

# **SEEBURG**

**HIGH FIDELITY MASTER AMPLIFIER**

**TYPE HFMA2**

# SEEBURG

## HIGH FIDELITY MASTER AMPLIFIER, Type HFMA2

The High Fidelity Master Amplifier, Type HFMA2 is a low distortion, wide frequency range, constant voltage type. It has a transistor preamplifier stage followed by seven tubes, two of which are 6L6's in a push-pull output stage to supply 25 watts of audio power for operation of the Select-O-Matic speaker and remote speakers.

The output of the low impedance magnetic pickup of the Select-O-Matic mechanism is connected through a single-contact socket to the transistor preamplifier, a 2N109. The 2N109 is followed by a 12AX7(V101) dual triode. The first section (A) of the 12AX7 provides additional amplification, the second section (B) is used as an AVC amplifier. A Treble Range control circuit utilizes the first section (A) of another 12AX7(V103) as an amplifier. Section (B) of this 12AX7 is a cathode follower for low impedance input to bass and volume control circuits. The output from the volume control is amplified by the first section (A) of a third 12AX7(V104), the second (B), section of which is a phase inverter that drives the 6L6 output tubes.

An automatic volume compensator is incorporated in this amplifier. It compensates for the variation 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 is used as a compensation control. Use of AVC is optional and may be suspended by removal of the 6BJ6 tube.

A selenium rectifier, CR101 serves a dual purpose. It rectifies the output of the AVC amplifier (V101, Section B) for variable grid bias for the 6BJ6 control tube. It also rectifies 25 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.

Use is made of inverse feedback to obtain output regulation necessary for constant voltage operation and to insure a minimum of distortion and hum. The inverse feedback is supplied from a secondary of the output transformer to the cathode circuit of the amplifier section of the 12AX7(V104).

The output transformer has two secondaries. One of these is for the Select-O-Matic speakers and is tapped for switch control of the power to the speakers. The other is for remote speakers and has taps to a terminal strip to accommodate High Fidelity Remote Speakers.

The terminal strip shown in *Figure 3* provides connections for high impedance remote speakers.

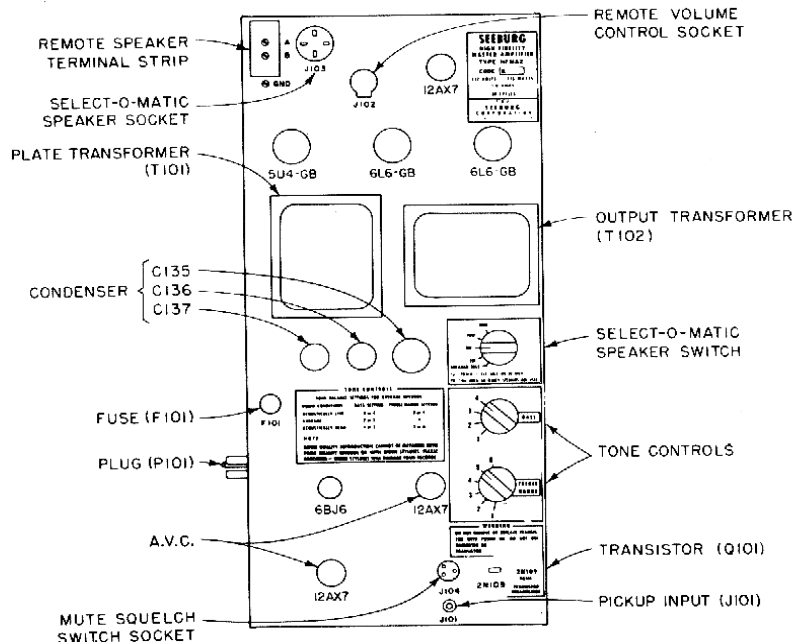


Figure 1. Top View

# HIGH FIDELITY MASTER AMPLIFIER, TYPE HFMA2

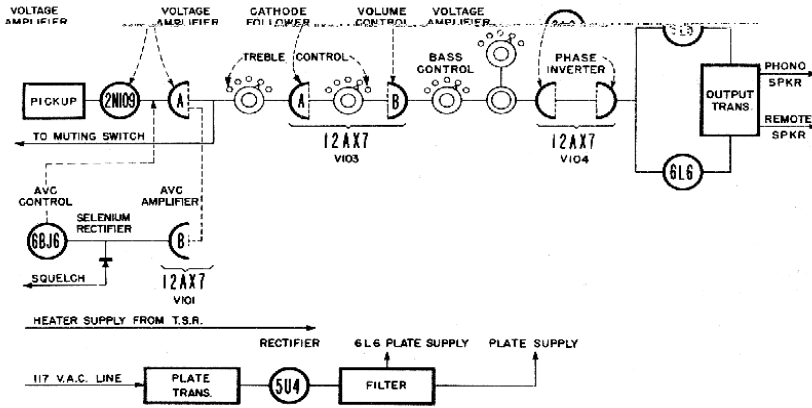


Figure 2. Block Diagram

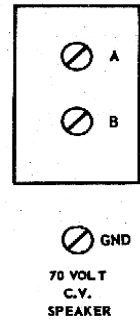


Figure 3. Terminal Block

1 Strip

has a position, of the test at

The high impedance output terminates at A and B and is for 70-volt Constant Voltage Speakers. The GND terminal is provided for grounding of shielded speaker lines.

of sound remote so it is Connect a socket s. A replacing a remote remote hundred, distur-

The total amplifier output power of 25 watts can be divided between the Select-O-Matic speakers and remote speakers with the proportions of volume conveniently adjusted by use of the Select-O-Matic Speaker Switch located at the upper end of the amplifier and shown in Figure 4. The switch is set to provide the desired balance of volume between the Select-O-Matic speakers and the remote speakers but the total power (in watts) of all the speakers in use must not exceed 25. The load (in watts) should also not be lower than 25% of the total, (6 watts).

ubes is ion Re- from an 5U4GB primary amplifier

If the total watts of the remote speakers and the Select-O-Matic cabinet speakers exceed 25 watts, an external Seeburg Power Amplifier, may be used to supply part of the load.

**IF NO REMOTE SPEAKERS ARE USED, THE SPEAKER SWITCH MUST BE SET AT THE 20 WATT POSITION.**

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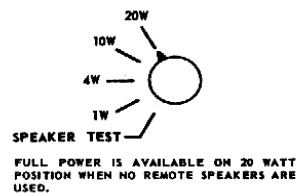


Figure 4. Speaker Switch

The Select-O-Matic speaker switch test position. With the switch in test position the speakers are connected to one side of the 6 volt tube heater circuit for a hum of approximately 3 volts.

The volume control adjusts the level of sound from the Select-O-Matic speaker and the remote speakers. It is located on the amplifier chassis accessible at the back of the cabinet. Connections for the control are made through a dummy plug on the amplifier chassis. A remote volume control may be used by replacing the dummy plug with the 9-prong plug of a remote volume control, Type MRVC-3. The volume control cable may be up to one foot in length without introducing hum or loss of volume.

Heater current for the amplifier is supplied at 6.3 volts from the Select-O-Matic receiver. Plate current for the tubes is supplied by an included plate supply transformer and rectifier. The plate supply transformer is protected by a fuse located on the amplifier chassis.

The Bass and Treble Range controls are four & six position switches respectively. The position of the controls when an amplifier is in normal use is determined by the type of music being reproduced, the room size and the acoustical conditions. "Flat" response is obtained with the Bass control at 1, the Treble Range control at 4 but with typical conditions and typical records, very real production is obtained by setting the Bass at 2 and the treble at 3.



## HIGH FIDELITY MASTER AMPLIFIER, TYPE HFMA2

## PARTS LIST

Item	Part No.	Part Name	Item	Part No.	Part Name
C101	87651	8 Mfd. 50 V. Lytic	R116	82632	8.2K 5% ½ W.
C102	86213	.005 Mfd. ±10% 400 V. Paper	R117	82640	27K 5% ½ W.
C103	87660	20 Mfd. 30 V. Lytic	R118	82418	330 10% ½ W.
C104	86247	.0068 Mfd. ±10% 200 V. Paper	R119	82422	680 10% ½ W.
C105	87651	8 Mfd. 50 V. Lytic	R120	82610	6.2K 5% ½ W.
C106	87235	.05 Mfd. 200 V. Paper	R121	82460	1.0 Meg. 10% ½ W.
C107	86300	.22 Mfd. ±20% 400 V. Paper	R122	82470	6.8 Meg. 10% ½ W.
C108	86140	.05 Mfd. ±10% 400V. Paper	R123	82793	68K 5% ½ W.
C109	86212	.01 Mfd. ±10% 400 V. Paper	R124	82629	5.6K 5% ½ W.
C110	86140	.05 Mfd. ±10% 400 V. Paper	R125	82466	3.3 Meg. 10% ½ W.
C111	86213	.005 Mfd. ±10% 400 V. Paper	R126	82472	10.0 Meg. 10% ½ W.
C112	87659	50 Mfd. 6 V. Lytic	R127	82449	120K 10% ½ W.
C113	86246	1.0 Mfd. ±10% 200 V. Paper	R128	82666	100K 5% ½ W.
C114	86270	680 Mmfd. ±10% 500 V. Ceramic	R129	82667	470K 10% ½ W.
C115	86212	.01 Mfd. ±10% 400 V. Paper	R130	82442	33K 10% ½ W.
C116	86207	.001 Mfd. ±10% 200 V. Paper	R131	82448	100K 10% ½ W.
C117	86268	470Mmfd. ±10% 500 V. Ceramic	R132	82609	300K 5% ½ W.
C118	87659	50 Mfd. 6 V. Lytic	R133	82457	560K 10% ½ W.
C119	86213	.005 Mfd. ±10% 400 V. Paper	R134	82460	1 Meg. 10% ½ W.
C120	86243	150 Mmfd. ±10% 500 V. Ceramic	R135	82798	360 5% ½ W.
C121	86213	.005 Mfd. ±10% 400 V. Paper	R136	82425	1.2K 10% ½ W.
C122	86159	.01 Mfd. ±10% 200 V. Paper	R137	82609	300K 5% ½ W.
C123	86297	.5 Mfd. ±10% 200 V. Paper	R138	82457	560K 10% ½ W.
C124	86248	.15 Mfd. ±10% 200 V. Paper	R139	82459	820K 10% ½ W.
C125	86248	.15 Mfd. ±10% 200 V. Paper	R140	82460	1 Meg. 10% ½ W.
C126	86248	.15 Mfd. ±10% 200 V. Paper	R141	82695	56K 5% ½ W.
C127	86248	.15 Mfd. ±10% 200 V. Paper	R142	309195	Volume Control
C128	86248	.15 Mfd. ±10% 200 V. Paper	R143	82691	200K 5% ½ W.
C129	86248	.15 Mfd. ±10% 200 V. Paper	R144	82464	2.2 Meg. 10% ½ W.
C130	87659	50 Mfd. 6 V. Lytic	R145	82421	560 10% ½ W.
C131	86140	.05 Mfd. ±10% 400 V. Paper	R146	82446	68K 10% ½ W.
C132	86243	150 Mmfd. ±10% 500 V. Ceramic	R147	82425	1.2K 10% ½ W.
C133	86146	.05 Mfd. ±10% 600 V. Paper	R148	82426	1.5K 10% ½ W.
C134	86146	.05 Mfd. ±10% 600 V. Paper	R149	82424	1.0K 10% ½ W.
C135a	87658	40 Mfd. 400 V. Lytic	R150	82631	7.5K 5% ½ W.
C135b		40 Mfd. 400 V. Lytic	R151	82430	3.3K 10% ½ W.
C135c		30 Mfd. 350 V. Lytic	R152	82425	1.2K 10% ½ W.
C136	87596	40 Mfd. 450 V. Lytic	R153	82456	470K 10% ½ W.
C137	87596	40 Mfd. 450 V. Lytic	R154	82667	470K 5% ½ W.
C138	86159	.01 Mfd. 200 V. Paper	R155	82659	330 5% ½ W.
C139a	87664	30 Mfd. 50 V. Lytic	R156	82433	5.6K 10% ½ W.
C139b		30 Mfd. 50 V. Lytic	R157	82457	560K 10% ½ W.
C140	86241	33 Mmfd. 500 V. Ceramic	R158	82789	390K 5% ½ W.
C141	86313	.01 Mfd. 500 V. Ceramic	R159	82433	5.6K 10% ½ W.
CR101	309115	Selenium Diode	R160	82789	390K 5% ½ W.
F101	303087	2 Amp Slo-Blo Fuse	R161	82627	4.7K 5% ½ W.
J101	300152	P. U. Socket	R162	82453	270K 10% ½ W.
J102	84305	Remote Volume	R163	82453	270K 10% ½ W.
J103	305206	Speaker Socket	R164	82701	2.7K 10% 1 W.
J104	12034	Mute Squelch	R165	82443	39K 10% ½ W.
L101	305446	Choke 1.5 HVS	R166	81197	600 5% 5 W.
P101	300007	Input Socket	R167	81197	600 5% 5 W.
P102	305316	Remote Volume Dummy Plug	R168	81198	3000 10% 10W.
Q101	308950	2N109	R169	81199	25,000 10% 10 W.
R101	82616	220K 5% ½ W.	R170	82451	180K 10% ½ W.
R102	82989	39K 5% ½ W.	R171	82418	330 10% ½ W.
R103	82639	22K 5% ½ W.	R172	82436	10K 10% ½ W.
R104	82618	100 5% ½ W.	S101	305541	Treble - Range Switch
R105	82624	3.3K 5% ½ W.	S102	305330	Bass Switch
R106	82850	82K 5% 2 W.	S103	305543	Speaker Switch
R107	82632	8.2K 5% ½ W.	T101	305430	Power Transformer
R108	82989	39K 5% ½ W.	T102	305560	Output Transformer
R109	82637	15K 5% ½ W.	V101	308120	12AX7 Tube
R110	82456	470K 10% ½ W.	V102	308603	6BJ6 Tube
R111	82698	150K 5% ½ W.	V103	308120	12AX7 Tube
R112	82450	150K 10% ½ W.	V104	308120	12AX7 Tube
R113	82454	330K 10% ½ W.	V105	308640	6L6 Tube
R114	82447	82K 10% ½ W.	V106	308640	6L6 Tube
R115	82847	68K 5% 2 W.	V107	308506	5U4 Tube