

**INSTRUCTION
BOOK**

**INSTRUCTION BOOK
FOR
M-6035 CUE-INTERCOM AMPLIFIER**

88 - 108 MC

**HARRIS
INTERTYPE
CORPORATION**

GATES®

GATES RADIO COMPANY • QUINCY, ILLINOIS • 62301 • U.S.A.
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INSTALLATION AND OPERATING INSTRUCTION FOR M-6035 CUE-INTERCOM AMPLIFIER

TECHNICAL DATA

GAIN:	86 DB \pm 2 DB @ 1 KC Variable - Requires 10K variable resistor. (Part of Console)
FREQUENCY RESPONSE:	Peaked for maximum intelligibility.
HARMONIC DISTORTION:	Under 4% at +28 DBM (.6 W) at mid-band frequencies.
NOISE:	-105 DBM equivalent input noise.
SOURCE IMPEDANCE:	45 Ohms.
OUTPUT LOAD IMPEDANCE:	45 Ohms. (High Impedance Speaker)
MAXIMUM INPUT LEVEL:	-40 DBM.
MAXIMUM OUTPUT LEVEL:	+30 DBM.
MAXIMUM OPERATING AMBIENT TEMPERATURE:	55° C. (131° F.)
MAXIMUM STORAGE AMBIENT TEMPERATURE:	85° C. (185° F.)
POWER REQUIREMENTS:	-37 V. DC (unregulated) 10 - 75 ma.
TRANSISTORS:	1 - 2N214 2 - 2N1183 3 - 2N1414 1 - 2N5088 1 - 2N5087
SIZE:	3-1/4" Wide x 7-1/2" Long x 1" Thick.

DESCRIPTION

The Gates M-6035 Transistor Cue-Intercom Amplifier is designed to be used in transistor consoles for cueing and talkback purposes. The amplifier utilizes a gain control for adjusting to different input levels. The amplifier is designed to be fed from a 45 ohm source and to operate into a 45 ohm speaker or resistive load.

The amplifier is designed to be used with the M-6039 mounting frame, which carries a mating receptacle for the printed card type connection. The connections on the printed wiring board are gold flashed for positive connection with the gold contacts on the mating receptacle.

The amplifier requires a -37 V. DC unregulated power source and requires from 10 ma. (at average power output) to a maximum of 75 ma. (at +28 DBM output).

THEORY OF OPERATION

For the purpose of explanation, the Cue-Intercom Amplifier can be considered to be made up of two distinct parts: The preamplifier, and the power amplifier.

THE PREAMPLIFIER

The two stage preamplifier is driven by an input transformer which is somewhat loaded by the input resistor. This resistor prevents excessive signals from being developed by the speaker at its resonance frequency, which would over-drive the input stage. Both stages are of the common emitter configuration, with direct coupling utilized between the stages. On the schematic, 837 9345 001, it should be noted that Q1 is a NPN type transistor and has its emitter returned to B- for biasing purposes.

Biasing is accomplished by a combination of voltage divider and emitter resistance as with R1, R2 and R5. This method of biasing also insures a high degree of temperature stability. Signal degeneration is also for Q2 by R7.

The volume control, (located on the console) situated between the preamplifier and power amplifier, is connected in reverse, to maintain the high source impedance at all settings that the power amplifier requires.

THE POWER AMPLIFIER

The output stages of the power amplifier operate Class B, and are arranged in the circuit configuration known as "single ended push-pull", or "followed emitter follower". The upper and lower units are in series across the power supply, and the load is connected at their junction when the signal at the collector of Q4 goes negative Q6 and Q8 conduct, since they are all PNP types. When the signal goes positive Q5 and Q7 conduct since Q5 is a NPN type. Thus, the full signal appears at the junction point.

Note that Q4 is the only stage in the power amplifier with this voltage gain. A high frequency transistor is used at this point to improve stability. Several feedback loops are employed in this circuit, including R10, C7, C10, and C9, C7 and C10 provide high frequency stability, C12 supplies positive feedback from the output to the collector circuit of Q4 to increase the signal handling capability of this stage.

MAINTENANCE

PREVENTIVE MAINTENANCE

The M-6035 Cue-Intercom Amplifier is designed for long, trouble-free service. However, as with all high quality electronic equipment, a regular program of inspection should be followed.

It is recommended that when the amplifier is first received, part of the console, D.C. voltage be measured with the same voltmeter that will be used for maintenance and troubleshooting, and these

readings be recorded on the amplifier schematic above the typical voltages shown.

SERVICING

When servicing the amplifier, the following points should be observed.

1. The condition of the output stage measuring the speaker bus voltage at the junction of R21 and the collector of Q8.
2. Circuit resistances should be measured only after removing the associated transistor or transistors, to prevent damage due to ohmmeter battery voltage.
3. DO NOT remove or insert transistors with the power ON.
4. DO NOT probe the printed board with a metal probe with the power ON.
5. Circuit voltages are reversed from standard vacuum tube practice, as is the polarity of all electrolytic capacitors.
6. The location of the positive end of each electrolytic capacitor is indicated by the white dot marked on the top of the circuit board.

PARTS LIST

Symbol No.	Gates Stock No.	Description
C1, C2, C3, C4, C9	522 0242 000	Cap., 25 mfd, 25 V.
C5	506 0005 000	Cap., .1 mfd., 200 V.
C6	522 0178 000	Cap., 25 mfd., 6 V.

Symbol No.	Gates Stock No.	Description
C7, C8	516 0054 000	Cap., .001 mfd., 1KV, 10%
	522 0256 000	Cap., 20 mfd., 50 V.
C12	522 0246 000	Cap., 100 mfd., 25 V.
C13	506 0006 000	Cap., .25 mfd., 200 V.
C14	506 0004 000	Cap., .05 mfd., 200 V.
Q1	380 0115 000	Transistor, 2N5088
Q6	380 0011 000	Transistor, 2N214
Q2,	380 0112 000	Transistor. 2N5087
Q3, Q4, Q5	380 0014 000	Transistor, 2N1414
Q7, Q8	380 0012 000	Transistor, 2N1183
R1	540 0081 000	Res., 22K ohm, 1/2 W., 5%
R2, R3	540 0071 000	Res., 8200 ohm, 1/2 W., 5%
R4	540 0076 000	Res., 13K ohm, 1/2 W., 5%
R5	540 0075 000	Res., 12K ohm, 1/2 W., 5%
R6	540 0057 000	Res., 2200 ohm, 1/2 W., 5%
R7,	540 0036 000	Res., 300 ohm, 1/2 W., 5%
R8	540 0045 000	Res., 680 ohm, 1/2 W., 5%
R9, R19, R20	540 0041 000	Res., 470 ohm, 1/2 W., 5%
R10, R14	540 0073 000	Res., 10K ohm, 1/2 W., 10%
R11	540 0085 000	Res., 33K ohm, 1/2 W., 5%
R12, R18	540 0039 000	Res., 390 ohm, 1/2 W., 5%
R13	540 0098 000	Res., 110K ohm, 1/2 W., 5%
R15	540 0049 000	Res., 1K ohm, 1/2 W., 5%
R16	540 0070 000	Res., 7500 ohm, 1/2 W., 5%
R23	540 0017 000	Res., 47 ohm, 1/2 W., 5%
R24	540 0023 000	Res., 82 ohm, 1/2 W., 5%
R21, R22	540 0005 000	Res., 15 ohm, 1/2 W., 5%
R25	540 0845 000	Res., 6.8 ohm, 1/2 W., 5%
R17	540 0025 000	Res., 100 ohm, 1/2 W., 5%
T1	478 0285 000	Transformer, Input

XD1, XD2	404 0227 000	Dissipator
XQ1, XQ2, XQ3, XQ4, XQ5, XQ6	404 0066 000	Socket
XQ7, XQ8	404 0149 000	Socket



