

INSTRUCTION MANUAL  
MODEL 602  
CONAX (Conaccelerator)  
Dual Channel Operation  
U.S. Patent No 3 111 635



FAIRCHILD RECORDING EQUIPMENT CORPORATION  
10-40 45th Avenue, Long Island City, NY.

IB602

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## FAIRCHILD CONAX

### MODEL 602

#### GENERAL

The FAIRCHILD CONAX is a device primarily developed for disk recording. It reduces the excessive accelerations which occur at high frequencies. Present day microphone technique and orchestration, combined with the RIAA treble pre-emphasis, often create quite impossible levels at the highest audible frequencies.

Until the last few years, it was assumed that the peak energy content in music and other recorded sounds decreased with increasing frequency, so this apparent margin was utilized to increase the signal-to-noise ratio by emphasizing the high frequencies in the sending (recording) end, and de-emphasizing them at the receiving (reproducing) end. By so doing, a considerable reduction in hiss and record noise was obtained. "Listener's fatigue" was reduced and the overall quality was considerably improved. This was done in FM and TV broadcasting as well as in disk recording with equally good results.

The improved frequency response of presently used microphones, and the character of the transmitted (recorded) material is sometimes a problem however, as mentioned above. Live TV shows, like children's programs, where numerous percussion-life noises may produce transients with excessive high frequency amplitudes can easily over-modulate the transmitter, if the level is not brought down, or a radical filter inserted. The CONAX is ideal for putting a ceiling on the high frequency peaks.

Tape recording is another field where the CONAX could be used to advantage, as tape recording curves also contain treble pre-emphasis. The tape itself already has a limiting action (saturation) at high frequencies, but unless the recording amplifier is free of distortion up to levels 15 to 20 db above tape saturation at these frequencies, the amplifier distortion will be the limitation. The CONAX will, however, solve the overload problem with a minimum of audible change in sound. Lower tape speeds, particularly, with considerable treble pre-emphasis can take advantage of a CONAX. Tape duplication is another field where the CONAX would be highly effective, especially where the material is transferred to lower speed tape.

In original recording sessions, CONAX, inserted in a microphone channel and used with discretion, will take care of excessive highs produced by female sibilant singers, loud cymbals, muted trumpets, bells, castanets and similar sounds, and

still maintain the basic sound quality.

The design of the CONAX is a result of both theoretical and practical studies. Even though it is impossible to insert a filter with considerable filtering action in an audio circuit without noticeable change in sound, the CONAX is very close to this seemingly impossible action and requirement. The reason for this is that the ear is not very sensitive to level differences at the highest frequencies, so a considerable reduction is possible without audible change if the duration of the high level peaks is short, that is, if it does not amount to a major part of the total energy content of the music. If there is a continuous high level at the highest frequencies, the action of course will be audible and the unit will act as a filter.

The CONAX will always ensure the necessary safety margin and permit higher apparent levels on records, tapes and pre-emphasized broadcasting.

### DESCRIPTION

The MODEL 600 CONAX is a single channel unit. The MODEL 602 is a dual channel unit for stereo use. As both channels in the stereo CONAX are similar, only one will be described here.

Inputs and outputs appear on barrier-type terminals at the rear of the unit. Plus 4 VU signal is fed to an input transformer. From the secondary, the signal is fed to the complex automatic filter, FL-101. The output of the filter feeds the grid of 1/2 12AX7 which, in turn, feeds the transformer loaded output tube 1/2 12BH7A. Feedback is applied from the primary of the output transformer to the cathode of 1/2 12AX7 without frequency discrimination.

Amplifier gain is variable by varying the amount of feedback. Screwdriver controls R109 and R209 are accessible through the front panel for this purpose.

In addition to plate and filament voltage, the power supply also furnishes a DC regulating voltage for the filter.

The threshold is variable in 6 steps. In OFF position, the amplifier works as a straight unity gain line amplifier with the filter inactive. In the other positions, different amounts of CONAX action takes place, the action increasing as position numbers increase.

### INSTALLATION & OPERATION

Unpack the unit. Remove the gray front cover plate, mount the unit in a relay rack, and mount the gray cover plate in

front of the black front panel. Connect to the program buss as described in INPUT & OUTPUT CONNECTIONS.

The unit is adjusted to unity gain at the factory. If tubes are replaced or the GAIN controls have been touched, the adjustment procedure is as follows:

Set the threshold control to OFF, feed 1KC at +4 dbm into the unit. Adjust the gain control(s) in the front panel until +4 dbm appears at the output (terminated).

### OPERATION

With the THRESHOLD switch in OFF position, the CONAX is a unit gain amplifier.

With the THRESHOLD switch in Position 1, only the highest frequencies, 10 to 15KC, are affected.

As the THRESHOLD switch is advanced towards larger position numbers, the action becomes more effective at higher frequencies.

As program material varies greatly in high frequency content and duration of high frequency peak levels, the application of the CONAX is somewhat a question of cut and try, if a peak reading meter with sufficiently short attack time to catch 10 to 15KC peaks is not at hand. The FAIRCHILD MODEL 641 stereo cutting system contains such a meter. On this meter, the action of the CONAX can be read directly in db if a given musical selection is played with and without the CONAX.

The CONAX should be used with discretion, that is, should not always work in position 5 which will give a maximum filtering action, and under extreme conditions slight intermodulation distortion. If this happens, retard the THRESHOLD switch to a lower number.

As the design is centered on maximum action with minimum audibility for a majority of peak energy distribution curves, careful use of this unit will make possible recordings and transmissions of optimum quality, with the advantages of reducing hiss and record noise and high level operation simultaneously.

### INPUT & OUTPUT CONNECTIONS

Inputs and outputs appear at the rear of the unit on barrier-type terminal strips. It is recommended that the CONAX be connected between an eventual limiter and the cutting amplifier in disk recording.

LEFT CHANNEL - INPUT  
(Z= 600 ohms)

Terminal 1 - tiepoint (no internal connection)

Terminal 2 - high

Terminal 3 - low

Terminal 4 - ground (chassis)

RIGHT CHANNEL - INPUT  
(Z= 600 ohms)

Terminal 5 tie point (no internal connection)

Terminal 6 - high

Terminal 7 - low

NOTE: If a floating circuit is used, it is necessary that Terminals 3 and 7 be strapped to Terminal 4.

LEFT CHANNEL - OUTPUT  
(Z= 600 ohms)

Terminal 8 - high

Terminal 9 - low

Terminal 10 - ground (chassis)

RIGHT CHANNEL - OUTPUT  
(Z= 600 ohms)

Terminal 11 - high

Terminal 12 - low

NOTE: If a floating circuit is used, it is necessary that Terminals 9 and 12 be strapped to Terminal 10.

If 150 ohm output impedances are desired, open front of the CONAX and restrap the output transformers inside the chassis. The connections are as follows:

150 ohms: join 5 and 6, connect to 4 and 7

600 ohms: join 5 and 6, connect to 3 and 8

If 150 ohm input impedances are desired, open front of the CONAX and restrap the input transformers. The connections are as follows:

150 ohms: disconnect wire between 2 and 3. Join 1 and 2. Join 3 and 4, connect to 1 and 4. Replace 820 ohm resistor with a 220 ohm.

(cont'd)

600 Ohms: Join 2 and 3, connect to 1 and 4  
Connect 820 ohm resistor from 1 to 4.

### MAINTENANCE

Very little maintenance is necessary. To check whether the CONAX action is effective, feed +14dbm at 1 kc and 10 kc into the unit with the THRESHOLD control in position 5. The difference in level shall be approximately 15 db.

### SPECIFICATIONS

GAIN	1
INPUT LEVEL REQUIREMENT	+4 VU or +8 VU
OUTPUT LEVEL	+4 VU or +8 VU (no overload before +27 dbm)
INPUT IMPEDANCE	150 ohm/600 ohm
OUTPUT IMPEDANCE	150 ohm/600 ohm
FREQUENCY RESPONSE	As straight amplifier: +1 db 25 cps to 15 KC  Maximum filter action: 6 db/octave. Roll off from 2 kc (75 micro-seconds)
DISTORTION	Below filter threshold: less than 1%
NOISE	70 db below +4 dbm
SEPARATION	Better than 45 db
TUBE COMPLEMENT	1 - 6X4 1 - 12AX 7 or ECC83 1 - 12BH7
FUSE	1 amp
POWER REQUIREMENTS	117V AC 30 VA (600) 35 VA (602)
WEIGHT	16.5 lbs
MECHANICAL DIMENSIONS	Standard 19" rack. 5/4" rack space, depth behind panel 9/2"

### WARRANTY

Every FAIRCHILD professional product carries a 90 day warranty on all parts. Should any part be found defective, the entire

unit may be returned to the factory during the warranty period for service, or, if applicable, FAIRCHILD will supply the replacement part to you if you wish to install yourself.

To validate the warranty, please complete and return the warranty registration included in this manual. If there is any question on this or other FAIRCHILD professional products, please do not hesitate to contact us.

ATTACHMENTS

Schematic diagram - CONAX MODEL 602

CONAX-action curves

WARRANTY REGISTRATION

MODEL 602 CONAX Serial No. \_\_\_\_\_  
Name of Purchaser \_\_\_\_\_ Date \_\_\_\_\_  
Address of Purchaser \_\_\_\_\_ Purchased \_\_\_\_\_  
\_\_\_\_\_

Name of Distributor \_\_\_\_\_  
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# CONAX - ACTION

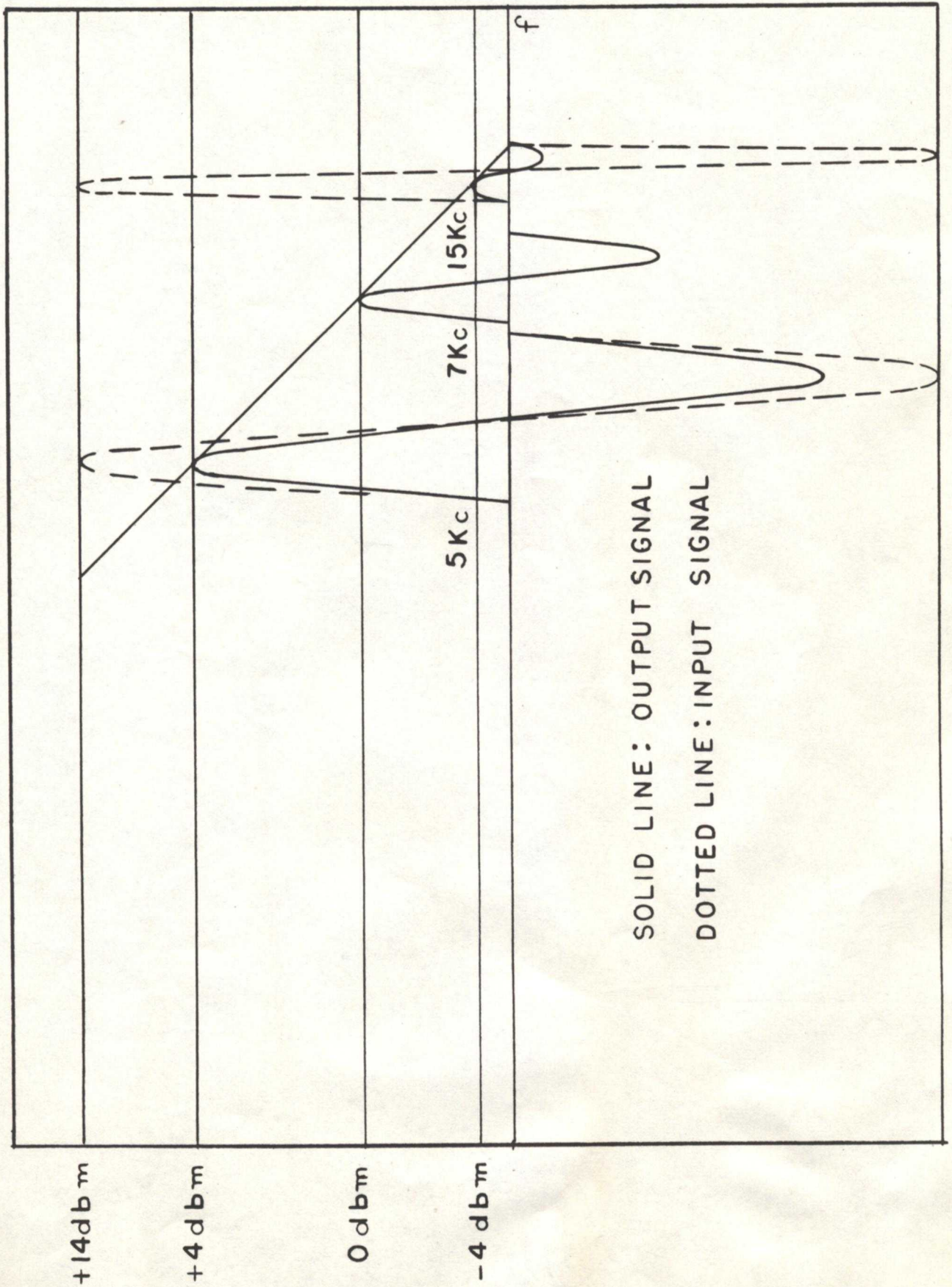


FIG. 1



# CONAX - ACTION

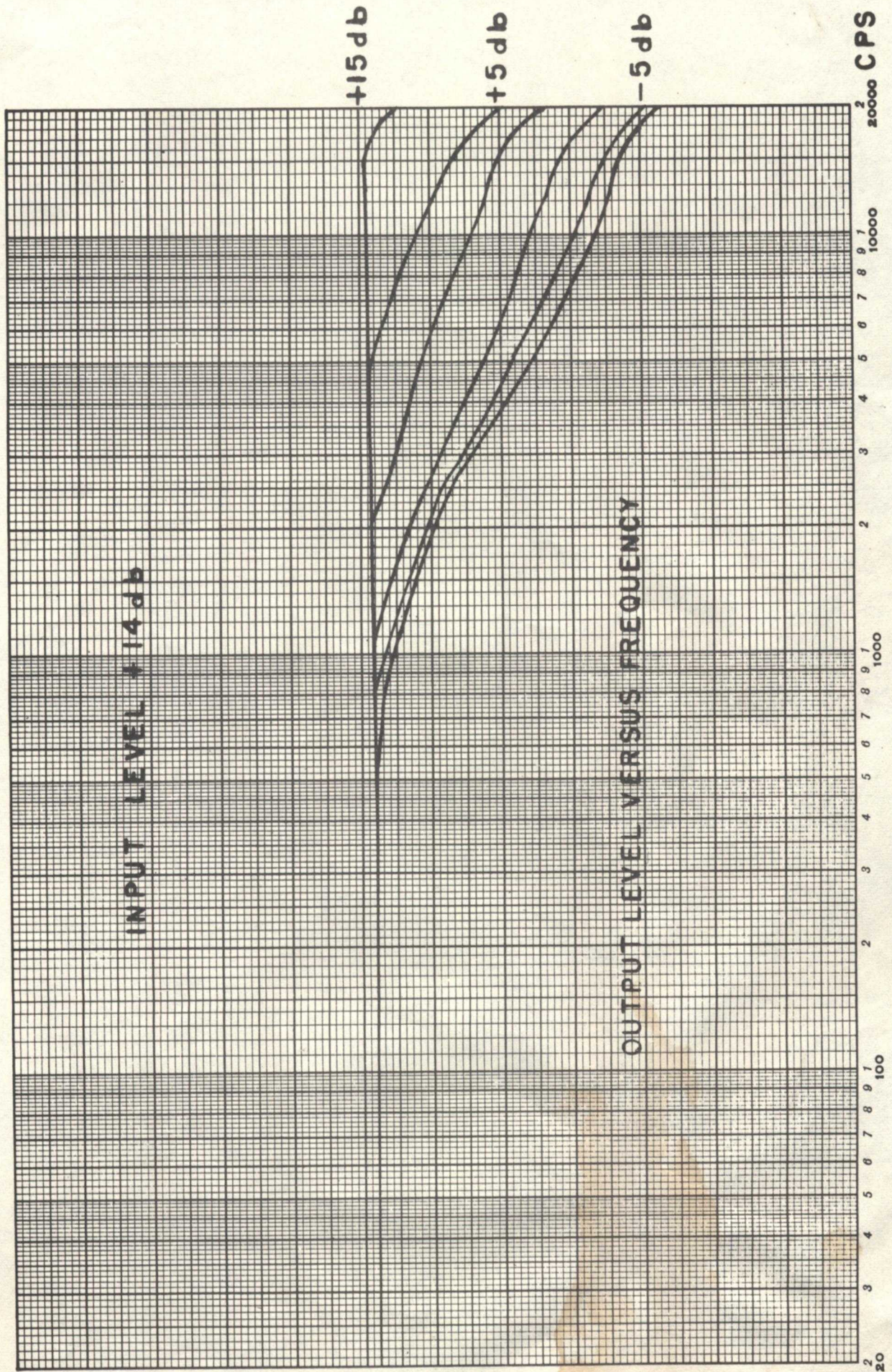
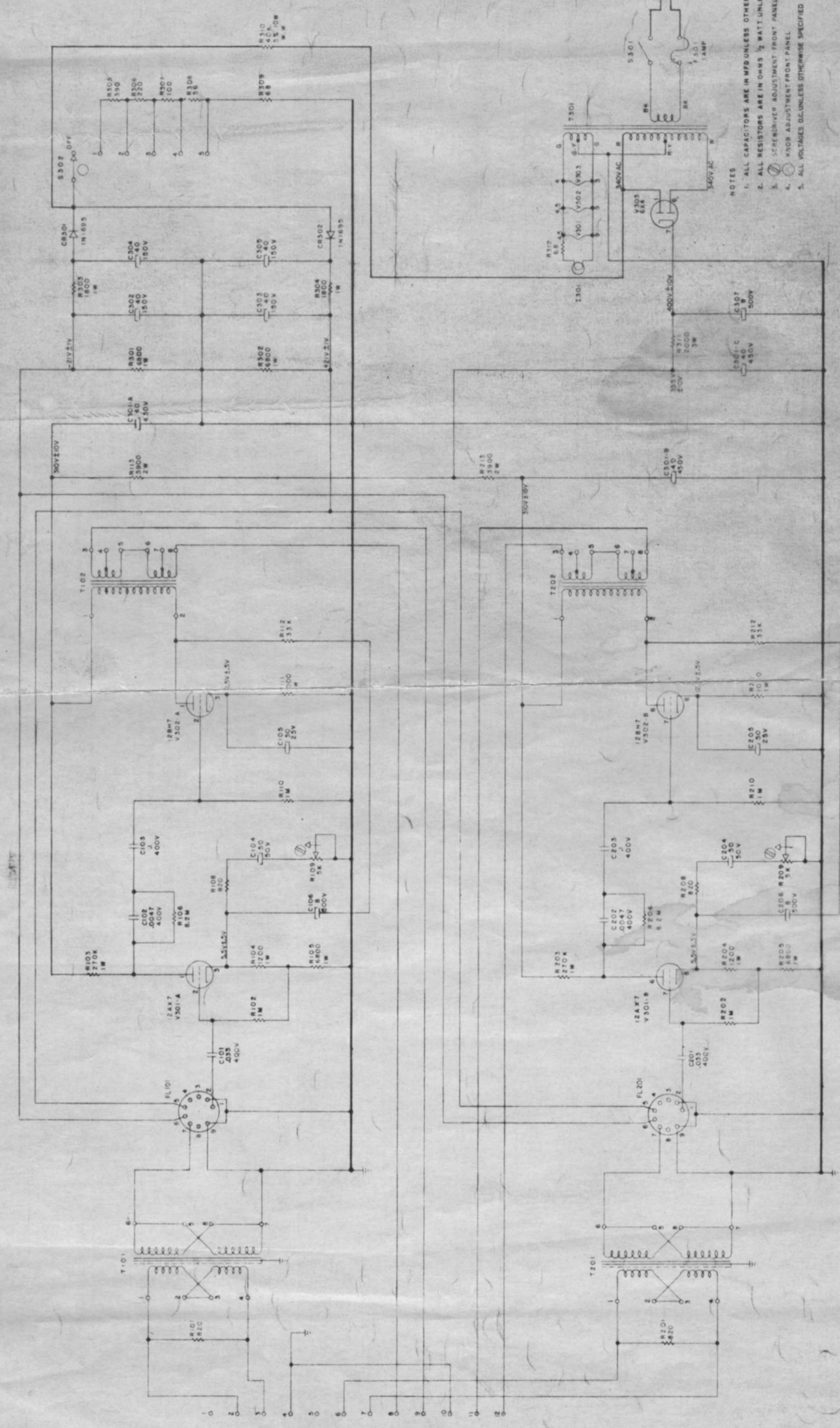


FIG. 2



- NOTES
1. ALL CAPACITORS ARE IN MFD UNLESS OTHERWISE SPECIFIED.
  2. ALL RESISTORS ARE IN OHMS 1/2 WATT UNLESS OTHERWISE SPECIFIED.
  3. SPEAKER ADJUSTMENT FRONT PANEL.
  4. KNOB ADJUSTMENT FRONT PANEL.
  5. ALL VOLTAGES DC UNLESS OTHERWISE SPECIFIED.

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