M5235 EQUALIZED PREAMPLIFIER

SPECIFICATIONS

Levels: With G.E. VRII cartridge, input 12 mv. Output; -10 DBM maximum, -20 DBM normal.

Distortion: Less than 1% at -10 DBM output, from 50 to 15,000 cps.

Impedances: Input depends on cartridge loading. Output 150 and 600 ohms balanced or unbalanced. High impedance connection also available, unbalanced.

Noise: 55 DB below -20 DBM output.

Power: Self-contained power supply.

Schematic for the preamplifier is shown on C-19343. It utilizes two 12AX7 tubes, with an RC feedback network around the first pair of triodes to provide the low frequency boost shown on the equalization curves. Straight feedback is used around the second pair of triodes to reduce distortion to a very low value.

High frequency roll-off shown on the curves is obtained by selecting various loading resistors for the cartridge in use. The value of resistance depends directly on the cartridge inductance, and in this case the resistors have been chosen to work in conjunction with the G.E. 520 mh group, such as the RPX-050 and 4G-050.

In the filter position of the compensator a capacitor is shunted across the cartridge, effectively forming a low pass filter and providing a means of scratch suppression for noisy records.

The RIAA curve was adopted in 1954 by the recording industry as a standard. It also provides a close match to the old and new AES, RCA Orthophonic, and new NARTB curves. The NAB curve provides equalization for transcription and early LP recordings.

In the event that a G.E. low impedance cartridge is used, change R20 to 2200 ohms, R21 to 4700 ohms and C7 to .05 mfd.

INSTALLATION

1. The photograph shows how the preamplifier is mounted on the Gates CB-100 and CB-500 turntable with the brackets provided. Many other methods of mounting are possible with other turntables. However, the length of cable from the cartridge should not exceed 4 or 5 feet.

2. The output pair, cartridge, a.c. line and external ground are connected by referring to the schematic, C-19343. Ground should also be connected to the turntable chassis and motor.

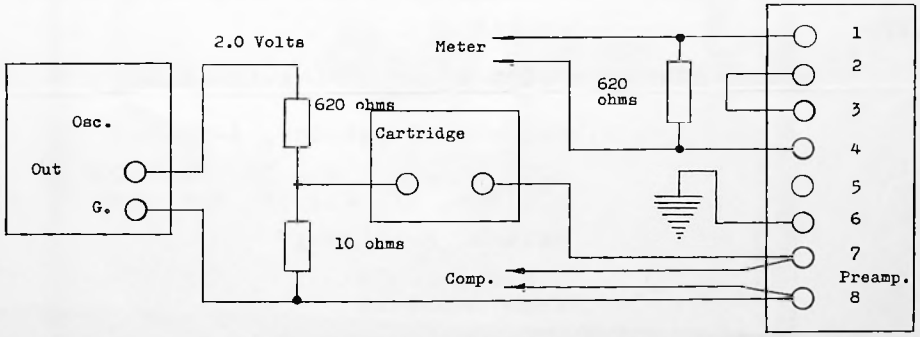
OPERATION

1. With the preamplifier operating into the control console, turn up the console and preamplifier gain controls to a point where hum can be heard in the monitor speaker, and adjust the hum balance control, R1, for a minimum.

2. The majority of broadcast consoles require a level at the turntable input of -20 DBM at 150 or 250 ohms. This output will be obtained with a G.E. cartridge when the gain control is rotated about 1/5 turn. The level can be checked by measuring the audio voltage between terminal 5 and ground with a VTVM. A voltage of .45 volts R.M.S. will provide an output level of -20 DBM.

TEST

If it is desired to test the performance of the preamplifier, use the test set up shown in the sketch.



Set the preamplifier level control to obtain -10 DBM output at the output terminals, at 1000 cps. The indicating meter should be a noise and distortion analyzer capable of reading down to -65 DBM.

Check response. Below 1000 cps, reduce the output of the oscillator to maintain a constant preamplifier output level, and read the response from the oscillator decade settings. Above 1 KC, the oscillator output should be held constant at 2.0 volts and the response read on the output meter. Curves shown on A-10940 should be reproduced within ±2 DB.

For noise and distortion checks, remove the cartridge. Set oscillator at 2.0 volts at 1 KC and adjust the preamplifier level control for -10 DBM output. Noise should be 65 DB below output level. This is dependent on input tube, hum balance and line polarity. For distortion, check from 1 KC to 15 KC with constant oscillator output; below 1 KC, reduce oscillator output to maintain constant preamplifier output. Distortion should be below 1%.

NOTE: If the above tests are made with the preamplifier output connected for 150 ohms, the actual output meter reading for the reference output level will be -16 DB.

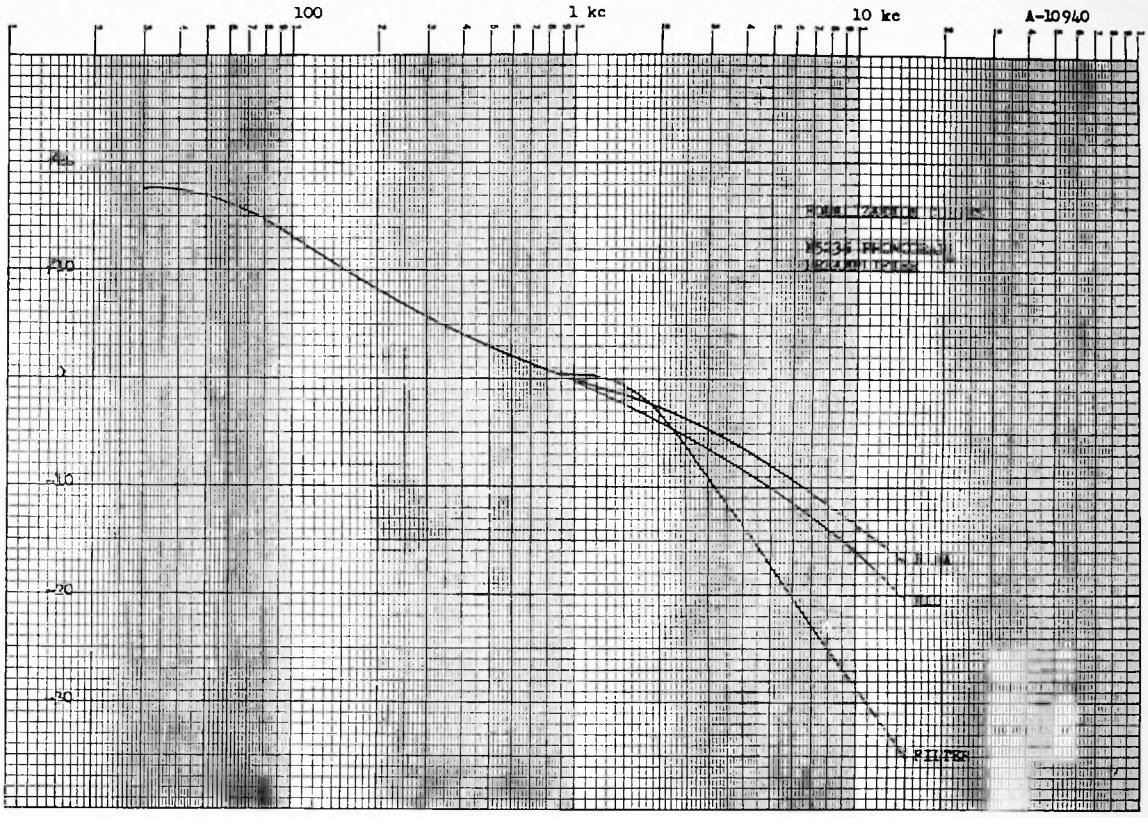
PARTS LIST

Symbol No.	Description
C1	Capacitor, 40-20-20 mfd., 250 V.
C2,C5	Capacitor, .01 mfd., 400 (W) V.
C3	Capacitor, .003 mfd., 500 (W) V., ±5%
C4	Capacitor, .05 mfd., 200 (W) V.
C6,C10	Capacitor, .5 mfd., 200 (W) V.
C8,C9	Capacitor, .00039 mfd., 500 (W) V.
CR1	Selenium Rectifier
F1	Fuse, 1/2 amp., 250 V.
R1	Control, 100 ohm, A-3404-17
R2	Resistor, 10K ohm, 1/2 W., 5%
R3	Resistor, 33K ohm, 1/2 W., 10%
R4	Resistor, 220K ohm, 1/2 W., 10%
R5	Resistor, 68K ohm, 1/2 W., 10%
R6	Resistor, 2200 ohm, 1 W., 5%
R7	Resistor, 100K ohm, 1 W., 5%
R8,R12,R15	Resistor, 100K ohm, 1/2 W., 5%
R9	Resistor, 2.2 megohm, 1/2 W., 10%
R10,R17	Resistor, 470K ohm, 1/2 W., 5%
R11,R14	Resistor, 2200 ohm, 1/2 W., 5%
R13	Control, 500K ohm, A-3404-28
R16	Resistor, 62K ohm, 1/2 W., 5%
R18	Resistor, 1200 ohm, 1/2 W., 5%
R19	Resistor, 47K ohm, 1/2 W., 5%
S1	Toggle Switch
T1	Power Transformer
T2	Output Transformer, A-10427-T
TB1	Terminal Board
TB2	Terminal Board, B-10105-2
V1,V2	Tube, 12AX7
XF1	Fuseholder
XV1,XV2	Socket

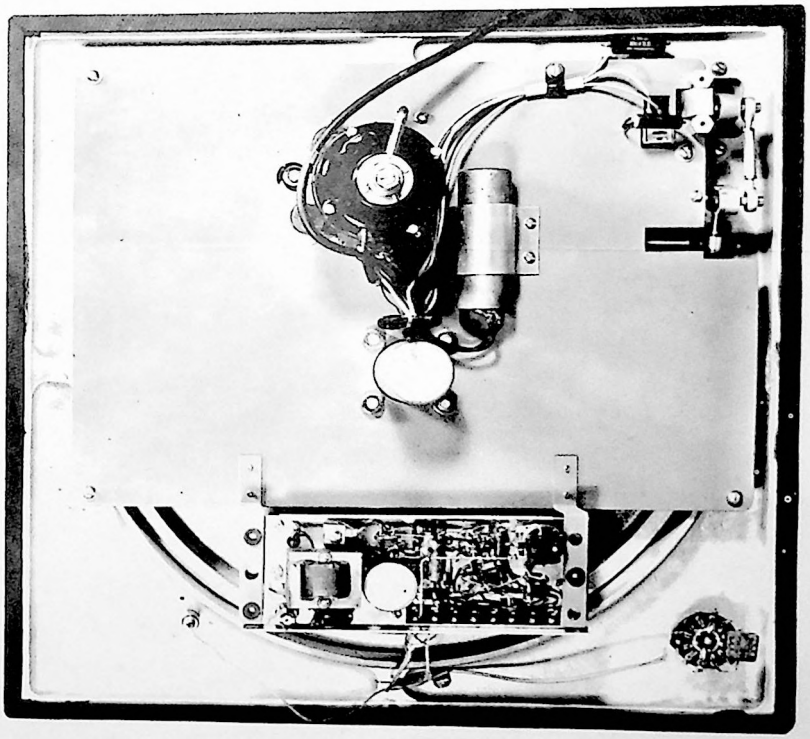
HI-FREQ. COMPENSATOR ASSEMBLY - A-10943-101

C7	Selector Capacitor, A-9110-3
R20	6200 ohm, 1/2 W., 5%, Resistor
R21	10K ohm, 1/2 W., 5%, Resistor
S2	Switch, B-11139-17
	Plate A-10884
	Knob S-626-11

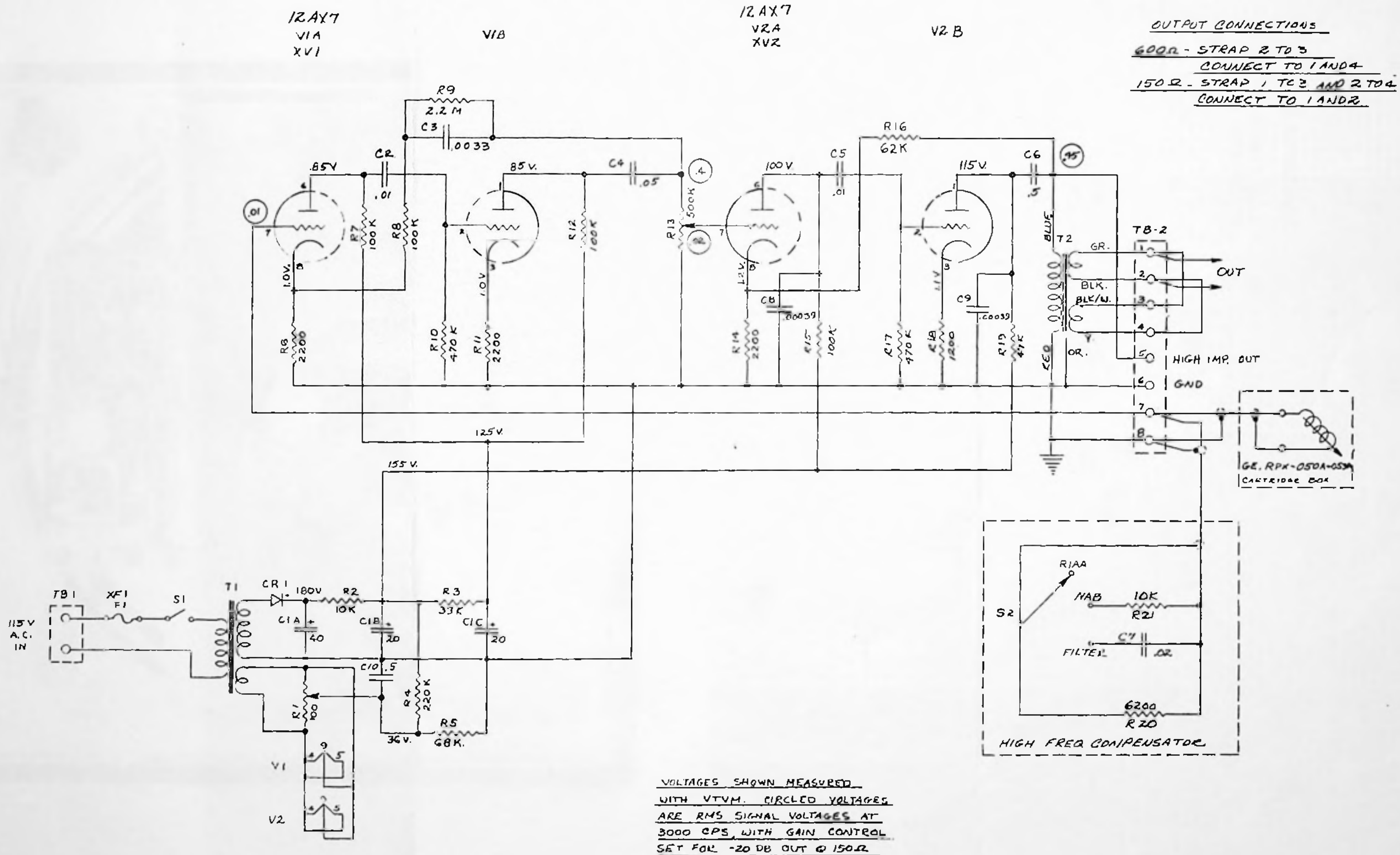
Gates Radio Company
Quincy, Illinois
IB-2304



A-10940



						FIRST MADE FOR	GATES RADIO COMPANY QUINCY, ILLINOIS		C-19343 SCALE
106	105	104	103	102	101		LIST OF PARTS		
QTY	QTY	QTY	QTY	QTY	QTY	ITEM	REFERENCE	FIN.	DESCRIPTION	MATERIAL



12AX7
V1A
XV1
V1B
12AX7
V2A
XV2
V2 B
OUTPUT CONNECTIONS
600Ω - STRAP 2 TO 3
CONNECT TO 1 AND 4
150Ω - STRAP 1 TO 3 AND 2 TO 4
CONNECT TO 1 AND 2
R9
2.2 M
C3
.0033
CR
.01
85V
85 V.
C4
.05
100 V
C5
.01
R16
62K
115V
C6
.5
R7 100K
R8 100K
R12 100K
R13 500K
R6 2200
R10 470 K
R11 2200
C8 .00039
R14 2200
R15 100K
R17 470K
R18 1200
C9 .00039
R19 47K
BLUE
T2
GR.
BLK.
BLK/W.
OR.
TB-2
OUT
HIGH IMP. OUT
GND
GE. RPX-050A-053
CARTRIDGE BOX
125 V.
155 V.
TB1
115 V
A.C.
IN
XF1
F1
S1
T1
CR 1
180V
R2
10K
R3
33K
C1A 40
C1B 20
C1C 20
C1D .5
R4 220 K
R1 100
R5
68K.
36 V.
V1
V2
S2
RIAA
NAB
10K
R21
FILTER
C7 .02
6200
R20
HIGH FREQ COMPENSATOR
VOLTAGES SHOWN MEASURED
WITH VTVM. CIRCLED VOLTAGES
ARE RMS SIGNAL VOLTAGES AT
3000 CPS, WITH GAIN CONTROL
SET FOR -20 DB OUT @ 150Ω

TITLE SCHEMATIC FOR EQUALIZED PRE-AMP.

M5235

MTL.	FIN.
DR. BYRCK DATE	CH. BY DATE	ENG. DATE

C-19343