

# **SEEBURG**

**HIGH FIDELITY AMPLIFIERS**

**TYPE C1FHA2 and C2FHA2**

# SEEBURG

## HIGH FIDELITY AMPLIFIERS, Type C1HFA2 and C2HFA2

The Type C1HFA2 amplifier is a single-channel, low distortion, wide frequency range, constant voltage type amplifier, designed for monaural reproduction of monaural or stereophonic records when driven with the Seeburg Magnetic Pickup. The C2HFA2 is a supplementary amplifier that can be added to the C1HFA2 to form a complete two-channel stereo amplifier. The C2HFA2 has the same characteristics and output as the C1HFA2 so the two amplifiers, combined, form a dual channel stereo amplifier having the same characteristics and application as the Type SHFA3 discussed in Service Manual pages beginning with page 4083.

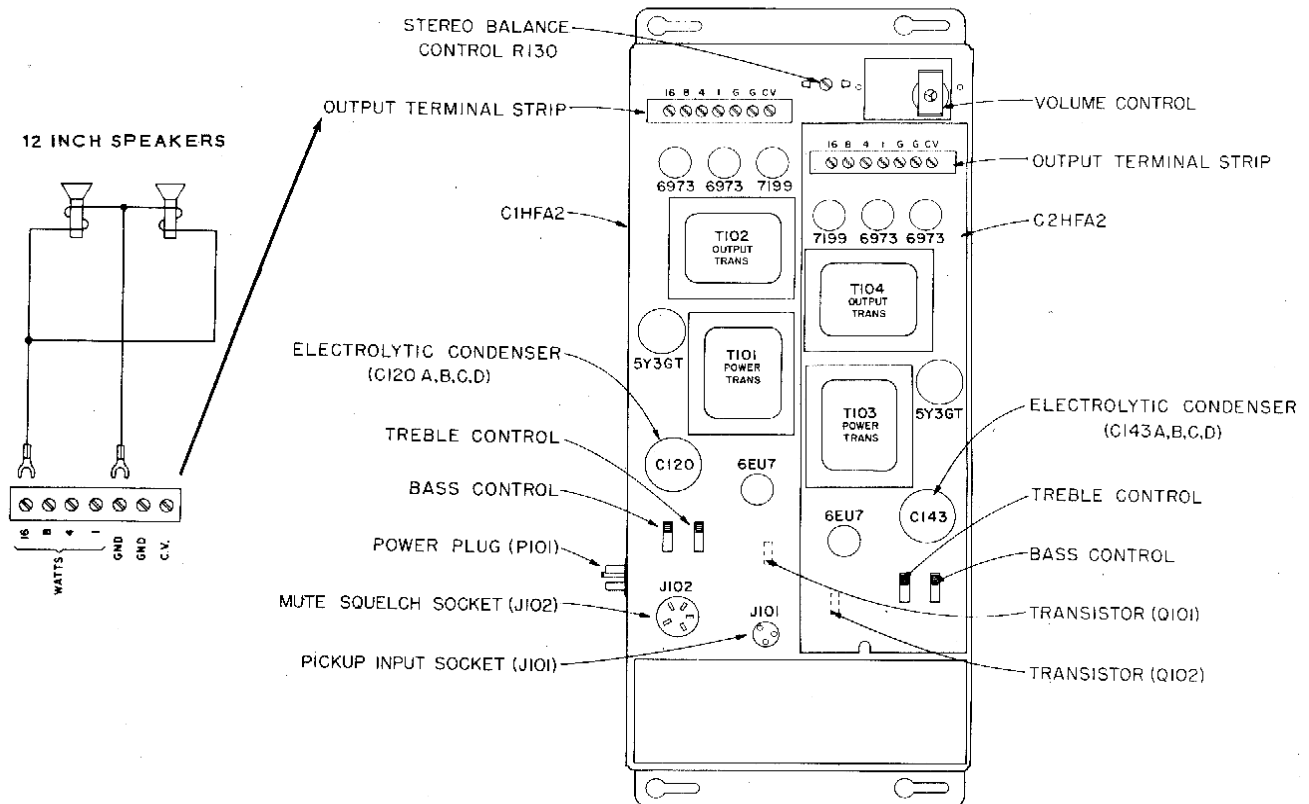
When the Type C1HFA2 amplifier only is used, the two outputs of the stereo pickup of the Select-O-Matic mechanism are connected in parallel at socket J101. This output then connects to the 2N591 input transistor, Q101. The 2N591 is followed by V101, the 6EU7 dual triode. The first section of the 6EU7 provides additional amplification. The second section is not used. The output from the volume control is amplified by the first section of the 7199, V102, the second section of which is a phase inverter that drives the

type 6973 output tubes.

Automatic volume compensation may be incorporated in this amplifier by addition of a Type AVCU10, Automatic Volume Control unit. It compensates for variations in the average volume levels of different records and makes possible a volume control setting for normal records without danger of "Blasting" or high volume due to exceptionally loud records.

A 6BJ6 tube is used for compensation control in each amplifier. Use of AVC is optional and may be suspended by removal of 6BJ6 tubes. The back-to-back selenium rectifier, CR201, has two functions. They rectify the output of the AVC amplifiers of each amplifier for variable grid bias for the 6BJ6 control tubes and also rectify 20 volts supplied from the control circuits of the Select-O-Matic mechanism for squelch operation. The squelch voltage from the mechanism is applied only when a record is not being played.

Inverse feedback is supplied from the secondary of the output transformer to the cathode circuit of the amplifier section of the 7199, V102, to insure a minimum of distortion and hum and to provide the necessary output voltage regulation



for constant voltage operation.

The output transformer secondary has low and high impedance terminals. The low impedance windings drive 16 ohm phonograph speakers. Connections to this load are through the speaker terminal board, TB101. The high impedance terminals are 70 volt, C.V. outputs that terminate at "G" and "CV" of the speaker terminal board and are for operation of constant voltage type remote speakers.

The total amplifier output power can be divided between the phonograph speakers and the external speakers by positioning the phonograph speaker terminals and the loading taps on the external speakers. The phonograph speaker terminals are calibrated in watts with reference to the power delivered at full output by the output transformer to the phonograph speaker load.

The total load of the phonograph speakers as indicated on the speaker terminals and the load of external speakers must not be greater than 20 watts.

The volume control adjusts the level of sound from the Select-O-Matic speaker and the remote speakers. It is located on the amplifier so it is accessible from the back of the cabinet. A power-

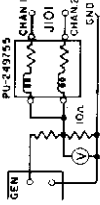
ed remote volume control, Type PRVC2, may be used by the installation of a motor on the amplifier volume control. The motor is remotely controlled to increase or decrease the phonograph volume.

Heater current for the amplifier tubes is supplied at 6.3 volts from the Tormat Selector Unit. Plate current for the tubes is from an included plate supply transformer and the 5Y3GT rectifier tube. The rectifier, CR101, supplies current for the transistor and for the grid bias voltage of the 6973 output tubes.

When the C2HFA2 amplifier is added for stereo operation, it replaces a blank metal plate that is on the top of the C1HFA2 chassis. The C2HFA2 amplifier has its own power supply consisting of a transformer, filter and a 5Y3GT tube rectifier. The two amplifier sections are interconnected to provide unitized control of tone and of volume and for the AVC operation. The two amplifiers are diagrammed on page 4085 where the interconnecting leads for the two sections are shown in dotted lines. It will be noted in the diagram that the jumper between terminals 2 and 3 of the input socket, J101, is opened so the independent stereo channels will be connected to their respective amplifier inputs.

# HIGH FIDELITY AMPLIFIER, Type C1HFA2 and C2HFA2

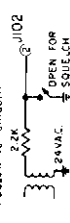
NOTES:  
1. PROPER SIGNAL GENERATOR IMPEDANCE FOR OBTAINING RESPONSE CURVES MAY BE OBTAINED AS SHOWN BELOW.



2. A.C. SIGNAL VOLTAGES ENCIRCLED WERE MEASURED WITH 1000 CFS. INPUT SIGNAL TO J101 USING A 600 OHM TERMINATION WITH C208 SHORTED TO GROUND.

3. D.C. VOLTAGES MEASURED TO GROUND USING 20000 OHMS PER VOLT VOLTMETER AND WITH NO INPUT SIGNAL.

4. SOLENOID ACTION OF CIRCUIT BY USING THE FOLLOWING CIRCUIT.



5. ALL RESISTORS ARE 1/2W 10% UNLESS OTHERWISE SPECIFIED

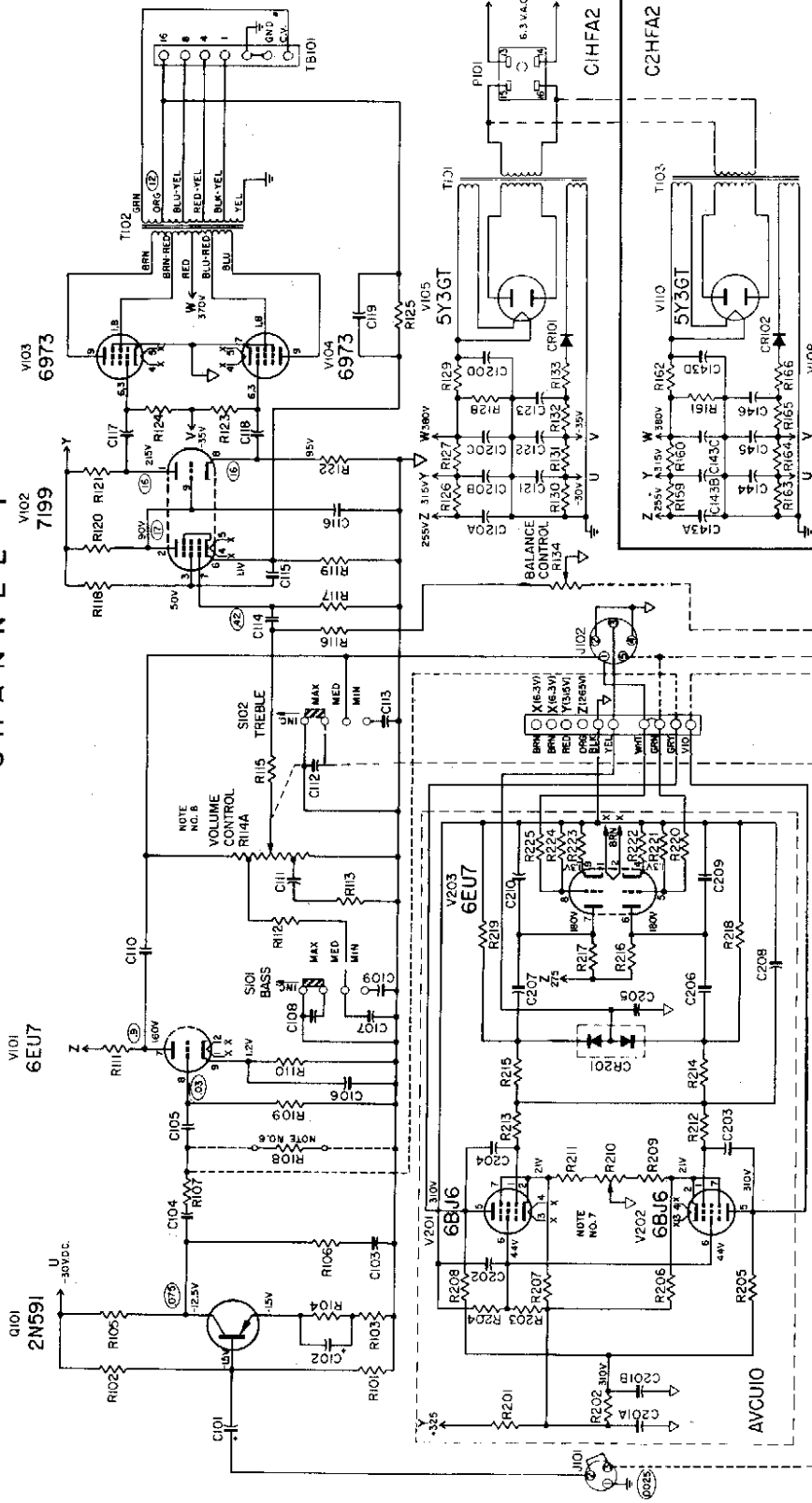
6. B10B AND B14Z NOT USED WHEN AVC102 IS USED.

7. ADJUST FOR EQUAL CATHODE VOLTAGE (PIN 2) V201 AND V202 WITH ZERO SIGNAL INPUT.

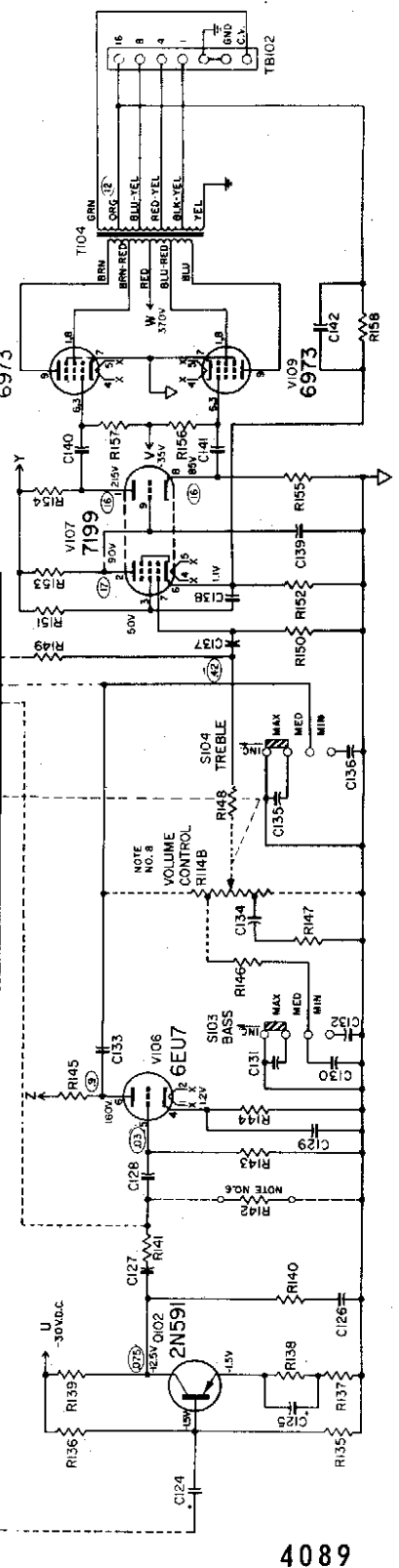
8. BOTH SECTIONS OF VOLUME CONTROL, R114A & R114B, ARE CONTAINED IN C1HFA2.

## CHANNEL 1

PART NO. 305967



## CHANNEL 2



# HIGH FIDELITY AMPLIFIER, Type C1HFA2 and C2HFA2

## PARTS LIST

Item	Part No.	Description	Item	Part No.	Description	Item	Part No.	Description
C101	87697	9 Mfd. 5 V. Lytic	C144	87691	50 Mfd. 60 V.	R123	82696	270,000 Ohm 5%
C102	87696	50 Mfd. 6 V. Lytic	C145	87691	50 Mfd. 60 V.	R124	82696	270,000 Ohm 5%
C103	86327	.047 Mfd. 10% 50 V. Mylar	C146	87690	20 Mfd. 75 V.	R125	* 82638	18,000 Ohm 5%
C104	86140	.05 Mfd. 10% 400 V. Paper	C201A	87688	50 Mfd. 400 V. Lytic	R126	82440	22,000 Ohm
C105	86212	.01 Mfd. 10% 400 V. Paper	C201B	87688	50 Mfd. 400 V. Lytic	R127	81194	3,300 Ohm 3 W.
C106	86334	0.1 Mfd. 10% 50 V. Mylar	C202	86140	.05 Mfd. 10% 400 V. Paper	R128	81199	25,000 Ohm 10 W.
C107	86332	.0068 Mfd. 10% 50 V. Mylar	C203	86212	.01 Mfd. 10% 400 V. Paper	R129	81173	100 Ohm 7 W.
C108	86326	.01 Mfd. 100 V. Mylar	C204	86212	.01 Mfd. 10% 400 V. Paper	R130	82434	6,800 Ohm
C109	86327	.047 Mfd. 10% 50 V. Mylar	C205	86313	.01 Mfd. 500 V. Ceramic	R131	82620	1,000 Ohm
C110	86140	.05 Mfd. 10% 400 V. Paper	C206	86212	.01 Mfd. 10% 400 V. Paper	R132	82474	3,300 Ohm
C111	86332	.0068 Mfd. 10% 50 V. Mylar	C207	86212	.01 Mfd. 10% 400 V. Paper	R133	82418	330 Ohm
C112	86309	.001 Mfd. 10% 500 V. Ceramic	C208	86342	1.5 Mfd. 200V. Mylar	R134	305833	Balance Control
C113	86340	.003 Mfd. 10% 500 V. Ceramic	C209	86270	680 Mmfd. 500 V. Ceramic	R135	82635	12,000 Ohm 5%
C114	86212	.01 Mfd. 10% 400 V. Paper	C210	86270	680 Mmfd. 500 V. Ceramic	R136	82616	220,000 Ohm 5%
C115	86140	.05 Mfd. 10% 400 V. Paper	CR101	309390	Selenium Rectifier	R137	82617	47 Ohm 5%
C116	86289	3.3 Mmfd. 500 V. Ceramic	CR102	309390	Selenium Rectifier	R138	82626	3,900 Ohm 5%
C117	86146	.05 Mfd. 10% 600 V. Paper	CR201	309391	Full Wave Selenium	R139	82675	47,000 Ohm 5%
C118	86146	.05 Mfd. 10% 600 V. Paper	J101	12034	Input Socket	R140	82625	3,600 Ohm 5%
C119	86243	150 Mmfd. 500 V. Ceramic	J102	84283	Mute Squelch 5 Pin	R141	82698	150,000 Ohm 5%
C120A	87694	20 Mfd. 400 V. Lytic	P101	300007	Power Input	R142	82775	39,000 Ohm 5%
C120B	87694	20 Mfd. 400 V. Lytic	Q101	309404	2N591 Transistor	R143	82456	470,000 Ohm
C120C	87694	40 Mfd. 400 V. Lytic	Q102	309404	2N591 Transistor	R144	82671	1,300 Ohm 5%
C120D	87691	20 Mfd. 450 V. Lytic	R101	82635	12,000 Ohm 5%	R145	* 82666	100,000 Ohm 5%
C121	87691	50 Mfd. 60 V.	R102	82616	220,000 Ohm	R146	82441	27,000 Ohm
C122	87691	50 Mfd. 60 V.	R103	82617	47 Ohm 5%	R147	82441	27,000 Ohm
C123	87690	20 Mfd. 75 V.	R104	82626	3,900 Ohm 5%	R148	* 82616	220,000 Ohm
C124	87697	9 Mfd. 6 V. Lytic	R105	82676	47,000 Ohm 5%	R149	82449	120,000 Ohm
C125	87696	50 Mfd. 6 V. Lytic	R106	82625	3,600 Ohm 5%	R150	82460	1 Meg Ohm
C126	86327	.047 Mfd. 10% 50 V. Mylar	R107	82698	150,000 Ohm 5%	R151	82459	820,000 Ohm
C127	86140	.05 Mfd. 10% 400 V. Paper	R108	82775	39,000 Ohm 5%	R152	82423	820 Ohm
C128	86212	.01 Mfd. 10% 400 V. Paper	R109	82456	470,000 Ohm	R153	82452	220,000 Ohm
C129	86334	0.1 Mfd. 10% 50 V. Mylar	R110	82671	1,300 Ohm 5%	R154	82811	15,000 Ohm 2 W. 5%
C130	86332	.0068 Mfd. 10% 50 V. Mylar	R111	* 82666	100,000 Ohm 5%	R155	82811	15,000 Ohm 2 W. 5%
C131	86326	.01 Mfd. 100 V. Mylar	R112	82441	27,000 Ohm	R156	82696	270,000 Ohm 5%
C132	86327	.047 Mfd. 10% 50 V. Mylar	R113	82441	27,000 Ohm	R157	82696	270,000 Ohm 5%
C133	86140	.05 Mfd. 10% 400 V. Paper	R114	305821	Volume Control (1 MEG EA. SECTION)	R158	* 82638	18,000 Ohm 5%
C134	86332	.0068 Mfd. 10% 50 V. Mylar	R115	* 82616	220,000 Ohm	R159	82440	22,000 Ohm
C135	86309	.001 Mfd. 10% 500 V. Ceramic	R116	82449	120,000 Ohm	R160	81194	3,300 Ohm 3 W.
C136	86340	.003 Mfd. 10% 500 V. Ceramic	R117	82460	1 Meg. Ohm	R161	81199	25,000 Ohm 10 W.
C137	86212	.01 Mfd. 10% 400 V. Paper	R118	82459	820,000 Ohm	R162	81173	100 Ohm 7 W.
C138	86140	.05 Mfd. 10% 400 V. Paper	R119	82423	820 Ohm	R163	82434	6,800 Ohm
C139	86289	3.3 Mmfd. 500 V. Ceramic	R120	82452	220,000 Ohm	R164	82620	1,000 Ohm
C140	86146	.05 Mfd. 10% 600 V. Paper	R121	82811	15,000 Ohm 2 W. 5%	R165	82624	3,300 Ohm
C141	86146	.05 Mfd. 10% 600 V. Paper	R122	82811	15,000 Ohm 2 W. 5%	R166	82418	330 Ohm
C142	86243	150 Mmfd. 500 V. Ceramic	C143A	87684	20 Mfd. 400 V. Lytic	R201	82421	560 Ohm
C143A	87684	20 Mfd. 400 V. Lytic	C143B	87684	20 Mfd. 400 V. Lytic	R202	82436	10,000 Ohm
C143B	87684	20 Mfd. 400 V. Lytic	C143C	87684	40 Mfd. 400 V. Lytic	R203	82454	300,000 Ohm
C143C	87684	40 Mfd. 400 V. Lytic	C143D	87684	20 Mfd. 450 V. Lytic	R204	82796	51,000 Ohm
C143D	87684	20 Mfd. 450 V. Lytic						

\* R111 AND R145 SHOULD BE 100K; R115 AND R148 SHOULD BE 220K; R125 AND R158 SHOULD BE 18K.