Resistor, 47K, ½W, Carbon, ±10%	4668
R48	Resistor, 33K, 1W, Carbon, ±10%	4666
R49	Resistor, 33K, 1W, Carbon, ±10%	4666
R50	Resistor, 100 OHM, 2W, Carbon, ±10%	4655
R51	Resistor, 100 OHM, 2W, Carbon, ±10%	4655
R52	Resistor, 200 OHM, 2W, W.W. Linear Pot	B4686
R53	Resistor, 200 OHM, 2W, W.W. Linear Pot	B4686
R54	Resistor, 1.2 MEG, ½W, Carbon, ±10%	4656
V1	Tube, 12AX7	4311
V2	Tube, 12AX7	4311
V3	Tube, 12AX7	4311
V4	Tube, 12BH7	4312
V5	Tube, 6V6GT	4313
V6	Tube, 6V6GT	4313
V7	Tube, 5Y3GT	4314
V8	Tube, 5Y3GT	4314
	Pilot 6V, No. 1847	4329
T1	Transformer, Power 96P46	1563
T2	Transformer, Output, 96A15B	1564
S.R.	Rectifier, Selenium 10MA	5914
Fuse	3AG, 1½ AMP, SLO-BLO, #31301.5	20171

Note: 1K=1,000 OHMS

1 MEG=1,000,000 OHMS

Schematic Diagram Model A 20C Amplifier



WARRANTY

ELECTRO-VOICE, INC. warrants each new product manufactured by it to be free from defective material or factory workmanship and agrees to repair or exchange any part thereof which under normal installation, use and service, discloses such defect. Our obligation under this warranty is limited to repairing or exchanging any defective part, with the exception of tubes, if that part is returned, transportation prepaid, within ninety (90) days from the date of original purchase by the consumer through our authorized dealer from whom the consumer purchased this product. This warranty does not apply to any of our products which have been repaired or altered in any way so as, in our judgment, to injure their stability or reliability, or which have been subject to misuse, negligence, or accident, or which have had the serial number altered, effaced, or removed. Neither does this warranty apply to any of our products which have been connected, installed, or adjusted otherwise than in accordance with the instructions furnished by us. Accessories not of our manufacture used with this product are not covered by this warranty.

This warranty is in lieu of all other warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sales of our product.