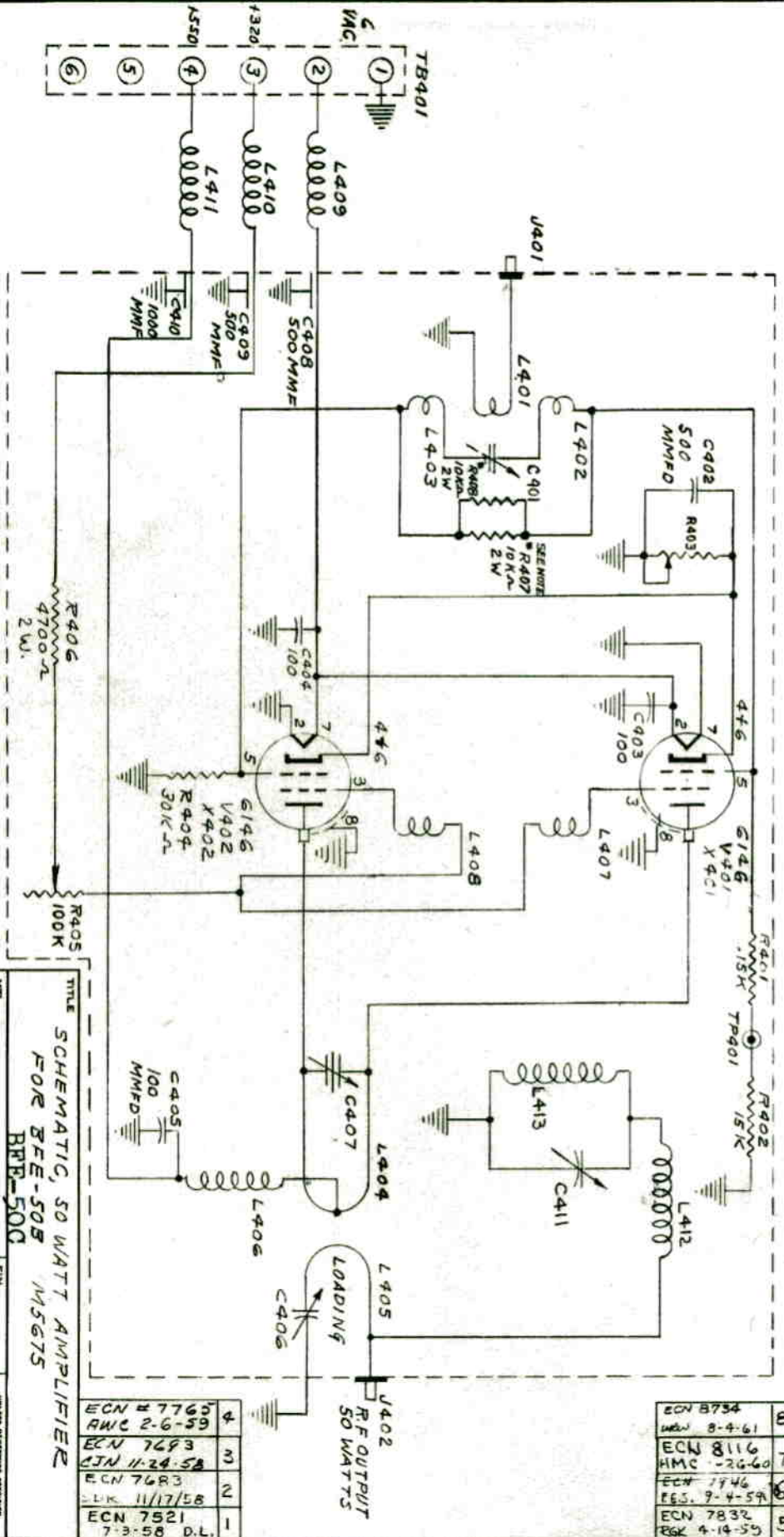


*R407 & R408 ARE USED IN FM-1B ONLY



QTY.	QTY.	QTY.	QTY.	QTY.	QTY.	QTY.	ITEM	REF. DES. EX. NO.
108	105	104	103	102	101	99		

REFERENCE	PT. OR QTY.	FIN.	DESCRIPTION
R401	15K		TP901
R402	15K		

QTY.	DESCRIPTION	MATERIAL
8		ECN 8734 MCM 8-4-61
7		ECN 8116 HMC -26-60
6		ECN 1746 FES. 7-4-59
5		ECN 7832 RGR 4-14-55

GATES RADIO COMPANY
QUINCY, ILLINOIS

B-65555
SCALE

TITLE
SCHEMATIC, 50 WATT AMPLIFIER
FOR BEE-50B MS675
RRB-500

REV.	DATE	BY	REASON
4			ECN # 7760 AWC 2-6-59
3			ECN 7693 CJA 11-28-58
2			ECN 7683 CLK 11/17/58
1			ECN 7521 7-3-58 D.L.

DR. BY/CHK. BY
DATE/DATE
ENG. BY/CHK. BY
DATE/DATE
FIN.
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
B-65555

INSTRUCTIONS FOR OPERATION OF M5675 AMPLIFIER

General Description

The M5675 Amplifier covers a frequency range of 88 to 108 mc. This is done without the addition or removal of any padding components in either grid or plate circuits. Power gain of this amplifier is approximately 10. When used as a final output stage, maximum power output is in the vicinity of 50 to 60 watts. The M5675 may also be used to drive following amplifier stages.

The series type of circuit is used in the grid and a conventional parallel type of circuit is used in the plate. This tends to make for less susceptibility of parasitics at higher frequencies than the amplifier is used. Screens of the 6146 amplifier tubes are isolated by chokes rather than RF grounded. This has proven to be more effective at VHF frequencies and eliminates the need for neutralizing. The reader should refer to schematic B-65555 for a better understanding of the circuit.

Tune-up

This particular amplifier should be tuned up for best efficiency and coupled for best transfer of power even if considerably less than full output power is desired. The screen control may then be turned down to reduce output power to the desired level.

To tune the grid circuit, place the negative probe of a voltmeter, into TP401 and ground the positive lead. With drive connected to input receptacle J401, tune C401 (grid tuning) for maximum negative reading on the voltmeter. This voltage may vary all the way from -15 to -45 volts depending on the amount of drive. This reading will drop as soon as screen and plate voltage are applied to the amplifier.

After the grid circuit has been properly tuned, coupling between L401 and L402, L403 should be varied to obtain the maximum negative voltage at TP401 with a minimum of drive. C401 must be retuned each time coupling is changed.

When the input circuit has been properly tuned, plate and screen voltage may be applied to the amplifier and the plate circuit tuned. It is recommended that this be done with the amplifier coupled into a 51 ohm non-reactive load. If plate current is being metered, tune the plate tune control C407 for a dip. Otherwise, tune C407 for maximum power output. Now vary coupling between L404 and L405. Turn amplifier back on and tune C406 for maximum power output along with C407. Several tries may be needed to find the best point of coupling between L404 and L405. Each time the coupling between L404 and L405 is varied, the plate must be retuned along with output coupling capacitor C406.

After tuning has been completed for best power output and efficiency, screen control R405 should be set for the desired power output. In no case should the output circuit be decoupled to reduce output power.

It should be emphasized that this amplifier is easily over-driven. For 50 watts output power approximately 3 watts drive is required. For 15 to 25 watts output power, about 1 watt of driving power is required. If driving power is increased above the required amount, power output of the amplifier will fall off due to high grid leak bias being created. A typical set of readings are given on this amplifier on the following page.

Coupling Amplifier to Another Stage

When the amplifier is going to be used to drive another amplifier stage, it is suggested that it first be tuned up into a load and then coupled to the grid circuit of the following amplifier stage.

To reduce the possibility of oscillations and/or parasitics, the input circuit of the following stage should be properly coupled and matched to the 51 ohm coaxial line connected to the output of the 50 watt amplifier. This may be done with a micromatch coupling unit. The following grid and input circuit should be adjusted for minimum SWR.

If a micromatch coupling unit is not available, the input coupling and grid tuning of the following stage should be tuned for maximum grid current in that stage.

If the following input circuit is properly matched, plate tuning of the 50 watt amplifier will not change appreciably when switching from a non-reactive load to being coupled to the following amplifier stage.

If the 50 watt amplifier stage was properly tuned up into a load and plate tuning deviates radically from where it was after being coupled into another stage, a major mis-match exists.

If the 50 watt amplifier unit is over-driving the following amplifier, screen control R405 should be adjusted for the desired drive. Do not decouple the 50 watt amplifier stage.

TYPICAL OPERATIONAL TEST DATA
OBTAINED ON

M5675 AMPLIFIER OPERATING AT 99.1 MC

Power Out	65 W.	50 W.	23 W.	17 W.	13 W.
Plt. Current	250 Ma.	215 Ma.	140 Ma.	130 Ma.	110 Ma.
Plt. Voltage	500 Volts	520 Volts	570 Volts	580 Volts	590 Volts
Screen Volts	290 Volts	235 Volts	150 Volts	147 Volts	132 Volts
Screen Current	12 Ma.	8.5 Ma.	3 Ma.	2.2 Ma.	1.5 Ma.
Cathode Volts	68 Volts	58 Volts	35 Volts	33 Volts	29 Volts
Driving Power	6.5 Watts	2.5 Watts	1 Watt	.8 Watt	.8 Watt
Grid Voltage	-10/-42"	-7/-33"	-8.5/-23"	-6.5/-20"	-3.5/-15"
(Grid voltage measured at TP401. indicates voltage before applying screen and plate voltage)					
Plt. Pwr. Input	107 Watts	97 Watts	75 Watts	72 Watts	61 Watts
Plt. Dissipation	42 Watts	47 Watts	52 Watts	55 Watts	48 Watts
Plt. Circuit Efficiency	61%	52%	31%	23.5%	21%

Figures below obtained with no drive.

Plt. Voltage	550 Volts	560 Volts	580 Volts	580 Volts	590 Volts
Plt. Current	165 Ma.	155 Ma.	125 Ma.	125 Ma.	105 Ma.
Cathode Volts	45 Volts	40 Volts	31 Volts	31 Volts	27 Volts
Plt. Dissipation	83 Watts	80 Watts	69 Watts	69 Watts	59 Watts

(All readings were made with screen connected to regulated +320 regulated supply)

PARTS LIST

<u>Symbol No.</u>	<u>Gates Stock No.</u>	<u>Description</u>
C401	520 0004 000	Cap., Variable, 2-19 mmfd.
C402	502 0194 000	Cap., 500 mmfd., 500V. Button Type
C403, C404, C405	516 0215 000	Cap., 100 mmfd, +10%
C406	520 0115 000	Cap., Variable, 5-25 mmfd.
C407	520 0164 000	Cap., Variable, 2-15 mmfd.
C408, C409	516 0227 000	Feedthru Cap., 500 mmfd.
C410	516 0235 000	Feedthru Cap., 1000 mmfd.
C411	520 0112 000	Var. Cap., 2.2-21.5 mmfd.
J401, J402	612 0233 000	Receptacle
L401	813 1772 001	Grid Coupling Coil
L402	813 1762 001	Grid Coil
L403	813 1761 001	Grid Coil
L404	913 1774 001	Plate Coil Assembly
L405	813 1771 001	Plate Output Loop
L406	494 0007 000	R.F. Choke
L407, L408, L410, L411	494 0004 000	R.F. Choke
L409	813 0246 001	Filament Choke
L412	813 3607 001	Coil
L413	813 3608 001	Coil
P401, P402	620 0122 000	Right Angle Adaptor, UG-27C/U
R401, R402	540 0482 000	Res., 15K ohm, 1W. 10%
R403	552 0058 000	Res., 500 ohm, 25W. Adj.
R404	540 0367 000	Res., 30K ohm, 1W., 5%
R405	550 0073 000	Control, 100K ohm
R406	540 0748 000	Res., 4700 ohm, 2W., 10%
R407, R408	540 0752 000	Res., 10K ohm, 2W., 10% (Used in FM-1B/1C only)
TB401	614 0096 000	Terminal Board
TP401	614 0312 000	Test Point Jack
V401, V402	374 0051 000	Tube, 6146
XV401, XV402	404 0016 000	Socket, Octal