INSTRUCTION BOOK

Model 920
Peak Limiting Amplifier

KTIM - AM ONLY

Bauer
ELECTRONICS CORPORATION

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Model 920
Peak Limiting Amplifier

BAUER ELECTRONICS CORPORATION
1663 Industrial Road
San Carlos, California

WARRANTY

Bauer Electronics Corporation warrants new equipment of its manufacture and assembly for one (1) year against breakage or failure of parts due to imperfection of workmanship or material, its obligation being limited to repair or replacement of defective parts upon return thereof, prepaid to the Bauer plant. High-voltage transformers, modulation transformers and reactors and filter chokes carry an extended warranty with 50% of the replacement cost being allowed should failure occur during the second year. Warranty will be based on date of invoice. No return shipments will be accepted without prior authorization. Electron tubes and silicon rectifiers bear only the warranty of the manufacturer thereof in effect at the time of shipment to Purchaser.

BAUER ELECTRONICS CORPORATION

INSTALLATION AND OPERATING INSTRUCTIONS

Peak Limiting Amplifier
Model 920

C O N T E N T S

ILLUSTRATIONS

62463
61064

SUMMARY OF MECHANICAL AND ELECTRICAL SPECIFICATIONS

FREQUENCY RESPONSE:

Without limiting: 0.5 db, from 20 cps to 20 kc.
With 5 db limiting: 0.5 db, from 20 cps to 20 kc.

DISTORTION:

Without limiting: Less than 1% from 50 cps to 15 kc.
With 7 db limiting: " " 1.3% " " " " " "

GAIN:

Jumper in low gain position: 24 db.
Jumper in high gain position: 37 db.

MINIMUM INPUT LEVEL TO ACCOMPLISH LIMITING:

Jumper in low gain position: -12 dbm.
Jumper in high gain position: -24 dbm.

MAXIMUM OUTPUT AT THRESHOLD OF LIMITING: 21 dbm.

INPUT AND OUTPUT IMPEDANCE: 600 ohms, unbalanced.

SIGNAL TO NOISE RATIO: 80 db.

COMPRESSION RATIO (above threshold of limiting): 12 to 1

ATTACK TIME: Adjustable from 100 to 1000 microseconds.

RELEASE TIME: Adjustable from 27 to 527 milliseconds.

TUBE COMPLEMENT: One each, 6BC8, 12AX7, 12BH7, 6AL5, 0B2, GZ34.

DIMENSIONS: Width: 19 inches.
Height: 3½ inches.
Depth: 9¼ inches.

WEIGHT: 17 pounds

MODEL 920
LIMITING AMPLIFIER

PHYSICAL DESCRIPTION

The Bauer Model 920 "Peak-Master" is an extremely versatile professional quality peak limiting amplifier designed for use in the recording, broadcasting and motion picture industries, as well as other high quality audio systems. The Model 920 is a true limiting amplifier capable of high gain, low distortion, linear amplification at levels below the threshold of limiting, and with excellent limiting characteristica and negligible increase in distortion at levels above.

The Model 920 is designed to be mounted in a standard 19" rack. The unit requires only 3½" of rack space, and the front panel is hinged to provide accessibility to inner components. The highest quality military type printed circuitry is combined with 1% precision resistors and overrated components throughout to insure maximum performance and reliability. Plug-in type "FP" electrolytic capacitors are used for ease of replacement.

The "Peak-Master" has a self contained power supply, a VU meter that is switchable to indicate input or output level as well as gain reduction in db, and input and output attenuators detented in 2 db steps, with vernier adjustments in excess of 2 db for each step.

The limiter is provided with a terminal strip on the rear of the unit for interconnecting the amplifier with a system. The terminal strip also provides for connecting a remote VU meter if desired.

Separate adjustments of the attack and release times are provided on the front panel as well as a limit defeat switch mounted on the rear of the attack control, to allow for the wide variety of program material that the Model 920 will be expected to handle. Checking the unit for balance, or rebalancing may be accomplished without the need of test equipment, because an internal signal for balancing is provided on one position of the test switch. Screw-driver adjustment holes are provided on the front panel so that the VU meter may be easily observed with the panel closed during balancing.

OPERATION

GAIN

The gain of the amplifier can be changed by altering resistance in the grid circuits of V1. Jumpers have been provided for this purpose (see Figure 2). Unless otherwise specified, the unit is wired with the two jumpers connected for low gain (24 db). If desired, the jumpers can be relocated to the high gain (37 db) position.

VU METER

Unless otherwise specified, the Model 920 is wired for a 8-dbm zero reading on the VU meter. If desired, the VU meter can be wired for a +4-dbm zero reading by relocating a jumper wire in the meter switching circuit (see Figure 2).

Terminals are provided on the rear of the unit for connecting a remote VU meter. A strapping arrangement on the VU meter terminal board allows the remote VU meter to perform all of the functions of the internal meter, or to just indicate gain reduction, while the internal meter is still usable to indicate input and output level.

ATTENUATORS

The input and output attenuators are both adjustable from 0 to 40 db. For this reason the "Peak-Master" may be utilized at any point in the system where the input signal level is between -24 dbm and +13 dbm. The attenuators are adjusted for proper operating levels as follows:

a. Rotate the input and output attenuators fully counterclockwise (maximum attenuation).

b. Interconnect the unit with the system using the terminal strip on the rear.

c. Feed a sample of the program material into the system.

d. Set the meter switch to GR position.

e. Decrease attenuation with the input attenuator until the desired amount of limiting is observed on the meter (limiting should not exceed 3 to 4 db except where the program material contains extremely loud peaks).

f. Set the meter switch to OUTPUT position.

g. Decrease attenuation with the output attenuator until the desired output level is observed on the meter.

h. Return the meter switch to GR position to verify amount of limiting during operation.

ATTACK AND RELEASE TIME

The ATTACK and RELEASE potentiometers should be adjusted for optimum results in accordance with the type of program material being used. The following general suggestions are given for use use of the ATTACK and RELEASE adjustments:

a. For vocal or narration program material with minimum low frequency information, best results are usually obtained by adjusting for very fast attack and release time.

b. The release time should be lengthened as the low frequency content of the program material increases.

c. The attack time should be lengthened when the program material contains tremelo or vibrato which the limiter might possibly follow.

The limit defeat switch is located on the attack potentiometer. By turning the attack control full counterclockwise, the limiting action may be defeated and the unit performs as a normal line amplifier.

Note: The fastest attack or release time is attained by turning the control full clockwise.

BALANCING ADJUSTMENTS

Inherent stability eliminates the need for frequent balancing of the Model 920. However, if thumping is noticed or components are replaced, the unit should be balanced as follows:

a. If using TEST 1 position, remove any input signal from the amplifier.

b. Set the attack and release controls to approximate mid settings.

c. Rotate the input and output attenuators fully counter-clockwise (maximum attenuation).

d. Before proceeding with balancing, check for GASSY condition of the 6BC8. Excessive gas in the envelope of this tube can cause serious distortion.

Set the meter switch to GR position. Rotate the RELEASE potentiometer to the full clockwise position, and then (while watching the meter) rotate it full counter-clockwise. An increase in the reading of more than 1/4 db indicates excessive gas and the 6BC8 should be discarded. This quick check should be performed from time to time to insure top performance.

e. Set the meter switch to OUTPUT position. Set the TEST switch to TEST 1 position.

Note: If desired, balancing can be performed by applying a 3-volt external signal to the input jacks and setting the test switch to TEST 2 position.

f. Rotate the output attenuator clockwise until an indication is observed on the meter.

g. Adjust first the PLATE BALANCE and then the CATHODE BALANCE controls for minimum meter deflection.

h. Rotate the output attenuator fully clockwise (zero attenuation).

i. Adjust first the PLATE BALANCE and then the CATHODE BALANCE controls for minimum meter deflection. Note meter indication.

j. Adjust the PLATE BALANCE control slightly clockwise until a change in meter indication is observed. Then attempt to adjust CATHODE BALANCE control for a meter indication less than that noted in Step i.

(1) If meter indication is less than that noted in Step i, perform step j repeatedly until absolute minimum meter indication is obtained.

(2) If meter indication is not less than that noted in Step i, adjust the PLATE BALANCE control slightly counterclockwise until a change in meter indication is observed. Then adjust the CATHODE BALANCE control for minimum deflection. Perform sub-step (2) repeatedly until absolute minimum meter deflection is obtained.

Note: The minimum meter deflection should be in the order of -20 db. If the two sections of the 6BC8 are not reasonably symmetrical, optimum balancing cannot be obtained.

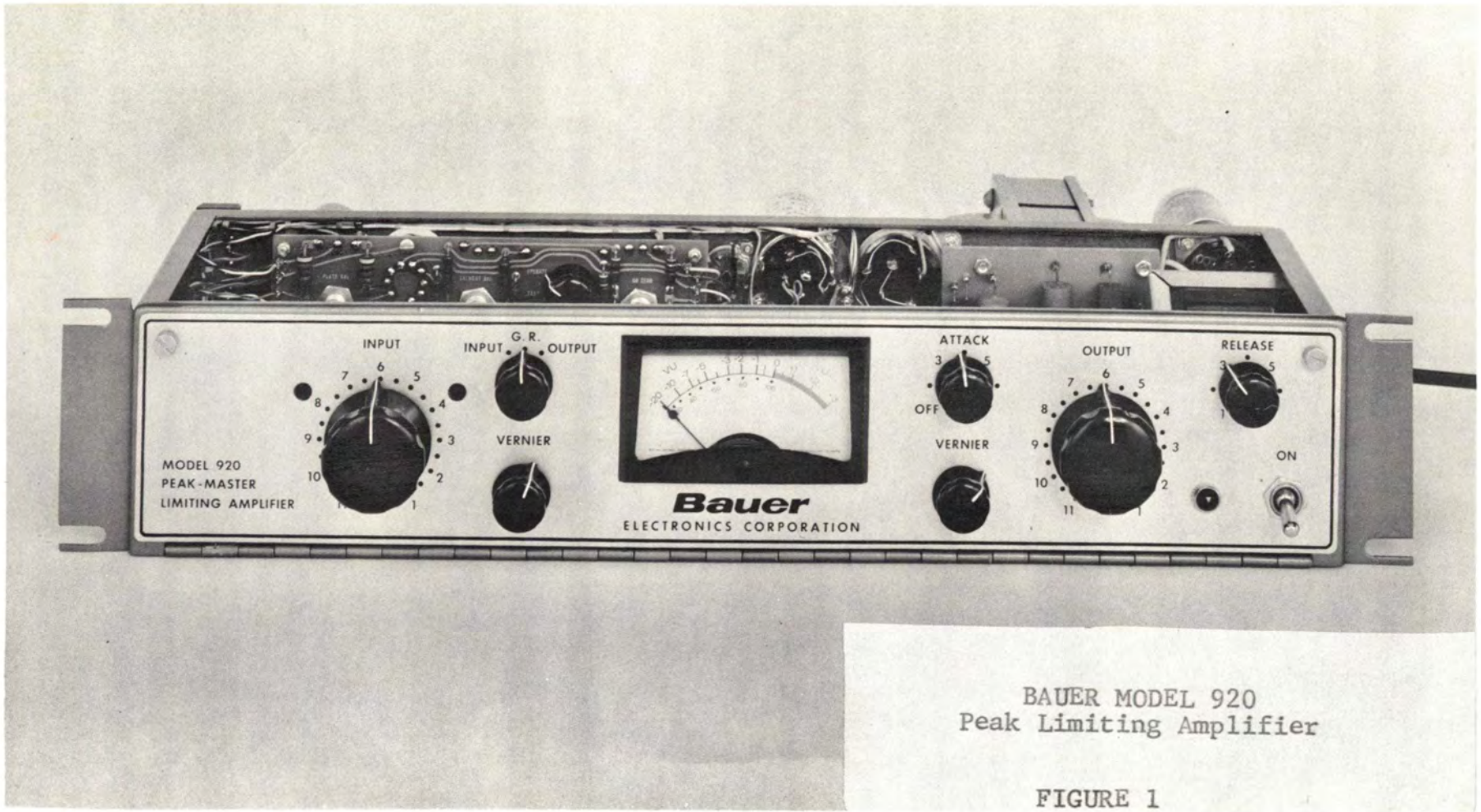
CAUTION: Do not leave test switch in TEST 1 position for an appreciable length of time with excessive imbalance. This can cause overloading of the output stage and damage to the 12BH7.

PARTS LIST

Symbol	Bauer Part No.	Description	Manufacturer
		Resistors	
R1	10-160	Potentiometer, 300 ohms, ww	WN-301
R2	10-161	Resistor, 20k, ½w, 1%	
R3	10-162	Resistor, 6.8k, ½w, 1%	
R4		Same as R3	
R5		Same as R2	
R6	10-163	Potentiometer, 100 ohms, 5w	WN 101
R7	10-164	Resistor, 47 ohms, ½w, 5%	
R8		Same as R7	
R9	10-165	Potentiometer, 1k, 5w	WN-102
R10	10-166	Resistor, 33 ohms, ½w, 5%	
R11		Same as R10	
R12	10-167	Resistor, 4.7k, 1w, 5%	
R13		Same as R9	
R14		Same as R12	
R15		Same as R2	
R16		Same as R2	
R17	10-168	Resistor, 180k, 1w, 5%	
R18		Same as R17	
R19	10-186	Resistor, 2.2k, ½w, 1%	
R20		Same as R-19	
R21	10-169	Resistor, 180k, ½w, 1%	
R22		Same as R21	
R23		Not used	
R24	10-170	Resistor, 220k, ½w, 1%	
R25		Same as R24.	
R26	10-171	Resistor, 1.2 meg, ½w, 1%	
R27		Same as R26	
R28	10-172	Resistor, 47k, ½w, 5%	
R29		Same as R28	
R30	10-173	Resistor, 330 ohms, 1w, 5%	
R31		Same as R1	
R32		Not used	
R33	10-174	Resistor, 10k, 10w	
R34	10-175	Resistor, 1k, 10w	
R35		Not used	
R36	10-176	Resistor, 82k, 1w, 5%	
R37	10-177	Resistor, 68k, ½w, 5%	
R38	10-178	Resistor, 10k, ½w, 5%	
R39	10-179	Potentiometer, 25k	B-26
R40	10-180	Potentiometer, 5 meg.	B-87
R41	10-181	Resistor, 270k, ½w, 5%	
R42	10-182	Resistor, 220k, ½w, 5%	
R43		Same as R42	
R44	10-183	Resistor, 8.2k, ½w, 5%	
R45	10-184	Resistor, 820 ohms, ½w, 5%	
R46	10-185	Resistor, 4.7k, ½w, 5%	

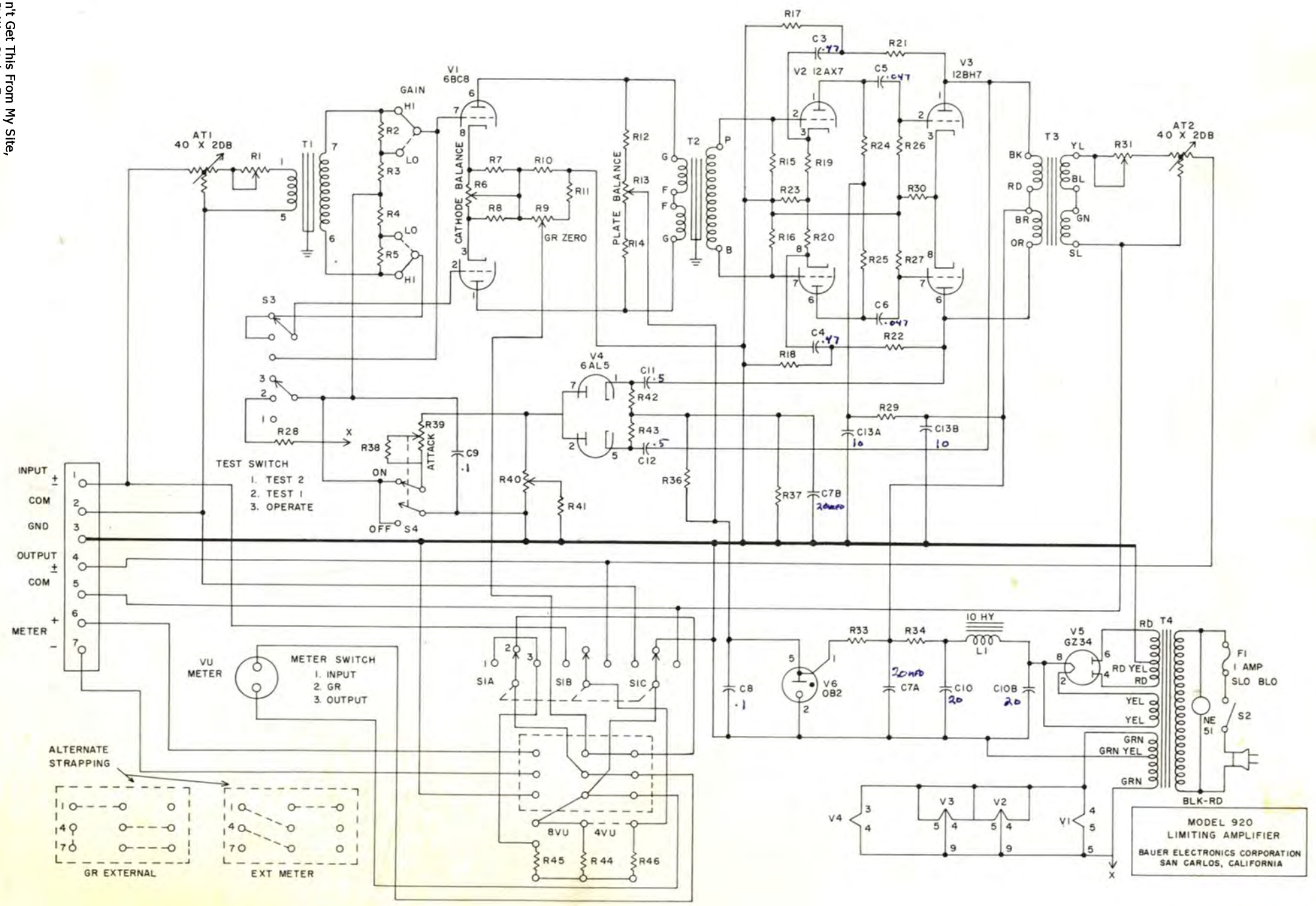
Symbol	Bauer Part No.	Description	Manufacturer
		Capacitors	
C1		Not used	
C2		Not used	
C3	20-140	.47 mfd, 200 v	
C4		Same as C3	
C5	20-141	.047 mfd, 600 v	
C6		Same as C5	
C7	20-142	20/20 mfd, 450 v	Mallory, F P-234
C8	20-143	0.1 mfd, 400 v	
C9	20-145	0.1 mfd, 100 v	P 82
C10	20-145	20/20/20 mfd, 450 v	Mallory, F P-444
C11	20-146	0.5 mfd, 600 v	CD-WA 6050-4
C12		Same as C11	
C13	20-147	10/10 mfd, 450/450 v	Mallory, F P-231
		Inductors	
L1	30-124	Filter choke, 10 h	8010
		Switches	
S1	50-115	Switch, Meter, 2P, 3 POS	Centralab PA-2003
S2	50-116	Switch, on/off, 3A, 250 v	20994-LH
S3	50-117	Switch, test, 2P, 3 POS	
S4	50-118	Switch, limit defeat	Centralab KR-3
		Meters	
VU Meter	60-110	Meter, VU	API-361
		Transformers	
T1	70-110	Transformer, Input	UTC 0-1
T2	70-111	Transformer, Interstage	A-19
T3	70-112	Transformer, Output	PA-6003
T4	70-113	Transformer, Power	Trans-Tech. 7525
		Tubes	
V1	80-110	Vacuum Tube, 6BC8	
V2	80-111	Vacuum Tube, 12AX7	
V3	80-112	Vacuum Tube, 12BH7	
V4	80-113	Vacuum Tube, 6AL5	
V5	80-114	Vacuum Tube, GZ34	
V6	80-115	Vacuum Tube, OB2	

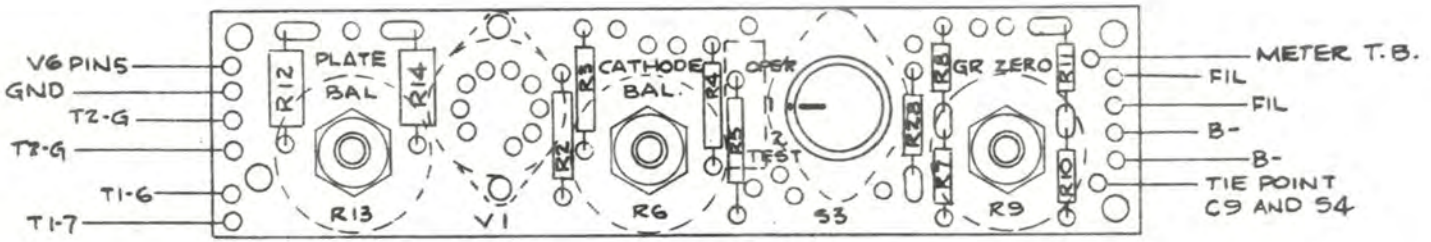
Symbol	Bauer Part No.	Description	Manufacturer
		Fuses	
F1	100-110	Fuse, 1A, 3AG, Slo-Blo	
		Pilot Lamps	
I1	110-105	Pilot Lamp, NE-51	
I2	110-106	Meter Lamp, #55	
		Terminal Boards	
TB1	130-105	Terminal Strip, 7 position	Cinch-Jones 7-140-Y
		Receptacles and Tube Sockets	
X1	150-110	Socket, Printed circuit,9 pin	121-54-12-117
X2		Same as X1	
X3		Same as X1	
X4	150-111	Socket, 7 pin	7 EM
X5	150-112	Socket, 8 pin	77-MIP-8
X6		Same as X4	
X7	150-113	Electrolytic Socket, 4 pin	2C7
X8	150-114	Electrolytic Socket, 3 pin	2C5
	250-140	Chassis	C-10030
	250-141	Escutcheon	
	250-142	Input transformer shield	UTC- 0-17
	250-143	Interstage transformer shield	UTC-A-33
AT1	250-144	Attenuator, Input	Langevin 1923
AT2	250-144	Attenuator, Output	LangevinAT-601
	250-145	Amplifier printed circuit board	B-10022
	250-146	Input printed circuit board	B-10034
	250-147	Power supply terminal board	A-10037
	250-148	Meter switch terminal board	A-10041
	250-149	Fuse Holder	HKP
	250-150	Pilot Lamp Holder	5B
	250-152	Tube Shield Base	9SB1
	250-153	Knob, 3/4"	V1G
	250-154	Knob, 1½"	V1B
	250-155	Transformer Clamps	VR1
	250-156	Tube Shield	TS-103U02

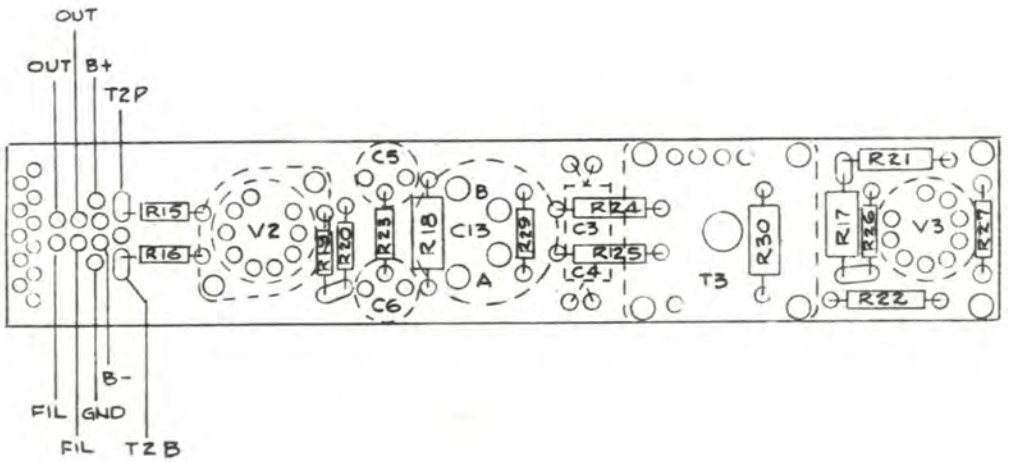


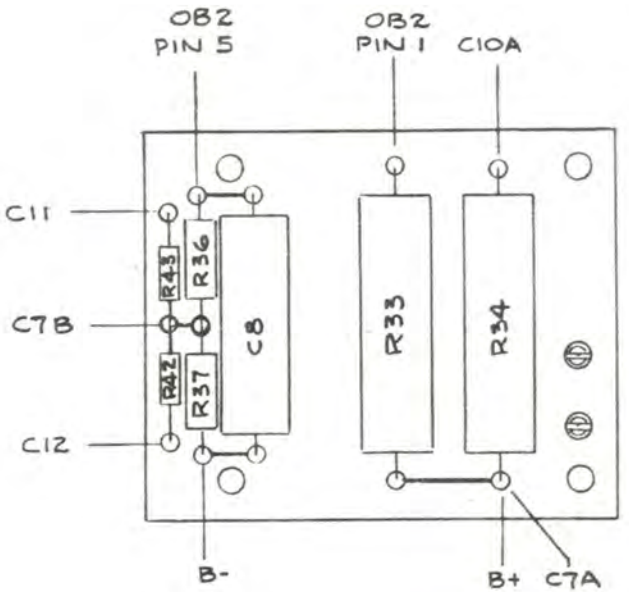
BAUER MODEL 920
Peak Limiting Amplifier

FIGURE 1









Component Location
Model 920 Limiting Amplifier

FIGURE 3