annel Stereophonic Transistor Audio Console

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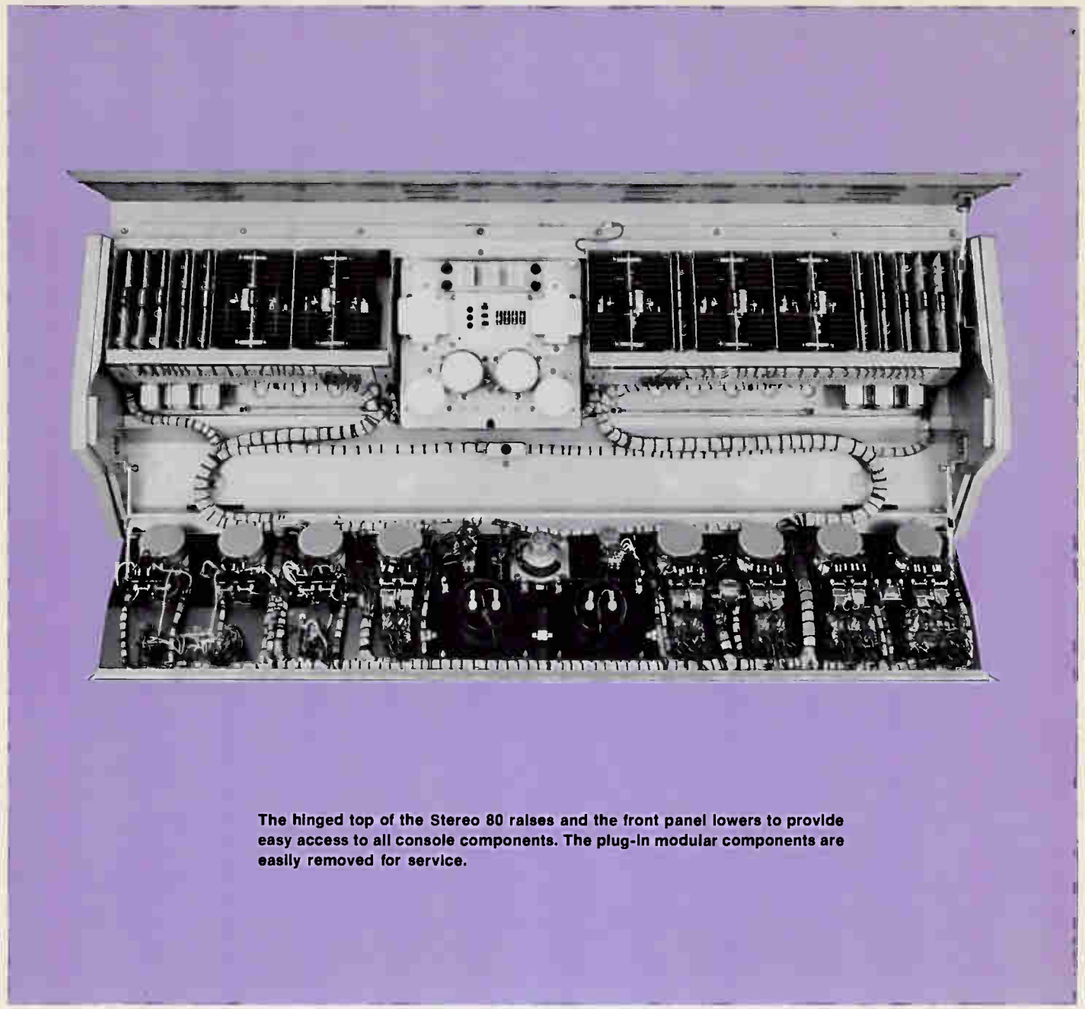
pairs of input signals by means of a front-panel switch.

Channel 3 is also equipped with low-noise preamplifiers, and also intended for use with low-impedance, broadcast type microphones. This channel has a stereo input and is assigned to the control room since these microphones function as part of the talkback system.

Channels 4, 5, 6 and 7 are all medium level inputs and may be used with stereo turntable preamplifiers, reel-to-reel tape, or cartridge machines. All channels have input transformers whose center taps may or may not be grounded, depending upon the given installation. They are shipped with the center taps ungrounded. A nominal level of —20 dBm or +4 dBm at 600 ohms is required. Input pads for the +4 dBm are provided on the various tape inputs.

Channel 8 is specifically designed to function with network and remote lines as sources. Various combinations of preview, talkback, and program cue are possible using the front panel switches. A nominal input of at least —20 dBm at 600 ohms is required for remotes and —14 dBm for the network.

All eight channels may be switched to either the program or audition positions to permit independent monitoring of any of the incoming sources without disturbing programming. Channels 4 through 8 have a cue position associated with the channel attenuator which provides signal to the amplified cue system. This signal can be monitored by an internal speaker or external headphones. On Channels 1 and 2, the center position of the program audition key switch provides a microphone cue signal to the cue selector switch. On Channel 3 this position is used with the control room microphones for talkback.



The hinged top of the Stereo 80 raises and the front panel lowers to provide easy access to all console components. The plug-in modular components are easily removed for service.

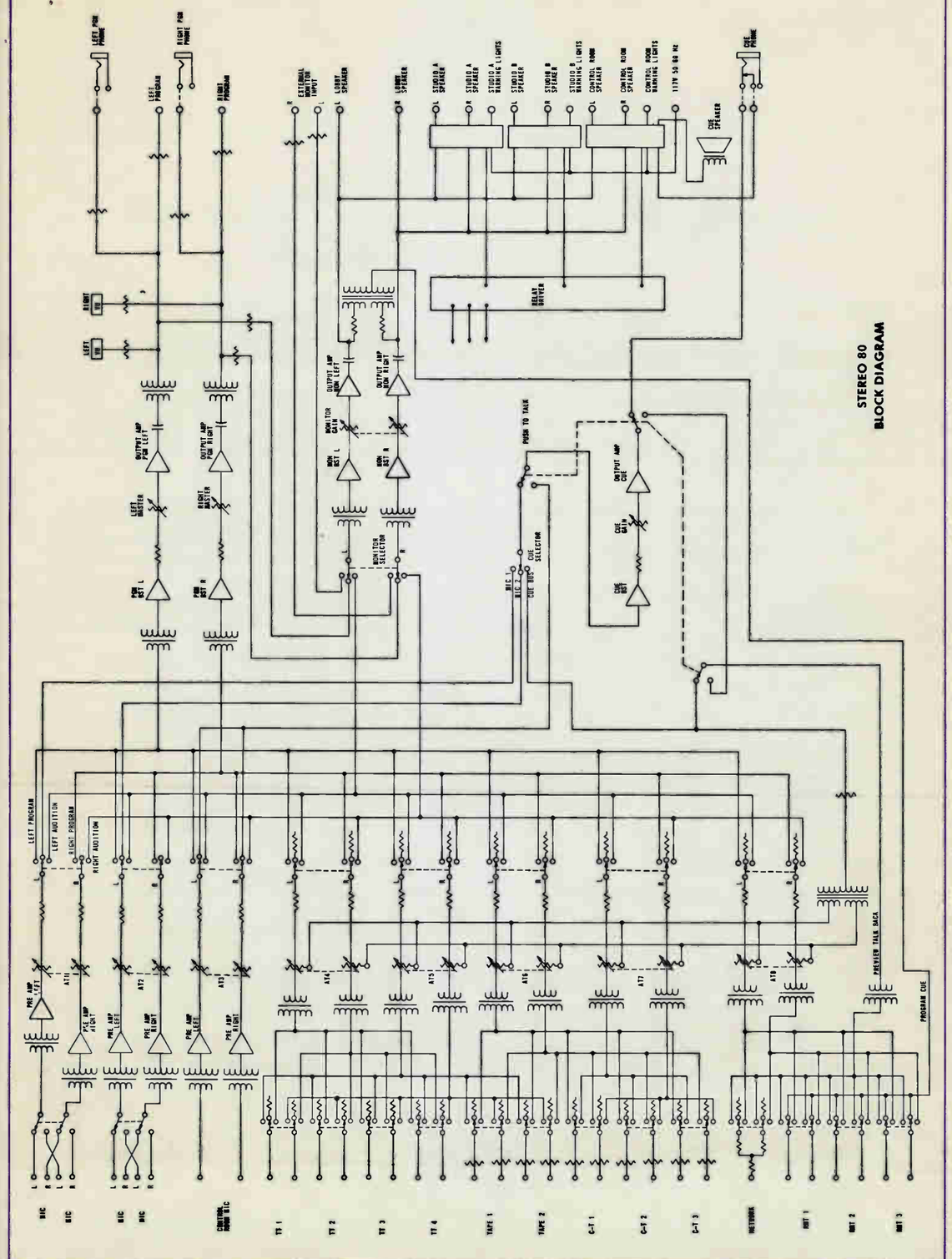
SPEAKER MUTING: A protective system of warning lights and relay speaker muting is provided to prevent acoustic feedback and broadcasting of cue signal when "live" microphones are nearby.

AMPLIFIERS: Each solid-state plug-in amplifier is mounted on a separate printed circuit board, which in turn mounts in a card-rack holder. These modules are as follows: six preamplifier modules, five booster amplifier modules, five output amplifier modules and one power supply regulator panel. Silicon transistors are used to assure the meeting of performance specifications and assure optimum console operation over a wide ambient temperature range. All amplifiers are completely accessible when the top of the console is opened, simplifying maintenance.

Program, cueing and monitor amplifiers all have the same electrical design and construction, and are completely interchangeable. As a result, two backup program amplifiers are provided as part of the console.

HIGH LEVEL, HIGH FIDELITY OUTPUT: The dynamic range of the preamplifiers will accommodate microphone levels to —17 dBm without overload or distortion. The program amplifiers deliver +32 dBm output and the monitor amplifiers +40 dBm, all with wide frequency response, low distortion and low noise.

STYLING: The Stereo 80 is handsomely styled with satin anodized aluminum front panels, and rich beige-gray Pebble-Tex cabinet. The modern design will complement any control room decor.



STEREO 80
BLOCK DIAGRAM

STEREO 80

SPECIFICATIONS

OPERATING MODE: Single output stereo programming with audition positions.

MIXING CHANNELS: Total—8. Three for microphones, two for turntables, two for tapes and one for remote/network.

INPUT CIRCUITS: Total—18. Five stereo pairs of microphones, four turntables, two tape machines, three cartridge tape machines, three remote lines and one mono network.

AMPLIFIERS AND POWER SUPPLIES PROVIDED: Six preamplifiers, five boosters, five output modules—program, monitor and cue (interchangeable as supplied). One rack-mount power supply panel.

OUTPUT CIRCUITS: One stereo program output @ +8VU, one monitor speaker pair unmuted for lobby, three monitor speaker pairs muted, one mono and one stereo headphone output.

MONITOR OUTPUTS: +40 dBm @ 8 ohm minimum load. Multi-speaker operation should use high impedance speakers (32-45 ohm) or accessory speaker-matching transformer (48/8 ohm) for minimum load of 8 ohms.

GAIN: Microphone to line: 100 dB,±2 dB. Medium level to line: 60 dB/36 dB, ±2 dB.

IMPEDANCES: Microphones: 150/250 ohms balanced. Turntable/tape: 600 ohms balanced. Network/remote: 600 ohms balanced. Monitor output: 8 ohms nominal unbalanced. Program output: 600/150 ohms balanced.

RESPONSE: Program: ±1.0 dB, 20 Hz to 20 kHz. Monitor: ±1.0 dB, 30 Hz to 15 kHz.

DISTORTION: Program circuits: 0.5% maximum, 20 Hz to 20 kHz @ +18 dBm. Monitor circuits: 1.0% maximum, 30 Hz to 15 kHz @ +40 dBm (10 watts).

NOISE: Program circuits: 75 dB below +18 dBm with —50 dBm input (—125 dBm equivalent input noise, measured 20 Hz to 20 kHz). Medium level inputs: (program) 78 dB below +18 dBm with —10 dBm input. Monitor circuits: signal/noise=78 dB below +40 dBm output.

FINISH: Satin anodized aluminum panels with lettering in black. Cabinet color . . . beige-gray Pebble-Tex.

POWER: 117/234 volts, 50/60 Hz, single-phase. Consumption: 120 watts, maximum.

MECHANICAL SIZE: (Console) 45″ wide, 15¾″ deep, 7¾″ high. Weight: 105 lbs. (Power supply panel) 19″ wide, 7¾″ deep, 7″ high. Weight: 21 lbs.

SHIPPING DATA: Packed weight: domestic, 210 lbs.; export, 250 lbs. Cubage: 19 cubic feet.

ORDERING INFORMATION

Stereo 80 eight channel stereo console, complete with six preamplifiers; five boosters; five program/monitor/cue output modules (interchangeable); and one power supply panel 994-6867-001

Speaker matching transformer 478-0291-000

GATES DIVISION
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JK-2.5M-273

ADV. 355

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GATES
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TAPE CARTRIDGE SYSTEM

CRITERION 80

CRITERION 80

CRITERION 80

TAPE CARTRIDGE SYSTEM

Now, from the originators of the cartridge tape system for broadcasting comes the ultimate in cartridge unit design . . . the Criterion 80 series, with built-in, performance-proven features. From sleek slide-out chassis and plug-in electronics to better timing, better wow and flutter, and dependable direct capstan drive for split-second timing accuracy, the Criterion 80 represents over ten years of actual experience in the design, engineering and manufacturing of broadcast tape cartridge equipment. Consequently, the Criterion 80 series offers all of the many features most desired by broadcasters, plus superlative workmanship which assures long and dependable service.

The Criterion 80 has design improvements for still more efficient operation not found in its predecessors. Backed up by the rugged deck and tape drive assembly for which it is famous, the Criterion 80 in addition has the latest in silicon transistors, plug-in printed circuit boards, and independent gain controls for the cue amplifiers.

The individual Criterion 80 circuits have been RFI proofed to make them impervious to strong RF fields. The printed circuit boards, however, are easily accessible for quick maintenance.

Other Criterion 80 advancements include output gain controls accessible from the front panel, automatic audio muting and transient suppression, and a +10 dBm output capability. All external cables have latching connectors for a more dependable installation.

MODELS AND TYPES

The Criterion 80 series is available in playback and record/playback combination models, in monaural or stereo. Basic desk-mount design may be adapted to rack mounting with optional rack adapters. The primary 1 kHz cue tone is standard. Second and third tone operation is optional at additional cost on both monophonic and stereophonic models. All versions of the Criterion 80 playback series meet National Association of Broadcasters specifications and offer features such as 24 volt dc external function switching for safety in remote controlled applications.

CRITERION 80

SPECIFICATIONS

PLAYBACK UNIT

POWER SOURCE:
105-125 volts, 60 Hz or 50 Hz.

POWER REQUIREMENTS:
70 watts maximum.

SYSTEM FREQUENCY RESPONSE:
±2 dB 50 to 15,000 Hz.

NOISE:
45 dB (Stereo), 48 dB (Mono) below NAB Std. Ref., 52 dB (Stereo), 55 dB (Mono) below tape signal reference of 400 Hz, 3% THD.

DISTORTION:
Record to playback, less than 2% at 6 dB above NAB Std. Ref.

EQUALIZATION:
NAB Standard Response.

AMBIENT TEMPERATURE:
55° C, maximum.

AUDIO OUTPUT:
600 ohms, balanced, 0 dBm nominal, +10 dBm maximum.

CUE SIGNALS:
NAB Standard Cue signals.

REMOTE CONTROL:
All Control Functions.

HEAD ASSEMBLY:
Laminated Hyperbolic heads in Micro-Set assembly.

TAPE SPEED:
7½ inches per second.

TAPE DRIVE SYSTEM:
Direct Capstan Drive, sealed ball bearings.

FLUTTER AND WOW:
0.2% or less

TIMING ACCURACY:
0.1% or better.

TAPE START AND STOP TIME:
Less than 0.1 second.

TAPE PULLING FORCE:
3 pounds.

DIMENSIONS AND WEIGHT:
Desk top cabinet, 6" high, 13½" wide, 14" deep. With rack adapter, 7" high, 19" wide. Net weight, 30 lbs.

RECORDING AMPLIFIER

POWER SOURCE:
From playback unit.

AMBIENT TEMPERATURE:
55° C maximum.

AUDIO INPUT:
600 ohms balanced line, input levels from −20 to +10 dBm, matching; +10 to +40 dBm bridging (20 K).

REMOTE CONTROL:
All functions and lamp indications.

BIAS OSCILLATOR:
Push-pull, 80 kHz.

DIMENSIONS AND WEIGHT:
Desk top cabinet, 4" high, 13¼" wide, 12½" deep. With rack adapter, 5¼" high, 19" wide. Net weight, 12 lbs.

ORDERING INFORMATION

HOW TO ORDER: Order basic single tone unit. For playback units, order second and third tone sensors as accessories. If ordering record/playback combination, also order cue oscillator. For rack mounting, order rack adapter/s.

RECORD/PLAYBACK COMBINATIONS

MPD-811 Matched playback and record amplifier, monaural, 1000 Hz cue, desk mount, 60 Hz	994-6729-001
As above, except 50 Hz	994-6733-001
MPD-821 Matched playback and record amplifier, stereo, 1000 Hz cue, desk mount, 60 Hz	994-6731-001

PLAYBACK UNITS

CPD-811 Playback unit only, monaural, 1000 Hz cue, desk mount, 60 Hz	994-6701-002
As above, except 50 Hz	994-6703-002
CPD-821 Playback unit only, stereo, 1000 Hz cue, desk mount, 60 Hz	994-6702-002
As above, except 50 Hz	994-6704-002

ACCESSORIES

QS-150 150 Hz cue sensor assembly, plugs into basic playback unit for conversion to two tone	900-0154-001
QS-8 8000 Hz cue sensor assembly, plugs into basic playback unit for addition of third tone	900-0155-001
TO-23 150 Hz and 8000 Hz cue oscillator assembly, plugs into record amplifier for conversion to three tone	900-0165-001
Rack Adapter-Playback, adapts any Criterion 80 desk mount playback unit for 19" rack mounting	994-6790-001
Rack Adapter-Record Amplifier, adapts any Criterion 80 desk mount record amplifier for 19" rack mounting	994-6791-001
AMS-4A Automatic switcher, mono (2 for stereo), four inputs to one output	900-0024-001
RC-T-8 Remote control with elapsed time indicator. May be used with all Criterion models. Complete record control, 60 Hz	900-0266-001
RC-T-8 As above, except 50 Hz	900-0266-002
RC-RA-8 Remote control box, may be used with all Criterion models. Complete record control of one unit	900-0267-001
RC-P4-8 Remote control box, may be used with all Criterion models. For playback control (START only) of up to four units	900-0268-001

CP-5M-472

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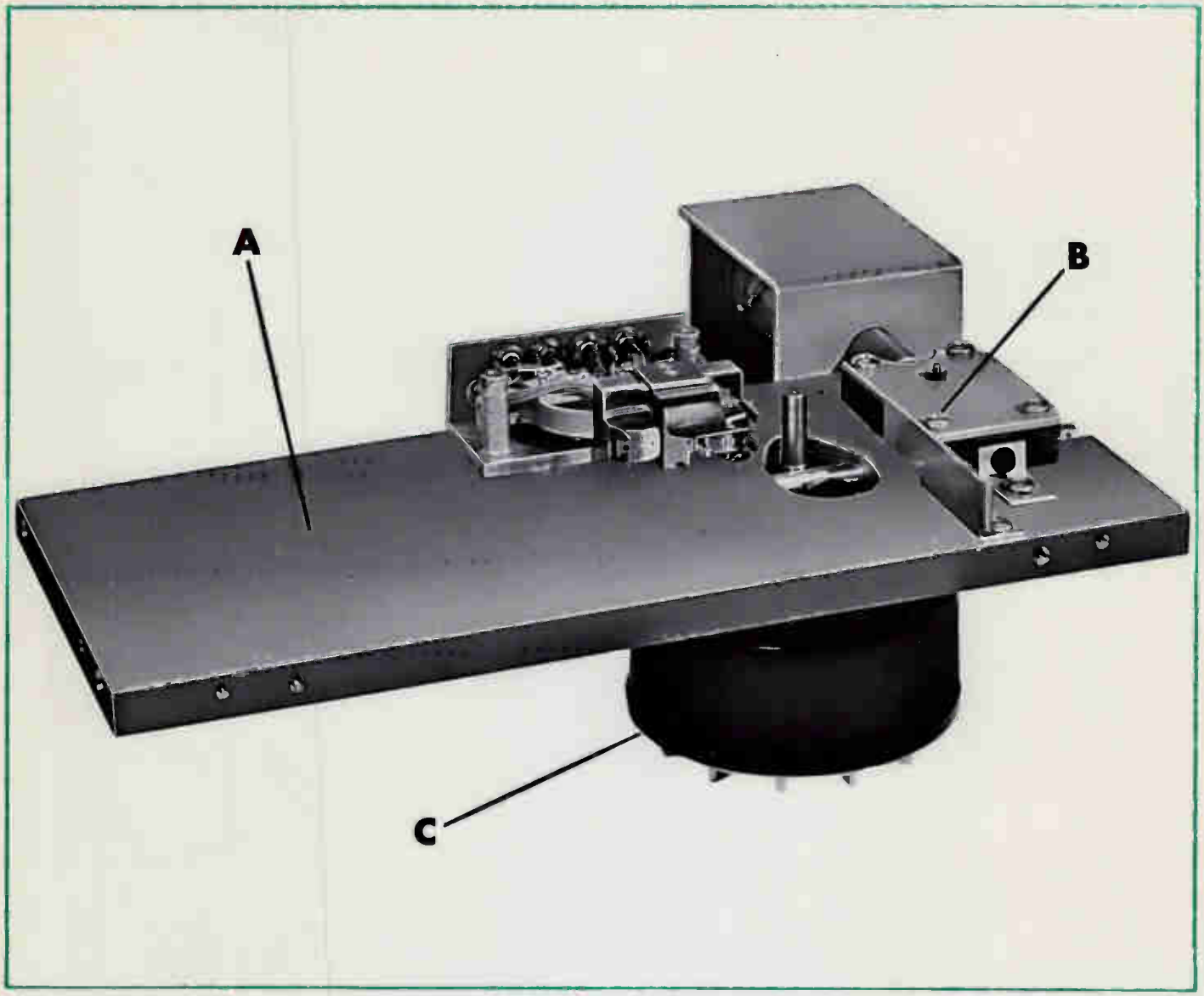


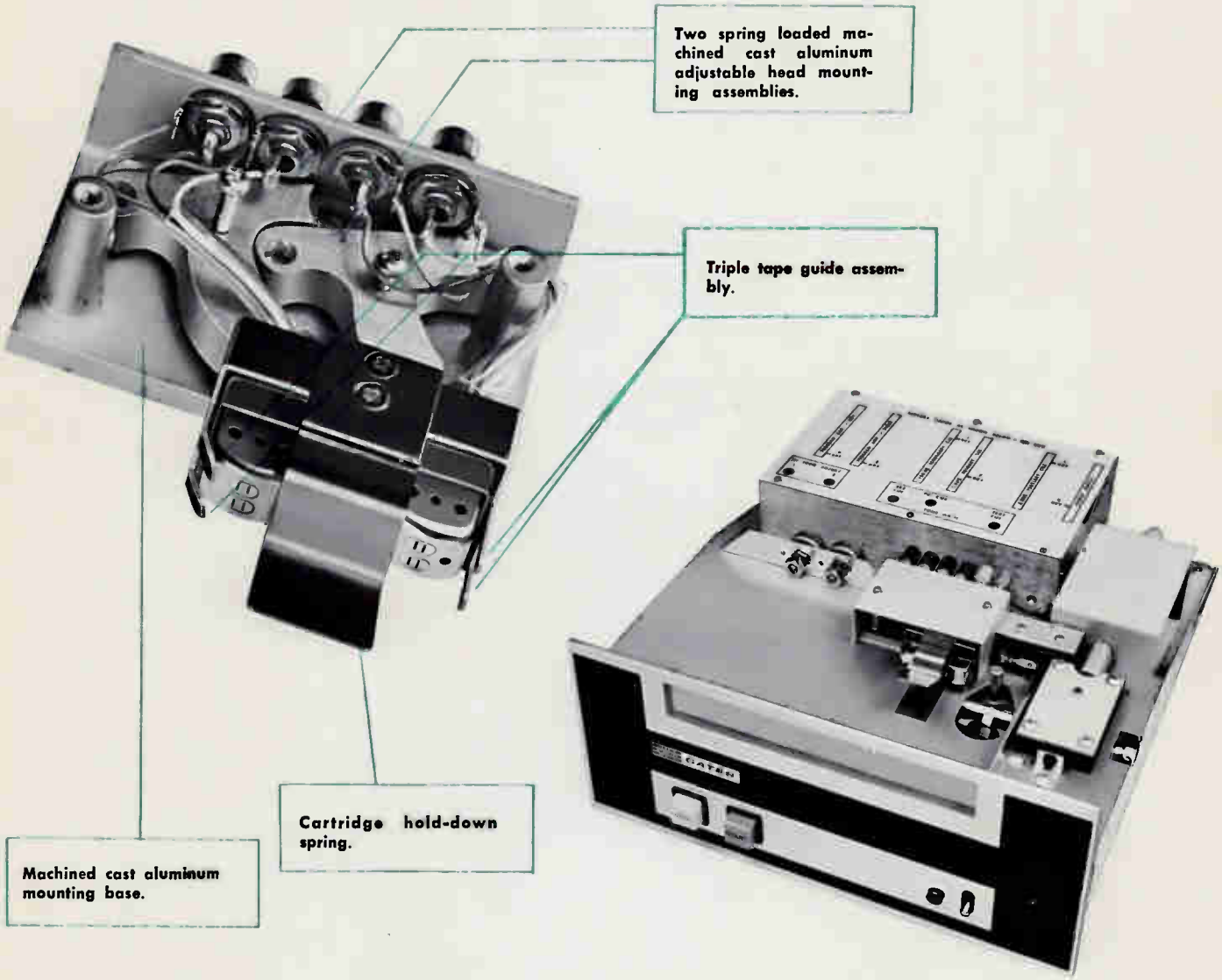
RUGGED DECK ASSEMBLY

(A) PRECISION MECHANICAL CONSTRUCTION: Major reasons for the excellence of the Criterion 80 units are: outstanding engineering, and the quality of the tape deck motor mechanism, head assembly, and control solenoid. The entire assembly is built upon a heavy-duty, precision-machined aluminum bar stock, which assists in providing proper cartridge alignment on the exclusive Micro-Set head assembly and is also the rugged integral mounting base for the other tape transport components.

(B) QUIET, STUDIO OPERATION: Improved solenoid action and computer-type relays reduce operating noise and contribute to the quiet mic-side operation of the unit. The fully proven automatic pinch-roller engagement makes actual studio operation easy, fool proof and noise free. Full motor shielding keeps signal-to-noise ratio low.

(C) POSITIVE DRIVE ACTION: The heart of the Criterion 80 series playback unit is the heavy duty tape transport with its hysteresis synchronous positive speed direct capstan drive motor. The Criterion 80 tape transport offers speed accuracy to within 0.1%; comparable to the finest reel-to-reel machines. Sealed instrument-type ball bearings are used to keep transport wow and flutter to less than 0.2% rms. Three pounds of tape pulling force developed by the Criterion 80 transport virtually eliminates timing errors, regardless of cartridge size or tape length.

PRECISION MICRO-SET HEAD ASSEMBLY



The assembly serves two purposes: (A) To provide convenient and positive positioning of any rear-mount head used on Criterion 80 Equipment by screwdriver adjustment and (B) To positively guide the tape as it passes the heads.

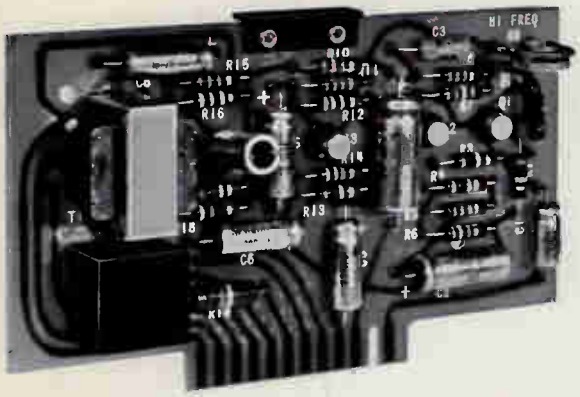
The machined cast aluminum base is the "core" of the entire assembly. It provides the base for positive mechanical mounting and adjustment of all components of the entire Micro-Set head assembly.

The cast head mounting assemblies are aligned to the front-to-rear axis of each head for positive vertical height positioning. A single adjusting screw provides positive azimuth alignment to micro-inch tolerances.

Three tape guides are integrated as one in-line assembly which is attached to the mounting base by screws. The positioning of the guide assembly is referenced from the tape transport deck in accordance with NAB standards for cartridge tape machines and assures proper tape height from the deck. Constant output quality, especially in audio response from cartridge to cartridge, is provided by the triple guide for positioning of the tape on the head.

The cartridge hold-down spring is directly attached to the mounting base by screws. Its position on the cartridge is not affected while making adjustments. An assembly cover provides added shielding. Improved laminated heads selected for the Criterion 80 series playback unit are high quality metal-face heads providing for long wear and low oxide accumulation. The special design provides improved high frequency response, usually exceeding the rated specifications.

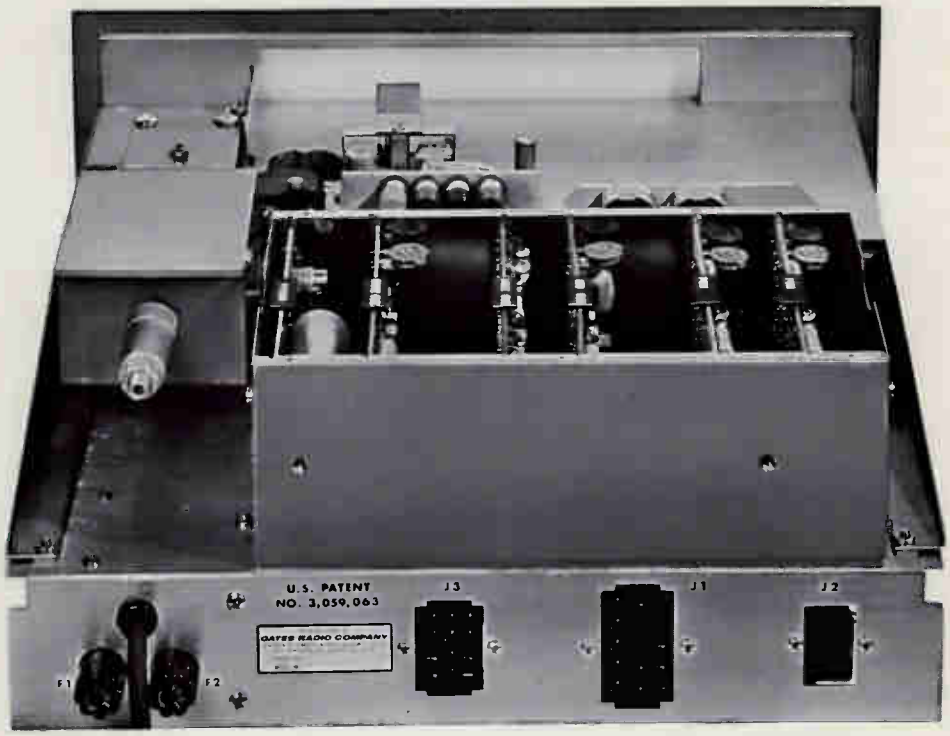
PRECISION MODULAR CONSTRUCTION



FULLY REGULATED POWER SUPPLY

A regulated supply is used to power all circuit modules assuring correct operating parameters for peak efficiency and reliable trouble-free operation at all times.

Separate distribution points provide isolation between cueing circuits and program circuits.



Plug-in circuit boards offer the finest in advanced solid state engineering adding years of useable life to electronic components and circuitry. The construction used in the Criterion 80 series, provides for modifications as may be required to make the Criterion 80 series compatable with almost any make of existing cartridge equipment. Circuit boards are used throughout for easy component access, should maintenance be required. Electronics are all of plug-in design, including relays, circuit boards, all audio and switching leads, even to the lighted front panel switch assemblies.

RECORDING UNITS

The basic Criterion 80 series recording amplifier is a solid state, primary cue device for use in association with any monophonic Criterion 80 playback. The recording amplifier is also available in stereo, with second and third tone options in mono or stereo at additional cost. The basic desk mount design is adaptable to rack mounting with optional rack adapters. Top-surface mounting of all components and the special construction used in the Criterion 80 recording amplifier provides for extremely easy maintenance when required.

HARRIS INTERTYPE CORPORATION

GATES
A DIVISION OF HARRIS-INTERTYPE

PRODUCT INFORMATION BULLETIN

CB - 77
12 - INCH TRANSCRIPTION TURNTABLE AND ACCESSORIES

Gates' CB-77 is a 12-inch professional transcription turntable with many unique design principles to provide outstanding sound reproduction and years of dependable service. These features include an exclusive inner hub drive that holds rumble to a minimum, and a heavy-duty hysteresis synchronous motor for firm, uniform drive and good torque for quick starting. Other features include: heavy machined aluminum platter; functional 3-speed selector switch; no belts or gear trains to wear.

The chassis is ready for you to attach the pick-up arm of your choice. See reverse side for turntable systems.

SPECIFICATIONS

CHASSIS SIZE: 16" x 16" x 1 5/16". Motor hang below bottom of chassis: 5¾".

CONSTRUCTION: Platter and base of machined aluminum.

FINISH: Beige-gray with escutcheon in black and turntable platter cover in heavy gray felt.

PLATTER SIZE: 13⅜".

CENTER BEARING: 1" diameter hardened steel, rotates in oilite bearing.

CENTER SPINDLE: Spring-locking type snaps up for 45 rpm, locks down for smaller spindle records.

MOTOR: Hysteresis synchronous, single phase, 600 rpm, with 40°C temperature rise.

CUEING: At 33⅓ rpm, ⅛ turn. At 45 rpm, ¼ turn. At 78 rpm, 1 turn.

NOISE OR RUMBLE: At 33⅓ rpm, rated −45 dB. At 45 rpm, rated −40 dB. At 78 rpm, rated −35 dB. (Meets or exceeds NAB specifications for stereophonic reproduction.)

WOW: 0.1% maximum, capable .08%.

FLUTTER: .07% maximum, capable .05%.

MOTOR START: Rocker-type illuminated mercury switch.

IDLER WHEEL: Special shear action neoprene, self-aligning.

SPEED CHANGE: To 33⅓, 45 or 78 rpm by single indexed lever control.

POWER: 117 volt, 60 Hz, 35 watts. (50 Hz model available, see below.)

WEIGHT: Net: 30 lbs. Packed: domestic, 40 lbs.; export, 65 lbs. Cubage: 3.6 cubic feet.

ORDERING INFORMATION

CB-77 12-inch transcription turntable, chassis only, 60 Hz_____**994-5798-005**

CB-77A 12-inch transcription turntable, chassis only, 50 Hz_____**994-5798-006**

12-INCH SYSTEM COMPONENTS

The following components are recommended to make up your 12-inch turntable system.

MONOPHONIC SYSTEM

CB-77 turntable, 60 Hz (50 Hz available)_____**994-5798-005**
Gray 206-S 12" tone arm_____**723-0259**
or
Gray 303 12" Micro-Trak tone arm_____**723-0268**
Shure M-44-7 stereo dynetic cartridge w/.0007" diamond stylus 723-0236
M-6244 equalized turntable preamplifier, transistorized_____**994-6244**

NOTE: If Gray 206-SG 12" tone arm is desired (catalog number 723-0250), order General Electric VR-II turn-around cartridge (catalog number 723-0017).

STEREOPHONIC SYSTEM

CB-77 turntable, 60 Hz (50 Hz available)_____**994-5798-005**
Gray 206-S 12-inch tone arm_____**723-0259**
or
Gray 303 12" Micro-Trak tone arm_____**723-0268**
Shure M-44-7 stereo dynetic cartridge w/.0007" diamond stylus 723-0236
M-6244 equalized turntable preamplifier, transistorized, (two required)_____**994-6244**

NOTE: To order cabinet, see below.

DUAL TURNTABLE CABINET

Beautifully styled, and dimensioned to accommodate either 12- or 16-inch Gates turntables.

Dual turntable cabinet_____**994-6449**

SINGLE TURNTABLE CABINET

Fits any decor. Accommodates either 12-inch or 16-inch Gates turntable.

Single turntable cabinet_____**994-6448**

TRANSISTORIZED PREAMPLIFIER

Single-channel preamplifier designed for use in broadcasting, recording, and general sound requirements where low distortion and exacting frequency response characteristics are demanded. Featuring self-contained power supply and transformer output. For stereo operation use two units. The input impedance of 47,000 ohms makes the M-6244 compatible with virtually all magnetic cartridges (including stereo).

SPECIFICATIONS

INPUT: 47,000 ohms.

OUTPUT: Adjustable from −22 dBm to −12 dBm with 12 mV input.

RESPONSE: Within ±1 dB of RIAA/NAB standard curve. Additional high-frequency, roll-off filter position provided.

DISTORTION: Less than 0.5% at normal levels (−22 dBm to −12 dBm output). Less than 1.0% at 10 dB overload (above 12 mV input).

NOISE: 68 dB or lower, below −12 dBm output (with 12 mV input).

LOAD IMPEDANCE: 600 ohms or 150 ohms, balanced or unbalanced.

MAXIMUM OPERATING AMBIENT TEMPERATURE: +60°C (+140°F).

POWER: 115 volts, 50/60 Hz, 1 watt.

MOUNTING: Two holes for mounting to Gates turntable or inside of any cabinet. May be mounted in any position.

SIZE: 2 5/16" wide, 8 5/8" long, 2 7/8" high.

WEIGHT AND CUBAGE: Net weight, 1¼ lbs. Packed weight, 8 lbs. Cubage, 1 cubic foot.

Transistor equalized turntable preamplifier (order two for stereo)_____**994-6244**

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PRODUCT INFORMATION BULLETIN

G-600 MICROPHONE

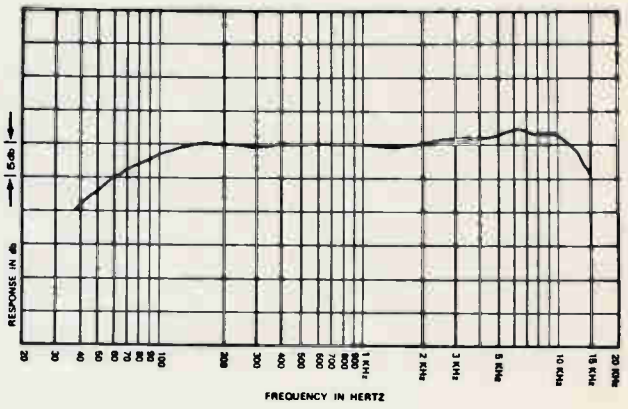


Figure 1—Frequency Response

DESCRIPTION AND APPLICATIONS

The Gates Model G-600 is a dynamic, omnidirectional microphone designed for exacting professional applications. It is ideally suited for film production, recording, FM, AM, and TV broadcasting, and for the more demanding PA applications.

The model G-600 is supplied with the model 310 stand clamp adapter. The non-reflecting fawn finish is ideal for "on camera" use. The high output level and low sensitivity to mechanical shock make it excellent for interviews, for pass-around use in audience participation, for hand-held use by vocalists, or as a lavalier.

The microphone features a diaphragm which permits very smooth response over a wide frequency range, and it withstands high humidity and temperature extremes, corrosive effects of salt air, and severe mechanical shocks. It is practically indestructible with normal use.

A four-stage pop and dust filter insures completely pop-free performance and virtually eliminates the need for an external windscreen for outdoor use.

An internal shock absorber effectively reduces pickup of cable and other noise generated by external contact.

SPECIFICATIONS

Element:	Dynamic
Frequency Response:	80 – 13,000 Hz
Polar Pattern:	Omnidirectional
Impedance:	Low (150 ohms)
Output Level:	–55 dB (0 dB = 1 mw/10 dynes/cm^2)
EIA Sensitivity Rating:	–149 dB
Case Material:	Steel
Dimensions:	5-15/16" l. x 1-13/32" dia.
Finish:	Fawn
Net Weight:	6 ounces, without cable
Switch:	None
Cable:	18', 2-conductor, shielded, broadcast type synthetic rubber-jacketed with Switchcraft A3F connector
Accessories:	Lavalier neck cord assembly and 310 clamp furnished

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The microphone shall be a Gates Model G-600 or equivalent. The microphone shall be an omnidirectional dynamic type with wide-range response uniform from 80 to 13,000 Hz. It shall have a nonmetallic diaphragm and a four-stage pop filter and magnetic shield to prevent dust and magnetic particles from reaching the diaphragm. The

impedance shall be such that the microphone will match 50, 150, and 250 ohm inputs. The line shall be balanced to ground and phased.

The output level shall be −55 dB with 0 dB equalling 1 mw/10 dynes/cm^2. EIA sensitivity rating shall be −149 dB. The magnetic circuit shall be a nonwelded circuit and employ Alnico V and Armco magnetic iron. The case shall be made of steel.

The microphone shall have a maximum diameter of 1-13/32 inches, a length of 5-15/16 inches, and a weight, without cable, of 6 ounces. Finish shall be non-reflecting fawn. An 18-foot, 2-conductor, shielded, neoprene rubber-jacketed, broadcast type cable shall be provided with a Switchcraft A3F or equivalent connector installed. The microphone shall have a built-in connector similar or equivalent to the Switchcraft A3M. The microphone shall include a stand coupler with a 5/8"−27 thread. The Gates Model G-600 is specified.

WARRANTY

The Model G-600, like all Gates professional microphones, is guaranteed unconditionally against malfunction for one year from date of purchase. Within this period, Gates will, at its option, repair or replace any G-600 exhibiting any malfunction, regardless of cause, including accidental abuse. This warranty does not cover finish or appearance. In addition, the model G-600 is guaranteed for its life against defects in the original workmanship and materials, and will be repaired or replaced at no charge if exhibiting malfunction from this cause. Microphones for warranty repair must be shipped prepaid to Gates Radio Company, Quincy, Illinois.

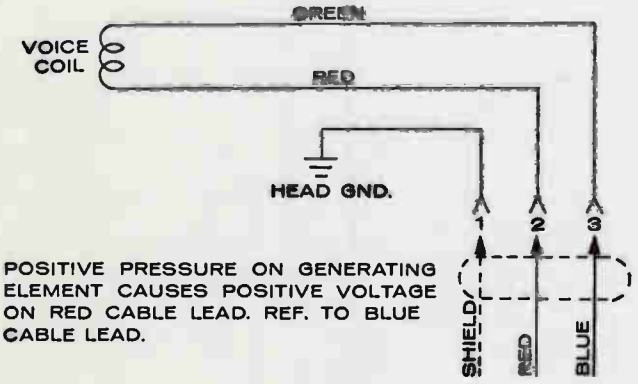


Figure 2—Wiring Diagram

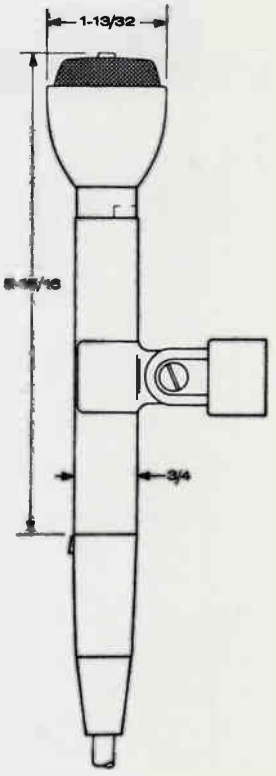


Figure 3—Dimensions

ORDERING INFORMATION

Gates' G-600 Microphone 720-0267

HARRIS INTERTYPE CORPORATION

GATES Product Information Bulletin

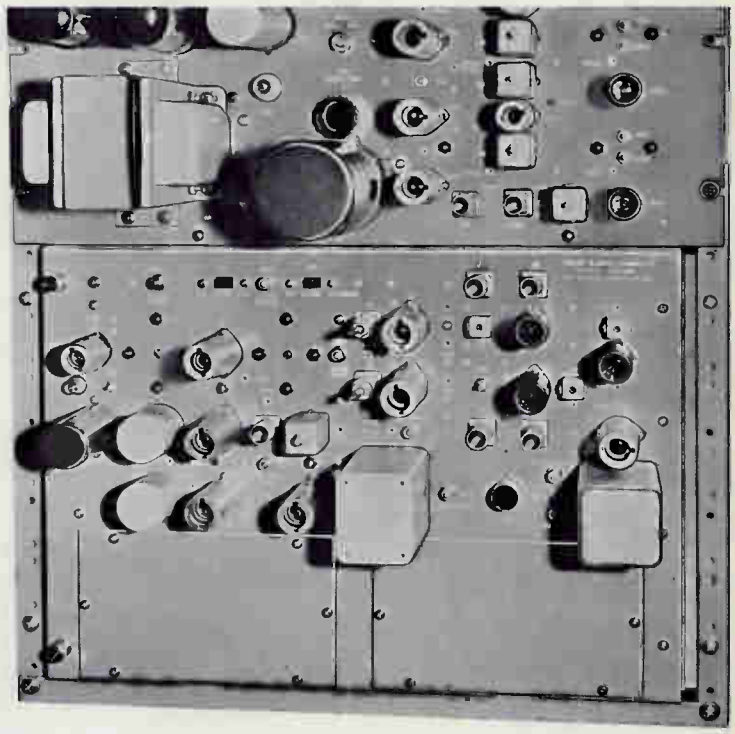
FM STEREO GENERATOR - SUB-CARRIER GENERATOR

MODEL M-6146

ADVANCED DESIGN: Precision engineered by Gates for the exacting demands of FM stereophonic broadcasting, the M-6146 stereo generator is acclaimed by broadcasters and listeners as producing "the finest sounding stereo signal of all stereo stations in our area." The M-6146 generator may be either factory installed when a new Gates transmitter is purchased, or may be added to existing modern FM transmitters within a matter of minutes. All FCC requirements for type approved stereo generators are met by the M-6146 as it provides an output which consists of L+R audio signal containing frequencies from 30 to 15,000 cycles, the 19 Kc. pilot and a 38 Kc. double sideband suppressed carrier signal modulated with the L—R component. The circuits employed are conventional and broadcast engineers will be familiar with the design concepts. The equipment is factory tuned to the specified operating frequency and the controls are sealed. More than adequate stereo channel separation is maintained to assure transmission of a superb stereo signal. The FCC specification for stereophonic channel separation is 29.7 db., and Gates precision design will easily provide separation of 30 db. or better.

SELF-CONTAINED: The Gates M-6146 stereo generator is a completely self-contained unit utilizing swing out construction for complete accessibility from the front panel which makes maintenance easy. A built-in matrix is featured which produces the L+R and L—R signals by the simplest and most used method known. The regulated power supply is self-contained and features 100% silicon rectifiers.

Gates stereo generating equipment is FCC type approved and reflects Gates determination to provide FM stereo without compromising the broadcasters SCA multiplex performance requirements. In addition to delivering superb stereo performance, the M-6146 stereo generator provides space for two M-6160 multiplex sub-carrier generators with inbuilt mute. This is a Gates exclusive and one compact and stable Gates M-6160 multiplex generator will permit simultaneous broadcasting of a 67 Kc. SCA and stereo. When not broadcasting stereo, the 41 Kc. SCA channel can be used simultaneously with the 67 Kc. generator. The Gates M-6249 stereo SCA remote switching kit is available which allows switching from stereo to monaural or stereo to 41 Kc. SCA operation.



Installation of stereo is simple and can be accomplished in less than one hour. Space is provided below the exciter in all Gates FM transmitters for the M-6146 stereo generator.

SPECIFICATIONS

AUDIO INPUT IMPEDANCE (left and right):
600 ohms.

AUDIO INPUT LEVEL (right and left):
Approximately + 5 dbm each channel.

DISTORTION:
1.0% or less 50 to 15,000 cps.

FREQUENCY RESPONSE (left or right):
± 1.0 db, 50-15,000 cps.
(At 30 cycles response is — 2 db.)

FREQUENCY STABILITY:
(19 Kc Pilot): ± 1cps (— 20° to + 140° C).

PILOT OSCILLATOR:
Crystal controlled in 60° C oven.

NOISE:
— 60 db.

PERCENT MODULATION OF MAIN CARRIER BY: PILOT: 8 to 10%

STEREO SEPARATION:
FCC Approved 30 db.

CROSSTALK (Sub-channel to main channel):
40 db or better.
(Main channel to sub-channel):
40 db or better.

SUBCARRIER SUPPRESSION (38 Kc.):
40 db.

SCA PROVISIONS:
Space provided for 41 Kc. and 67 Kc. sub-channel generators.

POWER INPUT:
117 volts, 50/60 cycles, single phase, 50 watts.

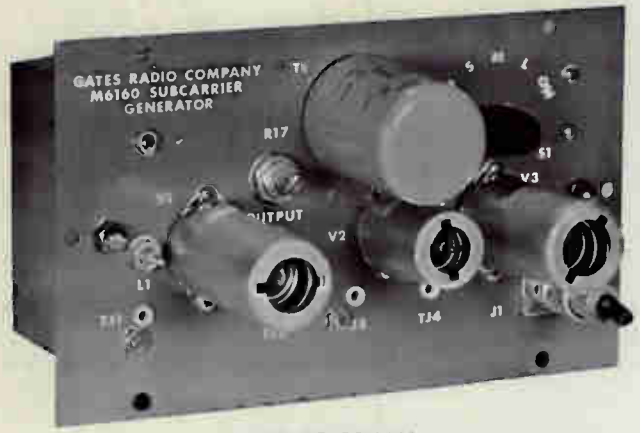
SIZE:
Width 19", height 12½", depth 8".

WEIGHT:
Packed (domestic) 80, (export) 105. Cubage, 8.

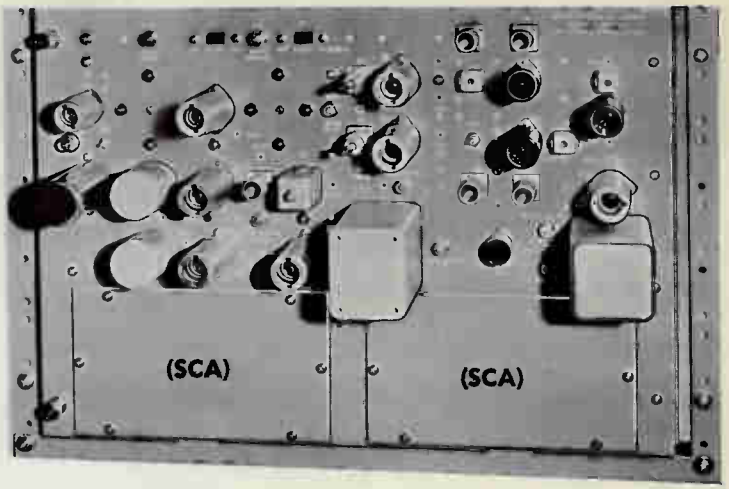
ORDERING INFORMATION

FM Stereo Generator	M-6146
Stereo SCA Remote Switching Kit	M-6249

SUB-CARRIER GENERATOR



MODEL M-6160



Gates Sub-Carrier Generators are used for SCA service in the United States or to provide a second or third FM program relay or STL channel where government regulations of a country permit. This sub-carrier generator is designed to operate with any Gates FM transmitter which is equipped with a Gates stereo generator. For SCA or multiplex broadcast service, the stereo generator acts as the companion inserter. A compact and extremely stable unit, it is easily installed in all Gates stereo generators which provide space to mount two units. The M-6160 Sub-Carrier Generator permits simultaneous broadcasting of a 67 Kc. SCA channel and FM stereo. When not broadcasting stereo, the two generators may be used, and a second SCA channel on 41 Kc. may be programmed.

INSTALLATION: Installed in less than 30 minutes, blank panels are removed on the M-6146 stereo generator (see illustration above) and the M-6160 multiplex generator is connected to the 150 volt, D.C. regulated power supply and filament supply of 6.3 volts AC in the transmitter. Audio input connections are arranged so that input impedance is 600 ohms, and ± 5 Kc. swing at 400 cycles audio input is obtained with + 10 dbm. input level. 150 ohm audio input impedance is also available by changing transformer input leads.

AUTOMATIC MUTING: Muting facilities are incorporated in the M-6160 SCA Generator with variable time constants. A front panel control switch having five positions, controls the mute time constant. Positions 2, 3 and 4 vary the "on" time from 5 milliseconds to 150 milliseconds while position 5 defeats the mute and provides continuous sub-carrier output. The mute is indispensable for subscription music service which completely quiets the channel during periods of no music such as the pause between musical selections.

SWITCHING KIT: The M-6249 switching kit is designed to switch from Monaural FM to Stereo by controlling the 19 Kc. pilot oscillator signal.
Since it is not possible to broadcast stereo and 41 Kc. SCA programming simultaneously, the M-6249 switching kit may also be used to control the M-6160 Sub-Carrier Generator operating on 41 Kc.
The kit is primarily intended to operate with Gates Remote Control systems such as the RDC-10C and RDC-200.

SPECIFICATIONS

FREQUENCY:
Any SCA channel between 25 and 75 Kc.

FREQUENCY STABILITY:
± 500 cycles.

INPUT IMPEDANCE:
600 ohm impedance balanced.

INPUT LEVEL:
+ 10 dbm., ± 2 db. for ± 5 Kc. deviation at 400 cycles.

DISTORTION:
Less than 1.5%, 30-15,000 cycles with ± 7.5 Kc. deviation.

AUDIO RESPONSE:
Flat or with 50 microsecond pre-emphasis. (as ordered)

FM NOISE:
— 55 db.

OUTPUT LEVEL:
1.5 VPP. adjustable by front panel control.

POWER REQUIREMENTS:
150 volts D.C. @ 5 Ma.
6.3 volts A.C. @ .75 A.

TUBE COMPLEMENT:
(2) 12AX7, (1) 5725/6AS6.

AUTOMATIC MUTE LEVEL:
Variable from 0 to — 40 db. by front panel control.

WEIGHT:
1 lb. 7 oz. Export packed 15 lbs. Cubage 1½.

DIMENSIONS:
Front panel; 7" x 4⅛" rear cover, 6" x 3½" x 2½" deep (designed to fit in panel slot of 6¼" x 3⅜").

ORDERING INFORMATION

S.C.A. Generator Complete with tubes M-6160
Remote switching modification kit M-6249

HARRIS INTERTYPE CORPORATION
GATES

GATES RADIO COMPANY
A Subsidiary of
Harris-Intertype Corporation
QUINCY, ILLINOIS 62302

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In Canada: Canadian Marconi Company, Montreal

HARRIS INTERTYPE CORPORATION

GATES Product Information Bulletin

10 AND 50 WATT FM BROADCAST TRANSMITTERS

Model BFE-10C Ten Watt FM Transmitter

THREE MODELS AVAILABLE

Gates consistently offers the most complete line of low powered wide band FM broadcast transmitters in the industry. Especially designed for educational FM broadcasting and for STL (studio-transmitter link) service, three popular models featuring direct crystal controlled cascade modulation are available. Included are the 10 watt BFE-10C and 50 watt BFE-50C versions for the standard FM broadcast band of 88 to 108 MHz, and the 50 watt Model BFR-50C which operates in the 40 to 220 MHz FM band. The BFR-50C is specifically designed for high fidelity program relay and STL service and is unusually popular with broadcasters abroad. The same low distortion, wide frequency response and reliability, so characteristic of Gates higher powered FM models, will be found in these three lower powered equipments.

Metering consists of an audio level meter to indicate proper modulation level and individual meters for RF output, plate current and plate voltage. The transmitters are 100% complete without external accessories other than antenna and audio equipment.

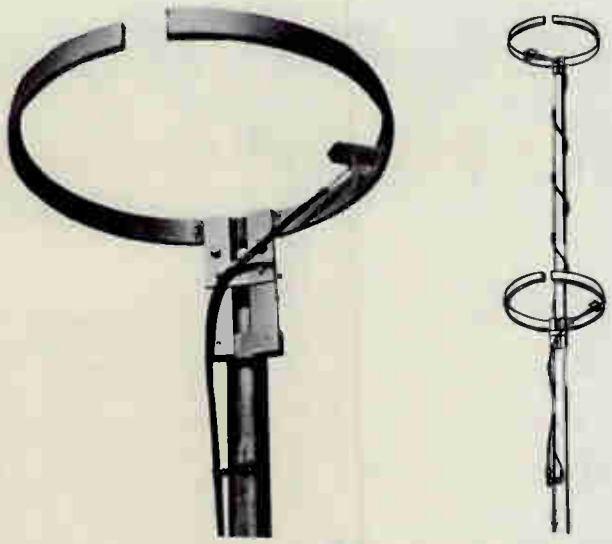
MODEL BFE-10C: The BFE-10C ten watt FM transmitter is FCC type approved for educational FM broadcasting. This unit is excellent for STL service or in any applications where 10 watts RF output is required. Supplied for monaural operation—stereophonic, and single or dual channel multiplexing equipment optional for use with the BFE-10C transmitter. A compact self-contained unit designed specifically for desk or external mounting, this 10 watt model incorporates the M-6095 exciter featuring direct crystal controlled cascade modulation. If stereo is desired, the M-6146 stereo generator is added.

Construction and design is pleasing to the eye and convenient to service. Immediate "full view" access is available by removing the front grill or the rear full length slip-on door. This complete 10 watt FM transmitter is used by many schools, colleges, universities and overseas broadcasters in conjunction with the Gates FM-11 single ring or the FM-22 double ring FM antenna. As part of this FM broadcast package, the Gates Studioette audio console is recommended. This complete educational broadcasting system is modern and equal to the best, yet will fit into the conservative budget.

MODEL BFE-50C: For 88 to 108 MHz FM service, the BFE-50C is similar in design to the BFE-10C transmitter but delivers 5 times as much power or 50 watts. A 50 watt power amplifier is added to the 10 watt section to provide the higher powered output. The amplifier consists of two 6146 tubes and a 600 volt power supply. Identical in appearance to the standard BFE-10C transmitter, the cabinet easily houses the 50 watt amplifier and power supply.

MODEL BFR-50C: This complact 50 watt transmitter is problably the world's most widely used FM relay transmitter. Designed to relay broadcast programs from studio to transmitter or between special program originating points, the Model BFR-50C operates on any one specific frequency (as ordered) within the 40 MHz to 220 MHz band. When operating below 80 MHz, the maximum swing is ±40 kHz or less. Above 80 MHz the frequency swing is ±75 kHz. The 50 watt amplifier consists of two radio frequency stages powered by a built-in 600 volt power supply. The range of this transmitter is greatly increased by use of a directional antenna. The corner reflector antenna when used at both transmitting and receiving ends, will result in several hundred watts of effective power. A relay link up to nearly 100 miles is possible, depending on the antenna height of both transmitter and receiver as well as terrain.

Front view (cover removed) of Model BFE-10C, ten watt FM transmitter. Models BFE-50C and BFR-50C are essentially identical in appearance.



Left, FM-11 single ring ommi-directional antenna with power gain of 0.8 dB. Right, two bay FM-22 ommi-directional antenna with gain of 1.6 dB. These are broad band, easy to install antennas.

Front view (cover removed) of BFE-50C fifty watt FM transmitter.

SPECIFICATIONS

POWER OUTPUT:
BFE-10C, 10 watts; BFE-50C, 50 watts; BFR-50C, 50 watts.

FREQUENCY RANGE:
Models BFE-10C and BFE-50C, 88-108 MHz, as ordered. Model BFR-50C, 40 to 220 MHz, as ordered.

STABILITY:
0.001% or better.

MODULATION:
Direct crystal controlled cascade modulation.

RESPONSE:
Within 1 dB of standard 75 microsecond pre-emphasis curve or flat ±1 dB, 50-15,000 Hz. Note: Will supply with 75 microsecond pre-emphasis curve unless ordered for flat curve.

FREQUENCY SWING:
±100 kHz: (±75 kHz = 100% modulation in FM broadcasting). Model BFR-50C. Models below 80 MHz have maximum swing of ±40 kHz, or less, as desired. Above 80 MHz may be ±75 kHz or less, as desired.

DISTORTION:
1% or less 30-15,000 Hz. ½% 100-10,000 Hz.

RF HARMONICS:
Suppression meets or exceeds all FCC requirements.

INPUT:
+10 dBm ±2 dB at 600 ohms impedance.

POWER:
117 volts, 50/60 Hz. BFE-10C, 120 watts; BFE-50C, 230 watts; BFR-50C, 230 watts.

RF OUTPUT:
50 ohms (Type N connector).

OSCILLATOR:
Direct crystal controlled.

NOISE:
65 dB below 100% modulation (FM).

TEMPERATURE:
−20° to + 50° C.

TUBES:
BFE-10C: (6) 6AU6, (3) 6J6, (3) 6201, (3) 7025, (2) OA2, and (1 each) 12AX7, 6A05, GZ34/5AR4, 6080, 6360.
BFE-50C: Same as above, with (2) 6146 and (1) 5R4GYA tube added.
BFR-50C: Same as BFE-10C with (1) 5894, (1) 6AQ5, and (1) 5R4GYA tube added.

ALTITUDE:
7500 feet.

FINISH:
Two tone beige gray with trim in brushed aluminum and black.

SIZE:
26½" high, 28" wide, 14" deep.

WEIGHT (Packed):
BFE-10C (domestic) 100 lbs; (export) 205 lbs.; 15 cu. ft.
BFE-50C (domestic) 125 lbs.; (export) 230 lbs.; 16 cu. ft.
BFR-50C (domestic) 125 lbs.; (export) 230 lbs.; 16 cu. ft.

ORDERING INFORMATION

BFE-10C, 10 Watt FM Transmitter, 88-108 MHz, with tubes and crystal	994-5594
Spare 100% tube kit for BFE-10C	990-0391
Manufacturer's recommended minimum tube kit for BFE-10C	990-0488
BFE-50C, 50 Watt FM Transmitter, 88-108 MHz, with tubes and crystal	994-5595
Spare 100% tube kit for BFE-50C	990-0489
Manufacturer's recommended minimum tube kit for BFE-50C	990-0490
BFR-50C, 50 Watt Relay Transmitter for 40-220 MHz, with tubes, crystal and oven	994-5599
Spare 100% tube kit for BFR-50C	990-0310
Manufacturer's recommended minimum tube kit for BFR-50C	990-0458
FM-11 Single Ring Educational (88-108 MHz) FM Antenna	710-0102
FM-22 Double Ring Educational (88-108 MHz) FM Antenna	710-0103

State carrier frequency when ordering all models and antennas and frequency swing desired when ordering Model BFR-50C transmitter.

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HARRIS INTERTYPE CORPORATION

GATES Product Information Bulletin

10 AND 50 WATT FM BROADCAST TRANSMITTERS

Model BFE-10C Ten Watt FM Transmitter

THREE MODELS AVAILABLE

Gates consistently offers the most complete line of low powered wide band FM broadcast transmitters in the industry. Especially designed for educational FM broadcasting and for STL (studio-transmitter link) service, three popular models featuring direct crystal controlled cascade modulation are available. Included are the 10 watt BFE-10C and 50 watt BFE-50C versions for the standard FM broadcast band of 88 to 108 MHz, and the 50 watt Model BFR-50C which operates in the 40 to 220 MHz FM band. The BFR-50C is specifically designed for high fidelity program relay and STL service and is unusually popular with broadcasters abroad. The same low distortion, wide frequency response and reliability, so characteristic of Gates higher powered FM models, will be found in these three lower powered equipments.

Metering consists of an audio level meter to indicate proper modulation level and individual meters for RF output, plate current and plate voltage. The transmitters are 100% complete without external accessories other than antenna and audio equipment.

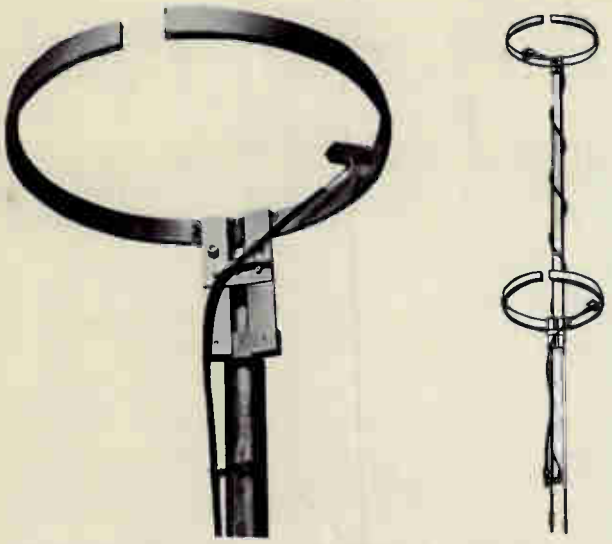
MODEL BFE-10C: The BFE-10C ten watt FM transmitter is FCC type approved for educational FM broadcasting. This unit is excellent for STL service or in any applications where 10 watts RF output is required. Supplied for monaural operation—stereophonic, and single or dual channel multiplexing equipment optional for use with the BFE-10C transmitter. A compact self-contained unit designed specifically for desk or external mounting, this 10 watt model incorporates the M-6095 exciter featuring direct crystal controlled cascade modulation. If stereo is desired, the M-6146 stereo generator is added.

Construction and design is pleasing to the eye and convenient to service. Immediate "full view" access is available by removing the front grill or the rear full length slip-on door. This complete 10 watt FM transmitter is used by many schools, colleges, universities and overseas broadcasters in conjunction with the Gates FM-11 single ring or the FM-22 double ring FM antenna. As part of this FM broadcast package, the Gates Studioette audio console is recommended. This complete educational broadcasting system is modern and equal to the best, yet will fit into the conservative budget.

MODEL BFE-50C: For 88 to 108 MHz FM service, the BFE-50C is similar in design to the BFE-10C transmitter but delivers 5 times as much power or 50 watts. A 50 watt power amplifier is added to the 10 watt section to provide the higher powered output. The amplifier consists of two 6146 tubes and a 600 volt power supply. Identical in appearance to the standard BFE-10C transmitter, the cabinet easily houses the 50 watt amplifier and power supply.

MODEL BFR-50C: This complact 50 watt transmitter is problably the world's most widely used FM relay transmitter. Designed to relay broadcast programs from studio to transmitter or between special program originating points, the Model BFR-50C operates on any one specific frequency (as ordered) within the 40 MHz to 220 MHz band. When operating below 80 MHz, the maximum swing is ±40 kHz or less. Above 80 MHz the frequency swing is ±75 kHz. The 50 watt amplifier consists of two radio frequency stages powered by a built-in 600 volt power supply. The range of this transmitter is greatly increased by use of a directional antenna. The corner reflector antenna when used at both transmitting and receiving ends, will result in several hundred watts of effective power. A relay link up to nearly 100 miles is possible, depending on the antenna height of both transmitter and receiver as well as terrain.

Front view (cover removed) of Model BFE-10C, ten watt FM transmitter. Models BFE-50C and BFR-50C are essentially identical in appearance.



Left, FM-11 single ring ommi-directional antenna with power gain of 0.8 dB. Right, two bay FM-22 ommi-directional antenna with gain of 1.6 dB. These are broad band, easy to install antennas.

Front view (cover removed) of BFE-50C fifty watt FM transmitter.

SPECIFICATIONS

POWER OUTPUT:
BFE-10C, 10 watts; BFE-50C, 50 watts; BFR-50C, 50 watts.

FREQUENCY RANGE:
Models BFE-10C and BFE-50C, 88-108 MHz, as ordered. Model BFR-50C, 40 to 220 MHz, as ordered.

STABILITY:
0.001% or better.

MODULATION:
Direct crystal controlled cascade modulation.

RESPONSE:
Within 1 dB of standard 75 microsecond pre-emphasis curve or flat ±1 dB, 50-15,000 Hz. Note: Will supply with 75 microsecond pre-emphasis curve unless ordered for flat curve.

FREQUENCY SWING:
±100 kHz: (±75 kHz = 100% modulation in FM broadcasting). Model BFR-50C. Models below 80 MHz have maximum swing of ±40 kHz, or less, as desired. Above 80 MHz may be ±75 kHz or less, as desired.

DISTORTION:
1% or less 30-15,000 Hz. ½% 100-10,000 Hz.

RF HARMONICS:
Suppression meets or exceeds all FCC requirements.

INPUT:
+10 dBm ±2 dB at 600 ohms impedance.

POWER:
117 volts, 50/60 Hz. BFE-10C, 120 watts; BFE-50C, 230 watts; BFR-50C, 230 watts.

RF OUTPUT:
50 ohms (Type N connector).

OSCILLATOR:
Direct crystal controlled.

NOISE:
65 dB below 100% modulation (FM).

TEMPERATURE:
−20° to + 50° C.

TUBES:
BFE-10C: (6) 6AU6, (3) 6J6, (3) 6201, (3) 7025, (2) OA2, and (1 each) 12AX7, 6A05, GZ34/5AR4, 6080, 6360.
BFE-50C: Same as above, with (2) 6146 and (1) 5R4GYA tube added.
BFR-50C: Same as BFE-10C with (1) 5894, (1) 6AQ5, and (1) 5R4GYA tube added.

ALTITUDE:
7500 feet.

FINISH:
Two tone beige gray with trim in brushed aluminum and black.

SIZE:
26½" high, 28" wide, 14" deep.

WEIGHT (Packed):
BFE-10C (domestic) 100 lbs; (export) 205 lbs.; 15 cu. ft.
BFE-50C (domestic) 125 lbs.; (export) 230 lbs.; 16 cu. ft.
BFR-50C (domestic) 125 lbs.; (export) 230 lbs.; 16 cu. ft.

ORDERING INFORMATION

BFE-10C, 10 Watt FM Transmitter, 88-108 MHz, with tubes and crystal	994-5594
Spare 100% tube kit for BFE-10C	990-0391
Manufacturer's recommended minimum tube kit for BFE-10C	990-0488
BFE-50C, 50 Watt FM Transmitter, 88-108 MHz, with tubes and crystal	994-5595
Spare 100% tube kit for BFE-50C	990-0489
Manufacturer's recommended minimum tube kit for BFE-50C	990-0490
BFR-50C, 50 Watt Relay Transmitter for 40-220 MHz, with tubes, crystal and oven	994-5599
Spare 100% tube kit for BFR-50C	990-0310
Manufacturer's recommended minimum tube kit for BFR-50C	990-0458
FM-11 Single Ring Educational (88-108 MHz) FM Antenna	710-0102
FM-22 Double Ring Educational (88-108 MHz) FM Antenna	710-0103

State carrier frequency when ordering all models and antennas and frequency swing desired when ordering Model BFR-50C transmitter.

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HARRIS
Communication Technology

PRODUCT INFORMATION BULLETIN

CB - 77 12 - INCH TRANSCRIPTION TURNTABLE

Gates' CB-77 is a 12-inch professional transcription turntable with many unique design principles to provide outstanding sound reproduction and years of dependable service. These features include an exclusive inner hub drive that holds rumble to a minimum, and a heavy-duty hysteresis synchronous motor for firm, uniform drive and good torque for quick starting. Other features include: heavy machined aluminum platter; functional 3-speed selector switch; no belts or gear trains to wear.

The chassis is ready for you to attach the pick-up arm of your choice.

SPECIFICATIONS

CHASSIS SIZE: 16" x 16" x 1 5/16". Motor hang below bottom of chassis: 5¾".

CONSTRUCTION: Platter and base of machined aluminum.

FINISH: Beige-gray with escutcheon in black and turntable platter cover in heavy gray felt.

PLATTER SIZE: 13⅜".

CENTER BEARING: 1" diameter hardened steel, rotates in oilite bearing.

CENTER SPINDLE: Spring-locking type snaps up for 45 rpm, locks down for smaller spindle records.

MOTOR: Hysteresis synchronous, single phase, 600 rpm, with 40°C temperature rise.

CUEING: At 33⅓ rpm, ⅛ turn. At 45 rpm, ¼ turn. At 78 rpm, 1 turn.

NOISE OR RUMBLE: At 33⅓ rpm, rated −45 dB. At 45 rpm, rated −40 dB. At 78 rpm, rated −35 dB. (Meets or exceeds NAB specifications for stereophonic reproduction.)

WOW: 0.1% maximum, capable .08%.

FLUTTER: .07% maximum, capable .05%.

MOTOR START: Rocker-type illuminated mercury switch.

IDLER WHEEL: Special shear action neoprene, self-aligning.

SPEED CHANGE: To 33⅓, 45 or 78 rpm by single indexed lever control.

POWER: 117 volt, 60 Hz, 35 watts. (50 Hz model available, see below.)

WEIGHT: Net: 30 lbs. Packed: domestic, 40 lbs.; export, 65 lbs. Cubage: 3.6 cubic feet.

ORDERING INFORMATION

CB-77 12-inch transcription turntable, chassis only, 60 Hz_____994-5798-005

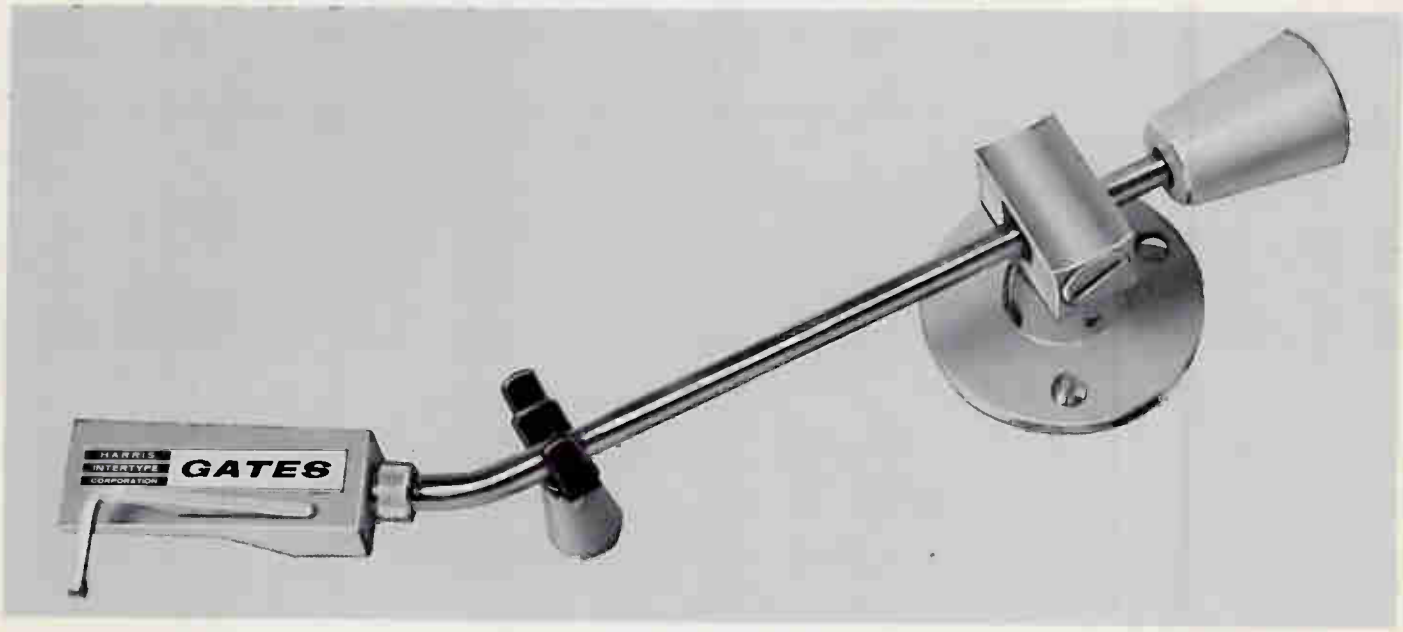
CB-77A 12-inch transcription turntable, chassis only, 50 Hz_____994-5798-006

GATES DIVISION
HARRIS-INTERTYPE CORPORATION
123 HAMPSHIRE STREET • QUINCY, ILLINOIS 62301 U.S.A.

HARRIS
Communications and Information Handling

Product Information Bulletin

12-INCH PROFESSIONAL TONE ARM



MODEL TA-12 TONE ARM

FEATURES

- High quality rugged arm.
- Tracks with as low as one gram pressure.
- Resonance less than 15 Hz.
- Arm rest with lock.
- High strength nickel plated steel for excellent RF shielding.
- Rapid cartridge installation or change.
- Separate vertical and horizontal pivots.
- Contemporary styling.
- Shell accepts all available standard cartridges.
- Adjustable rear weight.
- Fluid anti-skate mechanism.

Gates' TA-12 transcription tone arm, the product of established designers of quality audio equipment, has been developed to meet broadcasting's critical tracking requirements for fine groove stereophonic recordings.

Precision manufacturing, extensive quality control and rigid testing procedures are guarantees that this tone arm will fulfill broadcasting needs for micro pressure cartridges.

The Gates' TA-12, which tracks as low as one gram without skipping, faithfully reproduces stereo records by minimizing the effect of the tone arm on sound reproduction and by reducing excessive record wear.

Because of the advance design of the tone arm, resonance is less than 15 Hz, well outside the operating frequency range of the system. Distortion due to tracking error in the arm and pickup is reduced to a minimum by separate horizontal and vertical pivots.

Accurate tracking pressure is further achieved by rearweight adjustment with a calibration of approximately one gram per revolution. This reliable tracking allows for lower pressure on the stylus adding to the record and stylus life.

Gates' TA-12 transcription arm features an arm rest with a lock which considerably reduces accidental damage to the stylus. The arm is fabricated with rugged simplicity from nickel plated steel which provides excellent RF shielding.

Designed for modern cartridges, Gates' TA-12 tone arm incorporates mechanical features which permit easy installation and rapid shell and cartridge change.

The cartridge shell will accept all standard cartridges. Other features include clean, contemporary styling and a fluid anti-skate mechanism.

The tone arm is provided with mounting hardware, mounting template, anti-skate fluid, two one-gram weights, four feet of audio cord and complete instructions.

The TA-12 tone arm is ideal as a companion with Gates' CB-77 turntable.

The TA-12 tone arm is shown installed on the Gates' CB-77 turntable.

SPECIFICATIONS

DIMENSIONS:

Overall length ..... 12-1/2 inches
Pivot to rear ..... 3-3/8 inches

OVERHANG:

0.682 inches. Spindle center to stylus.

PIVOT TO SPINDLE:

8-5/16 inches.

TRACKING ERROR:

3.00 inch radius	0 degree 00 min.
3.75 inch radius	1 degree 28 min.
4.75 inch radius	0 degree 0 Min.
5.50 inch radius	2 degree 0 min.

RESONANCE:

Below 15 Hz at 1 gram with 30 by 10 cm/dyne compliance.

WEIGHT:

18 oz.

ACCESSORIES:

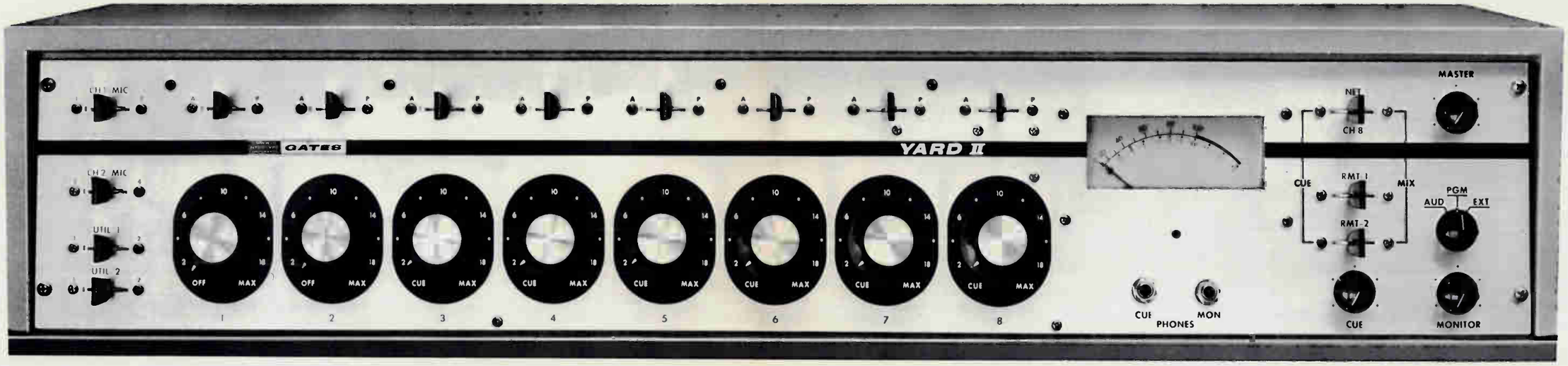
Turntable preamplifier (mono)	994-6690-001
Turntable preamplifier (stereo)	994-6977-001

ORDERING INFORMATION

TA-12 Transcription Tone Arm ---------- **723-0317-000**

GATES DIVISION
HARRIS-INTERTYPE CORPORATION
123 HAMPSHIRE STREET • QUINCY, ILLINOIS 62301 U.S.A.

EIGHT CHANNEL TRANSISTOR MONOPHONIC AUDIO CONSOLE



THE YARD II

Successor to the famous Yard console, the new Yard II now offers even greater versatility with the added reliability of total solid state design. Just over a yard wide, Gates Yard II console offers 12 inputs into 8 mixing channels. It is ideal as a full control facility for smaller AM and FM monophonic stations and a perfect submaster control or production console in larger operations. The low silhouette styling is a definite "plus" for television use.

Functionally arranged, the eight mixing channels are in the center of the board with the meter to the right, along with master gain controls. Preamplifiers used on microphone channels 1 and 2 may select from two low impedance microphones on each input. Five medium level channels can be used with any sources, such as turntables, tape recorders, etc. The eighth channel is specifically designed for use with network and two remote sources, and separate front panel switches provide selection of any of these inputs.

INDEPENDENT CHANNEL MONITORING AND RECORDING: Any of the 8 input channels may be switched to either the program or audition position to permit independent monitoring or recording of any incoming sources without disturbing programming.

HIGH FIDELITY PERFORMANCE: Frequency response of the Yard II is uniform ±1 dB from 30 to 15,000 Hz. Noise is better than 73 dB below normal output with crosstalk below the noise at normal levels and control settings. Distortion is less than 0.75% from 30 to 15,000 Hz at a +18 dBm output.

VU METER: A four-inch illuminated 'B' scale VU meter is flush mounted with the Yard II front panel for accurate level measurement.

LOW SILHOUETTE STYLING: Only 8½ inches high, the Yard II offers an excellent over the top view, especially adaptable for TV operation.

ACCESSIBILITY: All components can be quickly reached through the lift off top. The entire console is hinged at the rear for complete access to the under side of the console.

INPUTS: Four microphones, five medium level inputs, and three external line inputs. Cue bus is connected to mixers 3 through 8 to provide rapid cueing on all six channels.

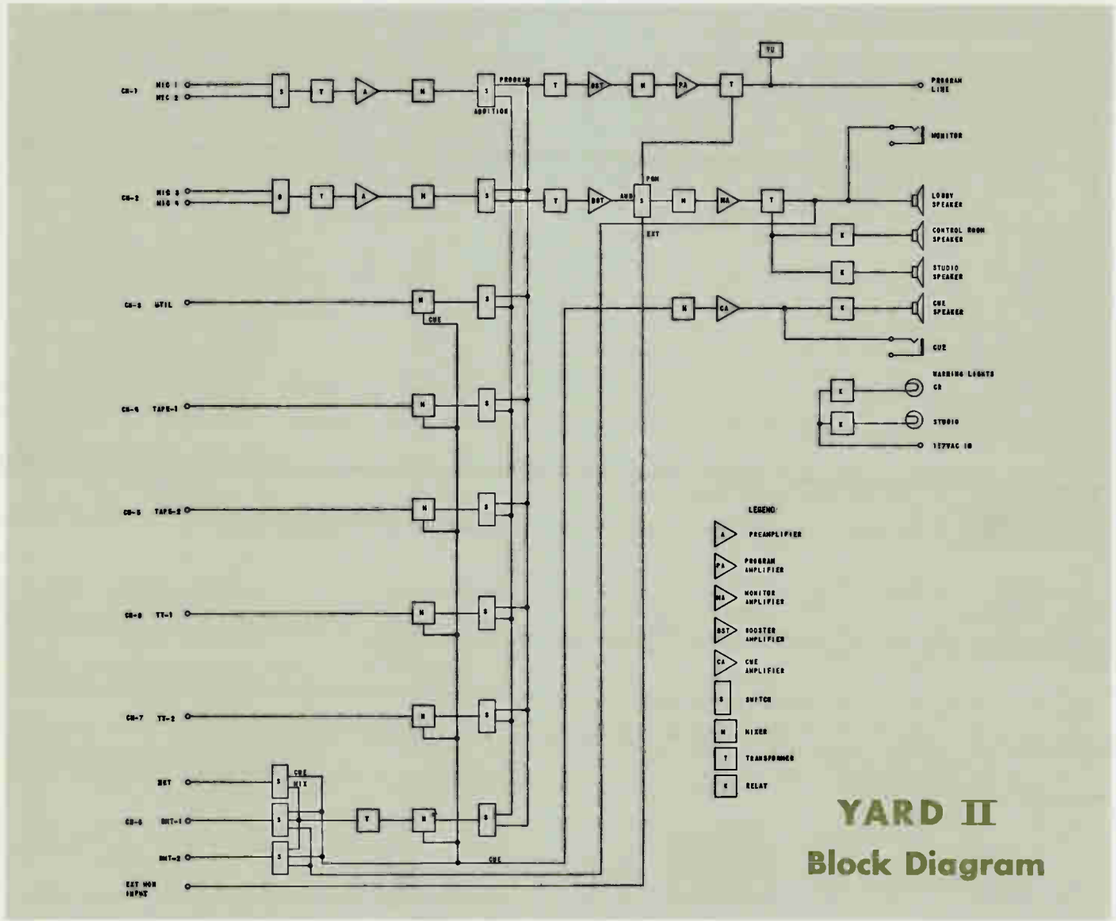
CUE AMPLIFIER: Built-in cue speaker in the top of the console provides cue from channels 3 through 8 to either the speaker built into the console or through the separate cue headphone jack.

BOOSTER AMPLIFIER: A monitor booster amplifier is provided as standard equipment to allow switching the monitor amplifier from program to audition without changing level.

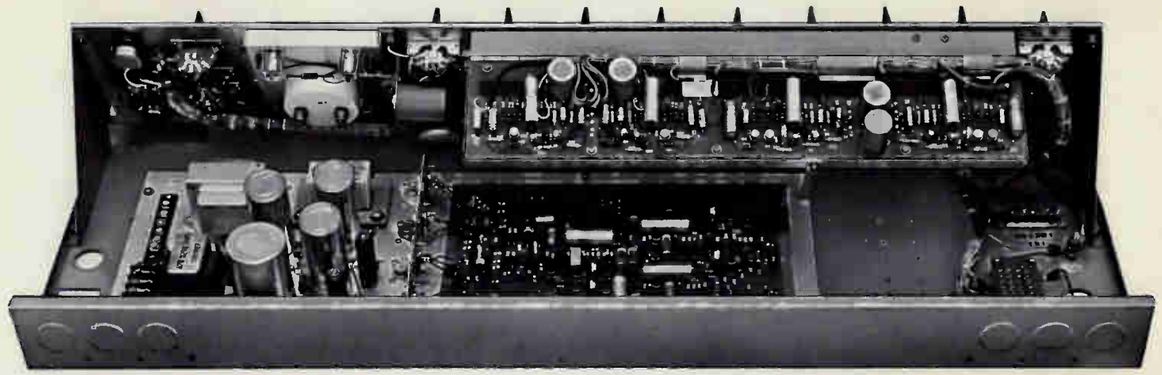
MUTING RELAYS: Two muting relays are supplied to operate warning lights as well as muting of the control room and studio speakers. A terminal strip on the console permits flexible selection of muting relay operation by simply changing jumper wires.

COLOR CODED CONTROLS: Mixer knobs are supplied with various colored disc inserts to color code controls such as red for turntables, green for studio A, etc.

COMPACT AND LIGHTWEIGHT: The 38" Yard II console is one of the most compact, full facility consoles ever produced. It measures 38" wide, 8½" high, and 13" deep, and weighs only 54 pounds.



YARD II
Block Diagram



Complete access to all components is via the easily removed cover of the Yard II. All input and output connections can be made through the rear or the bottom of the console. Convenient knock-outs on the rear apron provide entry for wiring cables.

Specifications

GENERAL

MIXING CHANNELS: Total of eight, all monaural. Two microphone, five medium level, one network/remote.

AMPLIFIERS PROVIDED: Two preamplifiers, two booster amplifiers, one program amplifier, one monitor amplifier, and one cue amplifier.

OPERATING MODE: Monaural.

INPUT CIRCUITS: Four for microphones, two for turntables, two for tape, one utility, three for network/remote.

OUTPUT LINES: One program, two muted speaker, one non-muted speaker, one cue speaker (muted), two headphone (monitor and cue).

MICROPHONE (CH. 1 & 2) TO PROGRAM LINE OUT

MAXIMUM GAIN: 103 ±2 dB.

FREQUENCY RESPONSE: ±1 dB, 30 to 15,000 Hz.

DISTORTION: Less than 0.75%, 30 to 15,000 Hz, at +18 dBm output.

NOISE: More than 73 dB below +18 dBm output with −50 dBm input. Equivalent input noise is better than −123 dBm, 30 to 15,000 Hz.

CROSSTALK: Below noise level, with normal levels and control settings.

MICROPHONE IMPEDANCE: 30/50 or 150/250 ohms, balanced.

MEDIUM LEVEL (CH. 3-7) TO PROGRAM LINE OUT

MAXIMUM GAIN: 63 ±2 dB.

FREQUENCY RESPONSE: ±1 dB, 30 to 15,000 Hz.

DISTORTION: Less than 0.75%, 30 to 15,000 Hz at +18 dBm output.

NOISE: More than 73 dB below +18 dBm output with −10 dBm input, 30 to 15,000 Hz.

CROSSTALK: Below noise level, with normal levels and control settings.

INPUT IMPEDANCE: 150 ohms, unbalanced.

NETWORK/REMOTES (CH. 8) TO PROGRAM LINE OUT

MAXIMUM GAIN: 43 ±2 dB.

FREQUENCY RESPONSE: ±1 dB, 30-15,000 Hz.

DISTORTION: Less than 0.75%, 30 to 15,000 Hz at +18 dBm output.

NOISE: More than 73 dB below +18 dBm output with +10 dBm input, 30 to 15,000 Hz.

CROSSTALK: Below noise level, with normal levels and control settings.

INPUT IMPEDANCE: 600 ohms, balanced.

MONITOR CIRCUITS

*GAIN: Mic. −Pgm. −Mon. Out 124 ±2 dB
Mic. −Aud. −Mon. Out 106 ±2 dB
Med. −Aud. −Mon. Out 66 ±2 dB
Ext. Mon. −Mon. Out 46 ±2 dB

*Approximately 11 dB additional gain is available by shorting out the R37, 10,000 ohm resistor, connected between the Monitor Selector Switch and the Monitor Gain control.

FREQUENCY RESPONSE: ±1 dB, 30 to 15,000 Hz.

DISTORTION: Less than 1%, 30 to 15,000 Hz at +40 dBm (10 watts) output.

NOISE: More than 73 dB below +40 dBm (10 watts) output, 30 to 15,000 Hz.

CROSSTALK: Below noise level, with normal levels and control settings.

POWER REQUIREMENTS

LINE VOLTAGE AND FREQUENCY: 117V (as shipped) /234V, 50/60 Hz.

POWER CONSUMPTION: 60 watts, maximum.

PHYSICAL SIZE

CONSOLE: 38" wide, 13" deep, 8½" high.

CONSOLE WEIGHT: 54 lbs.

POWER TRANSFORMER: Approximately 6½" long x 4" wide x 3½" high.

ORDERING INFORMATION

Yard II Audio Console complete ——— **994-6616**

HARRIS INTERTYPE CORPORATION
GATES®

GATES RADIO COMPANY • QUINCY, ILLINOIS • 62301 • U.S.A.
A division of Harris-Intertype Corporation

CP-5M-1168

ADV. 248

. . . from the Exclusive **GATES** Solid Statesman Line

YARD II

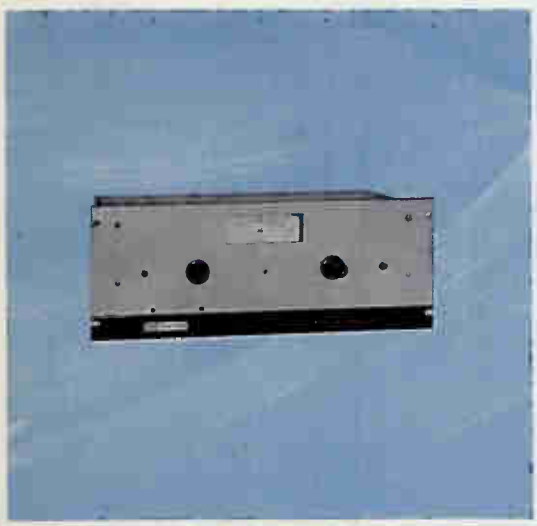
EIGHT CHANNEL TRANSISTOR MONOPHONIC AUDIO CONSOLE

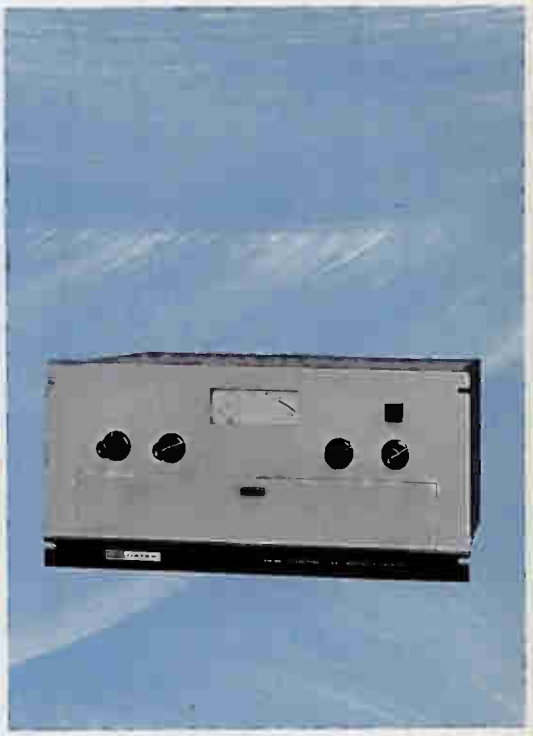
features:

- Eight Mixing Channels—12 inputs.
- High Fidelity Performance—extremely low noise.
- Crosstalk below measurable noise levels.
- Built-in Cue Amplifier and speaker.
- Low Silhouette Styling.
- Independent Channel Monitoring and Recording.
- Complete Accessibility to all components.
- Monitor-Amplifier Built-in.
- Compact and lightweight.
- Total Solid State (Silicon) Design.

GATES

FM MONITORS





STEREO MODULATION MONITOR

MODEL GTM-88S

Now . . . Gates monitors Gates. With three solid state FM monitors— fully FCC type approved, and thoroughly field tested. Now . . . Gates offers you the most complete line of FM broadcast equipment available under one label, from a single manufacturer.

Stereo Modulation Monitor Features

- Provision for adding SCA adapter
- Integrated Circuits for Dependability
- All Controls Accessible from Front Panel
- Silicon Solid State Circuitry
- Modular Construction
- Front Panel Control of Instrument Outputs

Operating Advantages

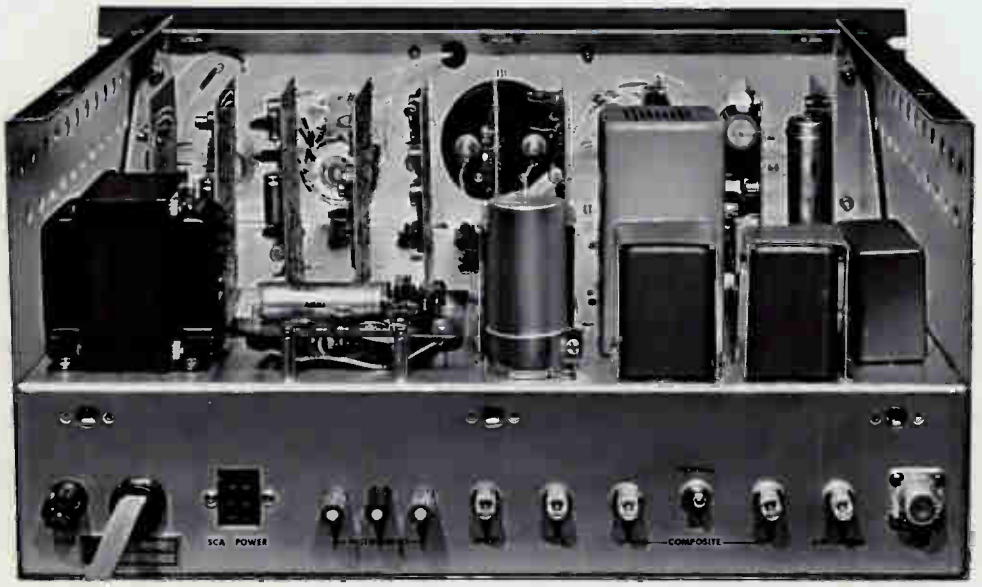
The GTM-88S measures all modulation characteristics of an FM monaural or stereo signal in accordance with FCC requirements. All normal operating controls are accessible from the front panel. Instrument outputs for the right and left channels on the rear of the monitor can be connected to such auxiliary test equipment as oscilloscopes, distortion analyzers and frequency monitors, which may remain connected without affecting monitor performance or accuracy. Left channel instrument output switchable to either channel by front panel control.

Modular Circuitry

Printed circuit construction is used throughout, and, combined with the total solid state design, improves overall dependability. The silicon transistors and integrated circuits were selected as they resist the effects of aging, moisture, and temperature variation, and assure stable operation even under adverse operating conditions.

Advanced Design

Space age integrated circuits combine all circuit components into a single silicon semi-conductor device, thus eliminating many physical components as well as their associated interconnections. These compact circuits, coupled with advanced solid state design, add to the overall product reliability and performance. Provision has been made for the addition of an SCA adapter to measure SCA modulation in accordance with FCC rules and regulations.



Rear View With Cover Removed

SPECIFICATIONS

ELECTRICAL

Operating Frequency: 87.5 to 108 MHz.

RF Input Impedance: 50 ohms, unbalanced.

RF Input Sensitivity: 0.1 to 1 watt.

Comp. Input Sensitivity: 0.7 V Peak-to-peak for 100% modulation.

Comp. Input Impedance: 4,000 ohms.

Comp. Output: 3 V Peak-to-peak at 100% modulation.

Comp. Output Impedance: 600 ohms.

Comp. Output Freq. Res.: ±0.5 dB, 30 Hz to 100 kHz.

19 kHz Output: 0.75 V Peak-to-peak into 20 k Ω load.

Headphones Output: Levels for loads from 4 ohms to several megohms with distortion 1% or less. Separate level control.

Power Requirements: 100-130 VAC, 50/60 Hz, 40 watts.

FCC Type Approval: No. 3-144.

INSTRUMENT OUTPUT (LEFT OR RIGHT)

Impedance: 20,000 ohms.

Frequency Response: ±0.5 dB, 50 Hz to 15 kHz.

Distortion (Monaural): 0.25% or better from 50 Hz to 15 kHz at 100% modulation.

Distortion (Stereo): 0.5% or better from 50 Hz to 15 kHz at 100% modulation.

Internal Noise: −70 dB or better in mono or stereo below 100% modulation at 400 Hz.

Channel Separation: 35 dB or better 50 Hz to 15 kHz.

CROSSTALK CAPABILITY

Main to Sub: 50 dB or better.

Sub to Main: 55 dB or better.

SCA to Main or Sub: 70 dB or better.

Subcarrier Suppression: 50 dB or better with modulation from 5 to 15 kHz.

MODULATION METER

Accuracy: ±5% or better.

Ballistics: Conform to FCC rules 73.322 (b).

Peak Modulation Indicator: Adjustable to indicate from 50% to 120% modulation.

AM Noise Measurement: AM noise up to −70 dB from 30 Hz to 75 kHz.

MECHANICAL

RF Input Connector: UHF plug.

Dimensions: 19" wide, 8¾" high, 14¼" deep.

Weight: 26 lbs. (net).

Ambient Temperature: 10°C (50°F) to 55°C (131°F).

Ambient Humidity: 0 to 95% relative.

Altitude: Sea level to 10,000 feet.

Mounting: Standard 19" rack panel or free standing.

ORDERING INFORMATION

GTM-88S FM Stereo Modulation Monitor, complete with crystal, calibrated to specified operating frequency 994-6569

MONAURAL MODULATION MONITOR

MODEL GTM-88M

Another engineering first from Gates—incorporating all the advanced performance features of the stereo unit. This monophonic monitor can be readily converted by Gates to stereo operation—with full FCC type approval. The conversion is easily accomplished by plugging in the appropriate modules and filters, then calibrating for stereo. The design also provides for the addition of an adapter for measurement of SCA modulation.

Performance Features

- Integrated Circuits for Highest Reliability
- Convertible to Stereo Operation
- Provision for Adapting to SCA Operation
- All controls Accessible From Front Panel
- Silicon Solid State Circuitry
- Modular Construction

Advanced Design

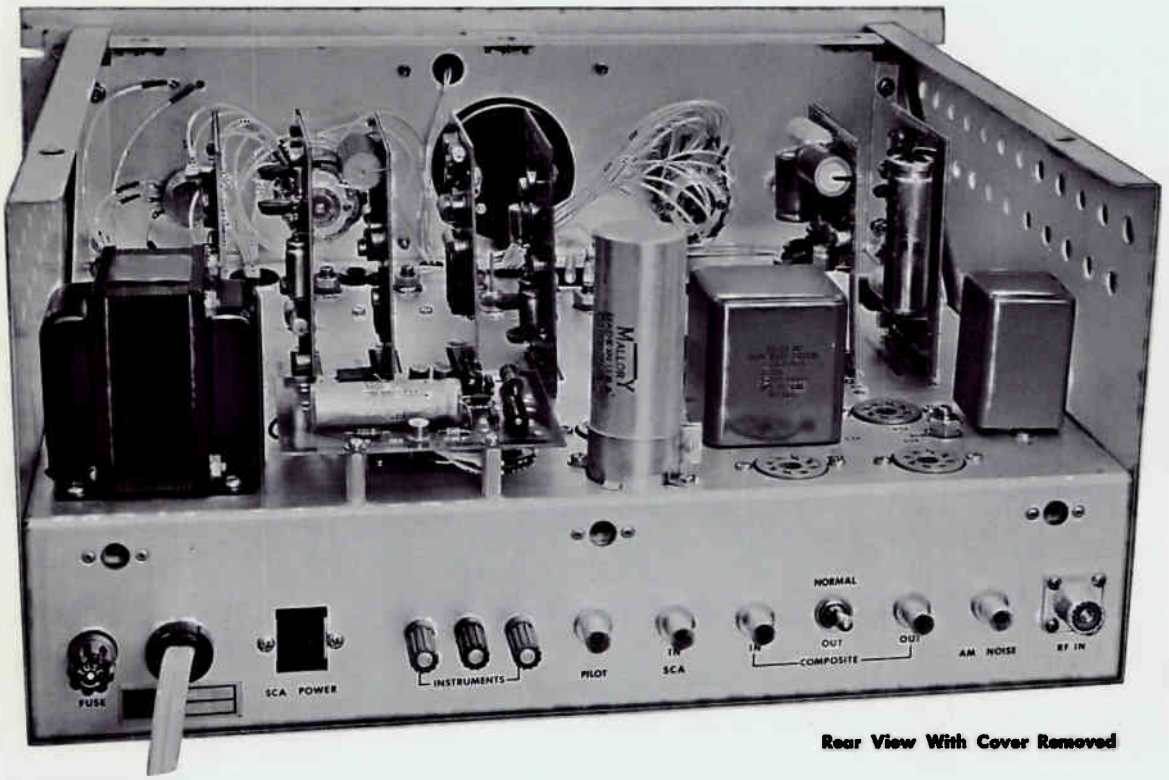
The printed circuit modular construction used in the GTM-88M allows conversion to stereo operation with no wiring changes. Silicon solid state and silicon integrated circuits used in the monitor were selected for their inherent dependability. Like the stereo model, the GTM-88M permits connection of auxiliary test equipment without affecting monitor accuracy.

Operational Features

All normal operating controls are on the front panel, with other controls behind a hinged front panel. Controls of the monitors are identical; thus, when converted to stereo the monophonic monitor requires no control changes. The peak modulation indicator is adjustable in 10 degree steps from 50% to 120%.

General

Separate headphone and instrument outputs receive an FM signal with de-emphasis, while the modulation monitor receives the complete signal with pre-emphasis to provide accurate modulation readings. Compact in size, the monaural modulation monitor was designed for standard rack mounting.



Rear View With Cover Removed

SPECIFICATIONS

ELECTRICAL

Operating Frequency: 87.5 to 108 MHz.

RF Input Impedance: 50 ohms, unbalanced.

RF Input Sensitivity: 0.1 to 1 watt.

Headphone Output: Load levels from 4 ohms to several megohms with 1% or less distortion. Separate level control.

Power Requirement: 100 to 130 VAC, 50/60 Hz, 40 watts.

FCC Type Approval: No. 3-145.

INSTRUMENT OUTPUT

Impedance: 20,000 ohms.

Frequency Response: ±0.5dB, 50 Hz to 15 kHz.

Distortion: 0.25%, 50 Hz to 15 kHz at 100% modulation.

Internal Noise: −70 dB below 100% modulation at 400 Hz.

MODULATION METER

Accuracy: ±5%.

Ballistics: Meet FCC rule 73.322 (b).

Peak Modulation Indicator: Adjustable from 50 to 120% modulation.

AM Noise Measurement Capability: −70 dB, 30 Hz to 75 kHz.

MECHANICAL

RF Input Connector: UHF plug.

Dimensions: 19" wide, 8¾" high, 14¼" deep.

Weight: 24 lbs. (net).

Ambient Temperature: 10° to 55°C (50° to 131° F).

Ambient Humidity: 0 to 95% relative.

Altitude: Sea level to 10,000 feet.

Mounting: Standard 19" rack panel or free standing.

ORDERING INFORMATION

GTM-88M FM Monaural Modulation Monitor, complete with crystal, calibrated to specified operating frequency _____ 994-6581

SCA MODULATION MONITOR ADAPTER

MODEL GTA-6741

Gates SCA modulation monitor adapter measures all modulation characteristics of an SCA signal when used in conjunction with Gates FM modulation monitors. This adapter can also be used with the GTA-88F SCA frequency comparator to measure the accuracy of SCA frequencies as specified by the FCC. Total solid state circuitry, plus integrated circuits throughout the GTA-6741, assures trouble-free operation.

A built-in peak modulation flasher provides indication of peak or over-modulation on the SCA channel. The GTA-6741 is also equipped with an instrument output for connection of external test equipment without affecting performance of the adapter. A separate audio output provides a +10 dBm signal to drive an external amplifier. A separate headphone jack is also provided.

Measurements that can be made using this SCA modulation monitor adapter and Gates GTM-88S stereo or GTM-88M monophonic modulation monitor include:

1. SCA channel modulation (41 and/or 67 kHz).
2. Crosstalk—SCA into main channel.
3. Crosstalk—SCA into stereo channel.
4. Crosstalk—Main into SCA channel.
5. Crosstalk—Stereo into SCA channel.
6. Crosstalk—67 kHz into 41 kHz SCA channel.
7. Crosstalk—41 kHz into 67 kHz SCA channel.
8. FM noise measurements—SCA channel.
9. SCA frequency accuracy (when used with Gates GTA-88F frequency comparator).
10. Distortion on the SCA channel (with external distortion analyzer).

SPECIFICATIONS

Operating Frequency: 41 kHz and 67 kHz.
SCA Peak Modulation Indicator: Adjustable to indicate from 50% to 120% modulation. Meets FCC Rules 73.332D (4).

CROSSTALK CAPABILITY

SCA Into Main Or Sub: (10% SCA) 70 dB or better.
Main Into SCA: (SCA 8:1) 50 dB or better (30 Hz-15kHz).
Stereo Into SCA: (SCA 8:1) 40 dB or better (30 Hz-15 kHz).
41 kHz Into 67 kHz: (both SCA at 10%) 45 dB (30 Hz-5 kHz).
67 kHz Into 41 kHz: (both SCA at 10%) 45 dB (30 Hz-5 kHz).

AUDIO OUTPUT

Headphone Output: Provides sufficient level for headphones from 4 ohms to several megohms. Separate level control provided. ±1 dB 30 to 7,500 Hz.
Audio Output: +10 dBm at 600 ohms (unbalanced).

INSTRUMENT OUTPUT

Impedance: 20,000 ohms.
Distortion: 1% or better (30 Hz-7.5 kHz).
Frequency Response: ±0.5 dB (30 Hz-7.5 kHz).

GENERAL

Power Source: All DC voltages provided from GTM-88M or GTM-88S FM modulation monitors.
Size: 19" wide, 8¾" high, 11" deep. Including knobs and rear connectors, 13" deep.
Weight: 20 lbs. (net).
Ambient Temperature: 10°C to 55°C (50°F to 131°F).
Ambient Humidity: 0 to 95% relative.
Altitude: Sea level to 10,000 feet.
Mounting: Standard 19-inch rack panel or free standing.

ORDERING INFORMATION

GTA-6741 SCA Modulation Monitor Adapter _____ 994-6591

MODEL GTM-88F

FM FREQUENCY MONITOR

Gates new all solid state FM frequency monitor measures the precise operating frequency of the FM transmitter by utilizing pulse counting techniques. A crystal controlled wide band pulse signal is compared with the FM transmitter center frequency to determine any frequency deviation from the assigned operating channel. The pulse counting technique assures a measurement accuracy of better than 0.001%, and full compliance with all FCC requirements.

Frequency Range: 88 to 108 MHz (fixed).
Power: 100 to 130 VAC, 50/60 Hz, 40 watts. 19" W x 7" H x 10" D.
GTM-88F FM frequency monitor, complete with crystal, calibrated to specified operating frequency ——— **994-6588**

PILOT-SCA FREQUENCY COMPARATOR

Gates pilot-SCA frequency comparator determines the accuracy of the pilot frequency when used with Gates GTM-88S stereophonic modulation monitor, and SCA frequencies when used with the GTA-6741 SCA modulation adapter. Three integrated circuits, one transistor, and nine diodes (all silicon) are used for stability and reliability. The GTA-88F is factory calibrated, and will provide years of dependable service in full compliance with existing FCC rules.

Operating Frequencies: 19, 41 and 67 kHz as supplied.
Power: 100 to 130 VAC, 50/60 Hz, 10 watts. 19" W x 5¼" H x 6¾" D. (8¾" deep with knobs and rear connectors.)
GTA-88F 19 kHz pilot/SCA 41 and 67 kHz frequency comparator ——— **994-6603**

MODEL GTA-88F

MODEL GTM-88R

FM RF AMPLIFIER

Designed to operate in conjunction with Gates FM frequency and modulation monitors, the GTM-88R amplifier is used at a remote location to provide sufficient RF power to drive the monitors. This is ideal for applications where the monitors are located at the studio and the transmitter is at a remote location. It permits the operator to monitor the frequency and modulation of the transmitter as required by FCC regulations. Solid state silicon circuitry plus extensive use of integrated circuits throughout assures dependable, trouble-free operation.

Frequency Range: 87 to 108 MHz.
Power: 115 V, 50/60 Hz, 12 watts. 19" W x 5¼" H x 10" D.
GTM-88R FM RF amplifier complete with antenna, less interconnecting cable ——— **994-6614**

HOME OFFICE AND MAIN PLANT

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Phone: 222-8200, Area 217

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NEW YORK, NEW YORK 10016
130 East 34th Street
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1522 K Street, N. W.
Phone: 223-5508, Area 202

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HARRIS INTERTYPE CORPORATION

GATES RADIO COMPANY
A DIVISION OF HARRIS-INTERTYPE CORPORATION
123 HAMPSHIRE STREET • QUINCY, ILLINOIS 62301 • 217-222-8200

January 27, 1972

Mr. Glenn C. Petersen
161 East Goebel Drive
Lombard, Illinois 60148

Dear Mr. Petersen:

Thank you for your letter of January 24th concerning equipment used for educational broadcasting.

I am pleased to enclose literature covering the BFE-50C, BFE-10C, FM-11, FM-22, Yard II and general information which should be useful to you.

The 75 u second preemphasis curve is required by the F.C.C. to be compatible with the 75 u second deemphasis curve used in FM receivers.

The Yard II is very well suited for this type of operation... so is the Studioette 80...both consoles require -20 to -10 dBm level inputs for such things as tape recorders and turntable preamps...at 150 ohms. The mic circuits are designed for 150 ohm, -60 dBm inputs.

Thank you for thinking of Gates. If we can help you with your plans for an educational system, please do call or write.

Our District Manager for Lombard is Mr. Bob Gorjance - Bob is well qualified to assist you with your selection of a console and could answer any other questions you might have - no obligation, of course, for his services.

We hope to have the privilege of serving you soon for your equipment needs.

Sincerely,

Bob Groome

Bob Groome
Radio Product Specialist
BG:mh
encs

HARRIS INTERTYPE CORPORATION

GATES RADIO COMPANY

A DIVISION OF HARRIS-INTERTYPE CORPORATION

123 HAMPSHIRE STREET • QUINCY, ILLINOIS 62301 • 217-222-8200

G. Petersen, Pres.
Astronaut Electronic
161 E. Goebel Drive
Lombard, IL 60148

Dear Sir:

Thank you for your request for information. Your interest in Gates products and systems is sincerely appreciated. Enclosed is the literature you requested on the TE-201 Camera.

To acknowledge receipt of the requested information, and to allow us to supply you with further technical information, would you kindly fill out the form below, fold, staple, and return to us. Thank you.

Cordially yours,

E. S. Gagnon

E. S. Gagnon
Manager, Product Marketing

My initial interest in your product is for:

☐ Present use
☐ Specific future use
☐ Possible future use
☐ Information only

I would appreciate further contact regarding your product:

☐ Now ☐ In 30 days ☐ In 3 months

My complete address is:

Name _____

Title _____

Company Name _____

Street Address _____

City _____ State _____ Zip Code _____

I WOULD LIKE INFORMATION ON OTHER GATES COMPANY PRODUCTS

☐ AM Transmitter, Power ____KW
☐ FM Transmitter, Power ____KW
☐ VHF TV Transmitter, Power ____KW
☐ UHF TV Transmitter, Power ____KW
☐ HF Transmitter, Power ____KW
☐ SSB Transmitter, Power ____KW
☐ Other _____

☐ Audio Consoles
☐ Remote Amplifiers
☐ Audio Amplifiers
☐ Program Automation
☐ Turntables
☐ Tape Cartridge Machines

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A Division of Harris-Intertype Corporation
QUINCY, ILLINOIS 62301

Attention: Product Marketing

HARRIS
GATES DIVISION
Harris-Intertype Corporation

TE-201
Live Color
TV Camera

TELEVISION

TE-201 Specifications

(Continued)

Gamma Correction: Continuously variable from unity to a slope ratio of 10 to 1 for precise gray scale tracking.

Aperture Correction: A self-contained phaseless horizontal aperture corrector with noise clipping is provided. Optional two line vertical aperture corrector with comb filter and noise clipping is available.

Registration: Within 0.15% of picture height in a circle within a diameter of 80% of picture height; 0.3% of picture height in a circle with a diameter of picture width.

Registration Method: Subtractive signal registration.

Viewfinder: 8″ (203 mm), diagonal dimension. Controls for contrast, brightness. Detachable from camera.

Intercom: Amplifiers provided. Dynamic microphone used with balanced party line. Each station has adjustable side tone and level.

SERVICE CONDITIONS

Ambient Temperature: —20°C to +40°C (—4°F to +104°F).

Ambient Humidity Range: 0 to 95% relative humidity.

Altitude: Sea level to 10,000 ft. (305 meters).

ELECTRICAL

AC Input Power: 95—130 Volts, 60 Hz. (50 Hz available with optional alternate transformer; other voltages available on special order.)

AC Power Consumption: Camera, 100 watts; viewfinder, 50 watts.

DIMENSIONS

Camera Head (with lens, without viewfinder): 9″ (230 mm) W x 5½″ H (140 mm) x 25″ (635 mm) L. Weight: 25 lbs. (11.3 kg).

Viewfinder: 9″ (230 mm) W x 8″ (200 mm) H x 16″ (410 mm) L. Weight: 15 lbs. (6.8 kg). Removable.

Camera Control Unit: 19″ (480 mm) W x 5¼″ (133 mm) H x 22″ (560 mm) L. Weight: 18 lbs. (8.2 kg).

Local Control Panel: 19″ (480 mm) W x 1¾″ (44 mm) H.

Rectifier Panel: 19″ (480 mm) W x 5¼″ (133 mm) H x 9″ (230 mm) L. Weight: 25 lbs. (11.3 kg).

Camera Cable: 0.68″ (17.3 mm) outside diameter. Weight: ¼ lb. (.11 kg.) per linear ft. 50 conductors, including 6 coaxial cables.

Ordering Information

TE-201 basic color camera, including camera head (less lens and tubes), control drawer, interconnection panel, interconnection harness, local control panel, rectifier panel, viewfinder 994-7200

TK-716 broadcast grade tube set including (1) XQ-1070 green, (1) XQ-1070 blue, and (1) XQ-1073 extended red 990-0716

TK-715 intermediate grade tube set including (1) XQ-1071 green, (1) XQ-1071 blue, and (1) XQ-1074 extended red 994-0715

Zoom lens, 15-150 mm, f/2.8 (max.), with remote iris, manual zoom and focus 938-7000

Zoom lens, 20-200 mm, f/2.1 (max.) with remote iris, manual zoom and focus 938-6619

TV-115 NTSC encoder, with built-in color bar generator 994-7210

Extender board for TV-115 952-7240

Camera cable, 50′—(also available in 100, 150 & 200 ft. lengths) 928-1146

Single headset 721-0076

Service engineering checkout available.

GATES DIVISION

HARRIS-INTERTYPE CORPORATION

123 HAMPSHIRE STREET • QUINCY, ILLINOIS 62301 U.S.A.

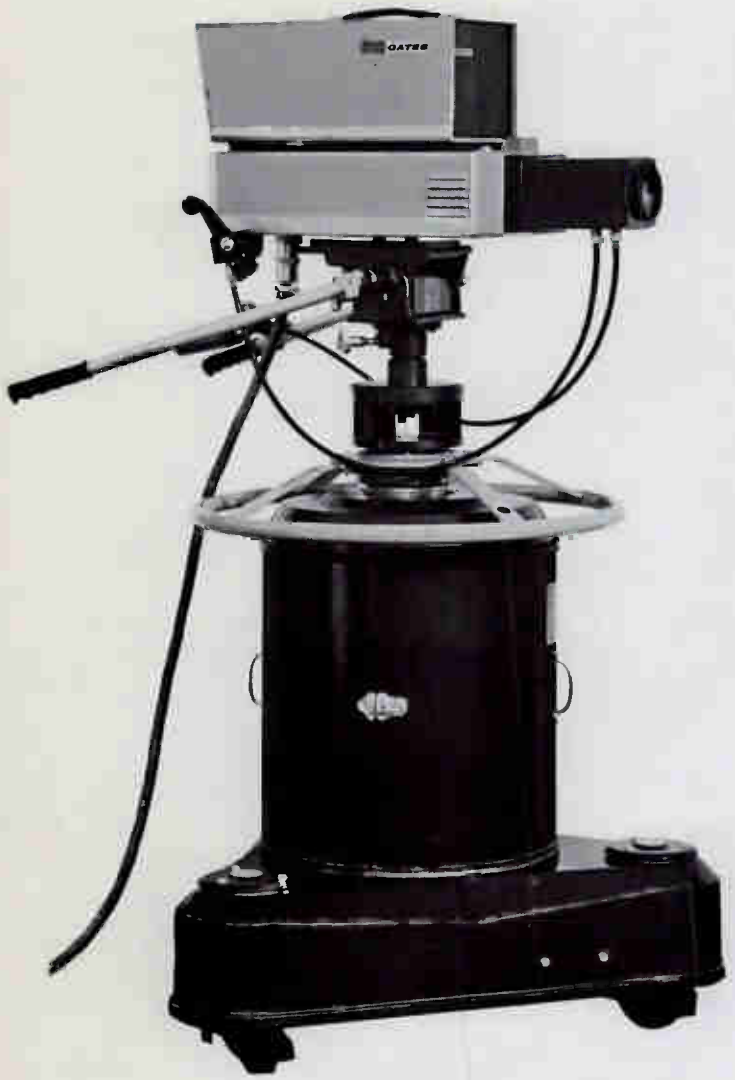
HARRIS
GATES DIVISION
Harris-Intertype Corporation

TE-201
Live Color
TV Camera

TELEVISION

HARRIS
Communications and Information Handling

Gates' TE-201 Live Colo



The Gates TE-201 live color television camera offers a unique combination of complete broadcast quality performance, ease of operation, lifetime economy, and great versatility, all in a lightweight, compact unit.

The TE-201's excellent color fidelity, color matching capability, and all-around low-light-level performance fit it admirably to broadcast applications. Wherever optimum picture quality is required, with moderate investment and long-term economy, the TE-201 can serve broadcasters, remote producers, production firms, CATV originators, and educational, medical, and industrial users.

The TE-201 meets all EIA and FCC broadcast standards when used with an NTSC encoder such as the Gates TV-115. The camera will also operate on 625 line, 50 field PAL or SECAM standards when used with an appropriate encoder.

Picture Quality, Color Fidelity: In picture quality and color fidelity, the TE-201 offers "big camera" performance from numerous state-of-the art design advances.

The outstanding colorimetry of the TE-201 results from many design features. Among these are built-in fixed color masking, a unique AGC (gated white pulse feedback loop) system between the preamplifiers and the processor to maintain color balance, adjustable gamma tracking, separate mesh lead oxide pickup tubes in all three channels, an extended-red tube in the red channel, computer-optimized circuit design, a relay type, dust-sealed optical package, and tight quality control of optical elements. These features also contribute to consistent colorimetry between cameras for fast, easy color matching.

Extremely "clean" pictures result from the use of advanced preamplifiers, which are comparable in quality to those used in "big" live cameras. System signal-to-noise ratio is 48 dB, and advanced first stage design eliminates the high peaker control.

The preamplifiers also are designed to accommodate 500% of normal level, to eliminate overload streaking.

Crisp, sharp picture detail: This is assured by self-contained, phaseless horizontal aperture correction circuits. Noise-clipping is used to keep aperture correction subjectively noise-free.

Printed circuit yokes, which are held to tight tolerances, and all-around circuit stability, provide the TE-201 with precise, stable registration. The subtractive registration technique, thoroughly proven in hundreds of live and film broadcast color cameras, is employed for simple, fast, and accurate registration.

Flare compensation circuits maintain the TE-201's blacks even under extremes of contrast as duty cycle changes.

FEATURES

- **"Big camera" broadcast picture quality and color fidelity, in a compact, 40 lb. unit.**
- **Outstanding low-light-level capability—unequaled signal-to-lag performance.**
- **Long-term stability assures performance economy.**
- **Simple operation—all electrical controls at camera control unit.**
- **Fast, economical maintenance from neat circuit layout, plug-in modules, rear-load pickup tubes.**
- **Camera, lens, viewfinder weigh only 40 pounds—viewfinder unlocks and detaches in seconds—lightweight camera cable.**

TE-201 Specifications

(Continued)

Gamma Correction: Continuously variable from unity to a slope ratio of 10 to 1 for precise gray scale tracking.

Aperture Correction: A self-contained phaseless horizontal aperture corrector with noise clipping is provided. Optional two line vertical aperture corrector with comb filter and noise clipping is available.

Registration: Within 0.15% of picture height in a circle within a diameter of 80% of picture height; 0.3% of picture height in a circle with a diameter of picture width.

Registration Method: Subtractive signal registration.

Viewfinder: 8″ (203 mm), diagonal dimension. Controls for contrast, brightness. Detachable from camera.

Intercom: Amplifiers provided. Dynamic microphone used with balanced party line. Each station has adjustable side tone and level.

SERVICE CONDITIONS

Ambient Temperature: —20°C to +40°C (—4°F to +104°F).

Ambient Humidity Range: 0 to 95% relative humidity.

Altitude: Sea level to 10,000 ft. (305 meters).

ELECTRICAL

AC Input Power: 95—130 Volts, 60 Hz. (50 Hz available with optional alternate transformer; other voltages available on special order.)

AC Power Consumption: Camera, 100 watts; viewfinder, 50 watts.

DIMENSIONS

Camera Head (with lens, without viewfinder): 9″ (230 mm) W x 5½″ H (140 mm) x 25″ (635 mm) L. Weight: 25 lbs. (11.3 kg).

Viewfinder: 9″ (230 mm) W x 8″ (200 mm) H x 16″ (410 mm) L. Weight: 15 lbs. (6.8 kg). Removable.

Camera Control Unit: 19″ (480 mm) W x 5¼″ (133 mm) H x 22″ (560 mm) L. Weight: 18 lbs. (8.2 kg).

Local Control Panel: 19″ (480 mm) W x 1¾″ (44 mm) H.

Rectifier Panel: 19″ (480 mm) W x 5¼″ (133 mm) H x 9″ (230 mm) L. Weight: 25 lbs. (11.3 kg).

Camera Cable: 0.68″ (17.3 mm) outside diameter. Weight: ¼ lb. (.11 kg.) per linear ft. 50 conductors, including 6 coaxial cables.

Ordering Information

TE-201 basic color camera, including camera head (less lens and tubes), control drawer, interconnection panel, interconnection harness, local control panel, rectifier panel, viewfinder 994-7200

TK-716 broadcast grade tube set including (1) XQ-1070 green, (1) XQ-1070 blue, and (1) XQ-1073 extended red 990-0716

TK-715 intermediate grade tube set including (1) XQ-1071 green, (1) XQ-1071 blue, and (1) XQ-1074 extended red 994-0715

Zoom lens, 15-150 mm, f/2.8 (max.), with remote iris, manual zoom and focus 938-7000

Zoom lens, 20-200 mm, f/2.1 (max.) with remote iris, manual zoom and focus 938-6619

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Extender board for TV-115 952-7240

Camera cable, 50′—(also available in 100, 150 & 200 ft. lengths) 928-1146

Single headset 721-0076

Service engineering checkout available.

GATES DIVISION

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ADV. 363

r Television Camera. . . Top Color Per

Operating Simplicity—With all TE-201 electrical operating controls at the camera control unit, the cameraman has only to frame, focus, and compose the picture. The zoom lens control is at right, the focusing control at left. Viewfinder brightness and contrast controls are set in under the viewfinder. At top is the viewfinder carrying handle.

The TE-201's excellent gray scale tracking is facilitated by the use of a single null meter, at the camera control unit, which sets black and white balance on each channel to within 0.5%.

The use of lead oxide pickup tubes in all three channels restricts extreme highlights from "blooming" to many times their normal size, as can happen with certain other types of pickup tubes.

The three lead oxide pickup tubes are all the separate mesh type, for flatter field and improved resolution.

The camera cable is immunized against interference pickup from electrical equipment by differential amplifiers for each channel as the first stage of the processor.

Outstanding Low-light-level Capability: The TE-201 offers incomparable all-around low-light-level capability. The camera's excellent sensitivity is made usable by its industry-leading signal-to-lag ratio, its high signal-to-noise ratio, and its color balance at all gain settings. These features enhance the camera's performance at all light levels.

The TE-201 provides full video for usable pictures at less than 10 foot candles, in the 4X gain maximum sensitivity mode, with an f/2.1 lens.

A single switch control selects 1X, 2X, or 4X gain sensitivity modes, and automatically maintains correct color balance at all light levels with no other adjustment required.

The TE-201's high signal-to-noise ratio of 48 dB, under normal lighting, remains proportionally high as camera sensitivity is increased for low-light-level operation. Noise is continually suppressed, for a cleaner, more usable picture.

The TE-201's industry-leading lag performance makes a 10-foot-candle picture usable even on fast sports action. In the 4X gain mode, the green channel signal-to-lag ratio is 32 dB. Image reduction on the red and blue tubes closely matches this figure, for minimal, balanced lag performance.

Long-term Stability: The TE-201's long-term, built-in stability assures both consistent performance and operating economy extending over the life of the camera. Numerous state-of-the-art design features contribute to stability.

Color balance stability is maintained by a unique automatic gain control system (gated white pulse feedback loop) between the preamplifiers and the processor. A calibrated reference white signal is injected into the preamplifiers during the vertical blank-

formance, Great Operating Economy

ing interval. The processor senses this signal, and automatically adjusts the gain of the system accordingly.

V-Interval Keyed Clamp: With this circuit, noise appearing during horizontal blanking is restricted from shifting black level reference. This design feature immunizes the system to noise by a factor of 20 to 1 or more.

Most DC voltages in the camera are regulated three times before they are used. Linear integrated circuits are used throughout the system, permitting negative feedback loops to render circuit groups more stable and linear. Class A/B amplifiers with stabilizing feedback are used for all sweep circuitry.

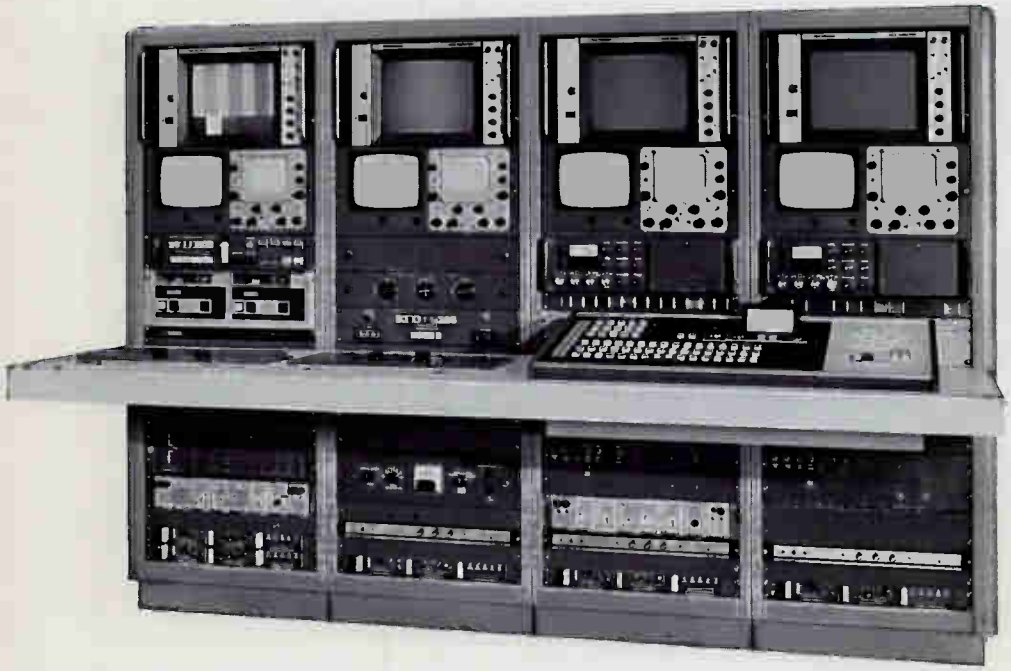
Pickup tube filament voltage is regulated for stable tube performance and longer tube life. Further assurance of stable operation results from regulation of focus current to within one-tenth of one per cent.

Operating Economy: The TE-201's unusual operating simplicity releases technical manpower for other assignments, and over the camera's life can add up to major savings. Non-technical personnel can easily operate the TE-201. At the camera head are only lens zoom and focus controls (besides viewfinder brightness and contrast). All electrical operating controls, such as iris (servo), master blanking and sensitivity, are at the camera control unit.

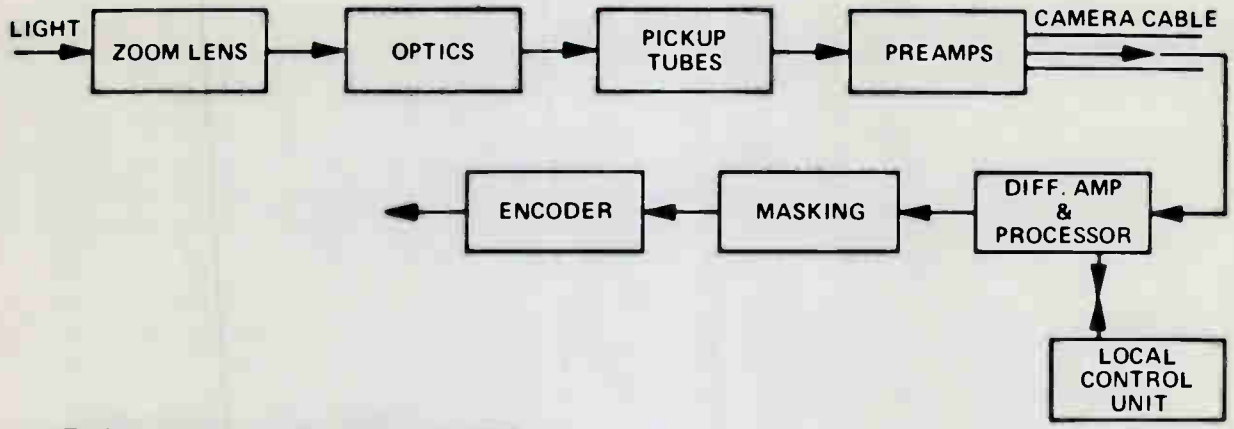
The camera's stability is so excellent that normally only the white levels and black levels on each channel need be set daily. This is done using a simple null meter, in six steps, in contrast to the 20 to 30 steps required for cameras without the TE-201's stability.

Operating Controls—The local control panel, with master blanking and iris (servo) controls is at top. The camera control unit is below, showing the null meter for simple daily checkout of black and white levels on each channel.

Maximum Access—The camera control unit extends out on its rack slides, and may be swung up on for 90-degree presentation and immediate access to either the top circuit boards (shown), or those on the bottom.



Typical Rack Installation—Rack equipment for two TE-201 cameras in a typical custom installation. The camera control units are mounted in the two right-hand short racks; the local control panels are set into the custom desk mount top.



TE-201 camera system functional flow diagram, including accessory encoder.

As noted under low-light-level performance, color balance is automatically maintained with gain sensitivity setting changes, with no other adjustments required.

Execution of the complete setup procedure is normally required only every several weeks, due to the TE-201's inherent stability.

Maintenance Economy: Contributing further to the lifetime economy of the TE-201 is its ease of servicing and maintenance. The total 40-pound weight of camera head, zoom lens, and viewfinder simplifies handling for maintenance.

The detachable 15-pound viewfinder unlocks and slides off in seconds, for easy portability, or maintenance without disabling the camera. Circuit boards are laid out neatly, with easy accessibility to all components.

All circuit modules, all integrated circuits, and most transistors are plug-in. All three pickup tubes can be changed quickly and easily from the rear in a few minutes without disturbing the yokes or the optics.

The entire camera control unit drawer extends out on its rack slides, and swings to present either the top or the bottom of the unit at 90 degrees, for fast access to all boards.

TE-201 Specifications

System Standards: NTSC. PAL and SECAM standards with appropriate encoder.

Scanning Standards: 525 lines, 60 fields, or 625 lines, 50 fields.

Signal Outputs: Red, blue, green, each 0.7 Volts into 75 ohms.

Signal Inputs: H drive, V drive, blanking, sync and subcarrier.

Geometric Distortion: No point will depart more than 1% of picture height from its true position on the face of the camera pickup tubes.

Focus Current Regulation: ±0.1%

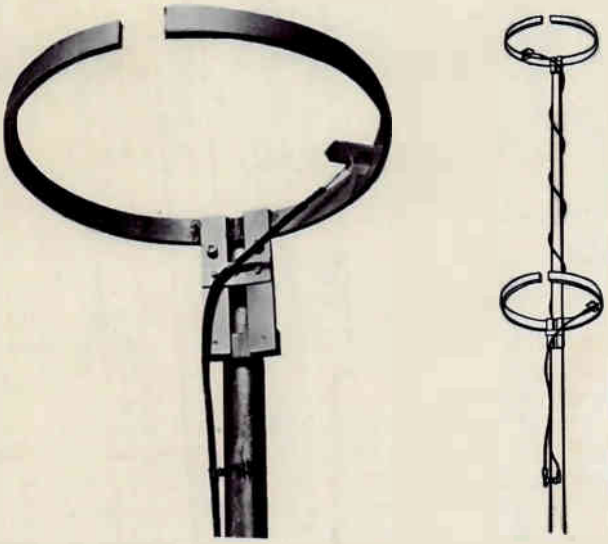
Signal-to-noise Ratio: 48 dB with 4.2 MHz bandwidth.

Sensitivity: 85 foot-candles (850 lux) for 100% video, at 48 dB signal-to-noise ratio, in 1X gain sensitivity mode with lens at f/2.8 and typical tubes. Less than 10 foot-candles (100 lux) for usable pictures in 4X gain sensitivity mode, with f/2.1 lens. Less than 20 foot-candles (200 lux) for usable picture in 4X gain sensitivity mode, with f/2.8 lens.

Signal-to-lag Ratio: 45 dB, green channel, in 1X gain mode. 32 dB, green channel, in 4X mode, peak to peak signal current to peak to peak decay lag current, measured without gamma correction at 200 milliseconds with typical tube. Image reduction of 4 to 1 is employed on the red and blue tubes for close balance with green.

Horizontal Resolution: 500 lines.

Masker: Included in the video processors, with fixed coefficients.



Left, FM-11 single ring ommi-directional antenna with power gain of 0.8 dB. Right, two bay FM-22 ommi-directional antenna with gain of 1.6 dB. These are broad band, easy to install antennas.

Front view (cover removed) of BFE-50C fifty watt FM transmitter.

SPECIFICATIONS

POWER OUTPUT:
BFE-10C, 10 watts; BFE-50C, 50 watts; BFR-50C, 50 watts.

FREQUENCY RANGE:
Models BFE-10C and BFE-50C, 88-108 MHz, as ordered. Model BFR-50C, 40 to 220 MHz, as ordered.

STABILITY:
0.001% or better.

MODULATION:
Direct crystal controlled cascade modulation.

RESPONSE:
Within 1 dB of standard 75 microsecond pre-emphasis curve or flat ±1 dB, 50-15,000 Hz. Note: Will supply with 75 microsecond pre-emphasis curve unless ordered for flat curve.

FREQUENCY SWING:
±100 kHz: (±75 kHz = 100% modulation in FM broadcasting). Model BFR-50C. Models below 80 MHz have maximum swing of ±40 kHz, or less, as desired. Above 80 MHz may be ±75 kHz or less, as desired.

DISTORTION:
1% or less 30-15,000 Hz. ½% 100-10,000 Hz.

RF HARMONICS:
Suppression meets or exceeds all FCC requirements.

INPUT:
+10 dBm ±2 dB at 600 ohms impedance.

POWER:
117 volts, 50/60 Hz. BFE-10C, 120 watts; BFE-50C, 230 watts; BFR-50C, 230 watts.

RF OUTPUT:
50 ohms (Type N connector).

OSCILLATOR:
Direct crystal controlled.

NOISE:
65 dB below 100% modulation (FM).

TEMPERATURE:
−20° to + 50° C.

TUBES:
BFE-10C: (6) 6AU6, (3) 6J6, (3) 6201, (3) 7025, (2) OA2, and (1 each) 12AX7, 6A05, GZ34/5AR4, 6080, 6360.
BFE-50C: Same as above, with (2) 6146 and (1) 5R4GYA tube added.
BFR-50C: Same as BFE-10C with (1) 5894, (1) 6AQ5, and (1) 5R4GYA tube added.

ALTITUDE:
7500 feet.

FINISH:
Two tone beige gray with trim in brushed aluminum and black.

SIZE:
26½" high, 28" wide, 14" deep.

WEIGHT (Packed):
BFE-10C (domestic) 100 lbs; (export) 205 lbs.; 15 cu. ft.
BFE-50C (domestic) 125 lbs.; (export) 230 lbs.; 16 cu. ft.
BFR-50C (domestic) 125 lbs.; (export) 230 lbs.; 16 cu. ft.

ORDERING INFORMATION

BFE-10C, 10 Watt FM Transmitter, 88-108 MHz, with tubes and crystal	994-5594
Spare 100% tube kit for BFE-10C	990-0391
Manufacturer's recommended minimum tube kit for BFE-10C	990-0488
BFE-50C, 50 Watt FM Transmitter, 88-108 MHz, with tubes and crystal	994-5595
Spare 100% tube kit for BFE-50C	990-0489
Manufacturer's recommended minimum tube kit for BFE-50C	990-0490
BFR-50C, 50 Watt Relay Transmitter for 40-220 MHz, with tubes, crystal and oven	994-5599
Spare 100% tube kit for BFR-50C	990-0310
Manufacturer's recommended minimum tube kit for BFR-50C	990-0458
FM-11 Single Ring Educational (88-108 MHz) FM Antenna	710-0102
FM-22 Double Ring Educational (88-108 MHz) FM Antenna	710-0103

State carrier frequency when ordering all models and antennas and frequency swing desired when ordering Model BFR-50C transmitter.

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HARRIS INTERTYPE CORPORATION

GATES Product Information Bulletin

10 AND 50 WATT FM BROADCAST TRANSMITTERS

Model BFE-10C Ten Watt FM Transmitter

THREE MODELS AVAILABLE

Gates consistently offers the most complete line of low powered wide band FM broadcast transmitters in the industry. Especially designed for educational FM broadcasting and for STL (studio-transmitter link) service, three popular models featuring direct crystal controlled cascade modulation are available. Included are the 10 watt BFE-10C and 50 watt BFE-50C versions for the standard FM broadcast band of 88 to 108 MHz, and the 50 watt Model BFR-50C which operates in the 40 to 220 MHz FM band. The BFR-50C is specifically designed for high fidelity program relay and STL service and is unusually popular with broadcasters abroad. The same low distortion, wide frequency response and reliability, so characteristic of Gates higher powered FM models, will be found in these three lower powered equipments.

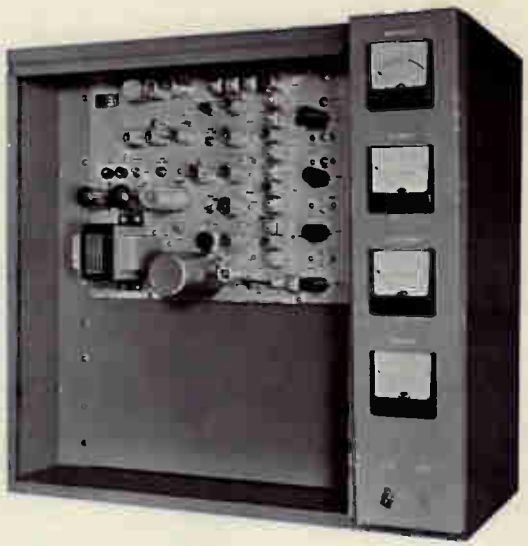
Metering consists of an audio level meter to indicate proper modulation level and individual meters for RF output, plate current and plate voltage. The transmitters are 100% complete without external accessories other than antenna and audio equipment.

MODEL BFE-10C: The BFE-10C ten watt FM transmitter is FCC type approved for educational FM broadcasting. This unit is excellent for STL service or in any applications where 10 watts RF output is required. Supplied for monaural operation—stereophonic, and single or dual channel multiplexing equipment optional for use with the BFE-10C transmitter. A compact self-contained unit designed specifically for desk or external mounting, this 10 watt model incorporates the M-6095 exciter featuring direct crystal controlled cascade modulation. If stereo is desired, the M-6146 stereo generator is added.

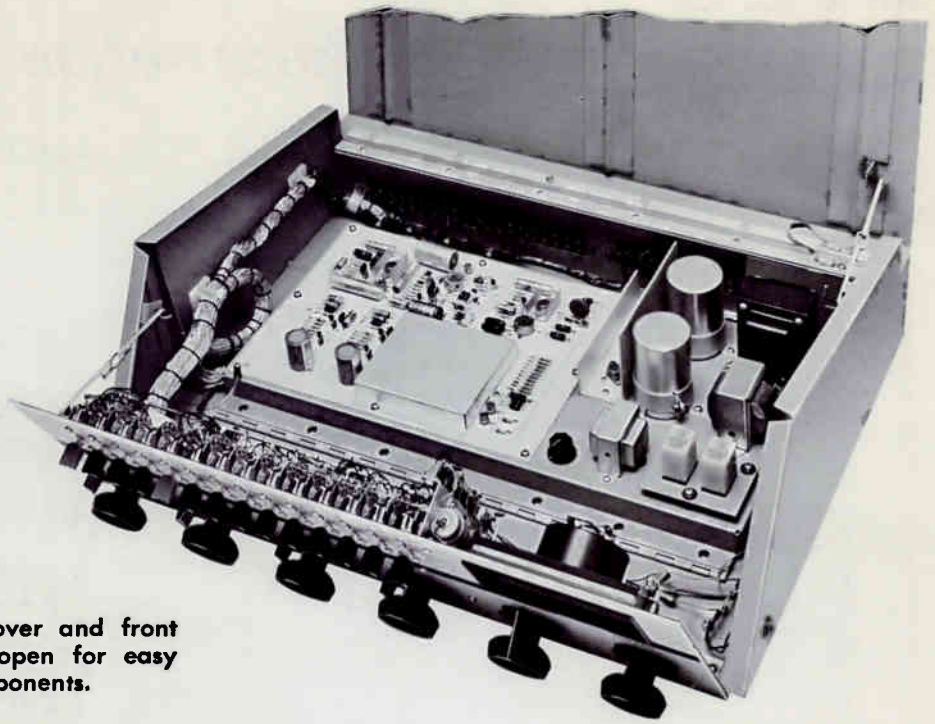
Construction and design is pleasing to the eye and convenient to service. Immediate "full view" access is available by removing the front grill or the rear full length slip-on door. This complete 10 watt FM transmitter is used by many schools, colleges, universities and overseas broadcasters in conjunction with the Gates FM-11 single ring or the FM-22 double ring FM antenna. As part of this FM broadcast package, the Gates Studioette audio console is recommended. This complete educational broadcasting system is modern and equal to the best, yet will fit into the conservative budget.

MODEL BFE-50C: For 88 to 108 MHz FM service, the BFE-50C is similar in design to the BFE-10C transmitter but delivers 5 times as much power or 50 watts. A 50 watt power amplifier is added to the 10 watt section to provide the higher powered output. The amplifier consists of two 6146 tubes and a 600 volt power supply. Identical in appearance to the standard BFE-10C transmitter, the cabinet easily houses the 50 watt amplifier and power supply.

MODEL BFR-50C: This complact 50 watt transmitter is problably the world's most widely used FM relay transmitter. Designed to relay broadcast programs from studio to transmitter or between special program originating points, the Model BFR-50C operates on any one specific frequency (as ordered) within the 40 MHz to 220 MHz band. When operating below 80 MHz, the maximum swing is ±40 kHz or less. Above 80 MHz the frequency swing is ±75 kHz. The 50 watt amplifier consists of two radio frequency stages powered by a built-in 600 volt power supply. The range of this transmitter is greatly increased by use of a directional antenna. The corner reflector antenna when used at both transmitting and receiving ends, will result in several hundred watts of effective power. A relay link up to nearly 100 miles is possible, depending on the antenna height of both transmitter and receiver as well as terrain.



Front view (cover removed) of Model BFE-10C, ten watt FM transmitter. Models BFE-50C and BFR-50C are essentially identical in appearance.



Hinged top cover and front panel swing open for easy access to components.

Studioette 80 Transistor Console

SPECIFICATIONS

MIXING CHANNELS: Total 4. Key selected to program or audition bus. Channels 1 and 2 for microphones, 3 and 4 for multi-input use such as turntables, tapes, etc: Cue position on faders 3 and 4.

AMPLIFIERS PROVIDED: 1 program, 1 monitor, 2 preamplifiers.

OPERATING MODE: Single channel monaural.

INPUT CIRCUITS: 4 microphones, 3 turntables, 2 reel-to-reel and 1 cartridge machine, 2 remote lines, 1 network line. (1 external input for the monitor amplifier).

OUTPUT LINES: 1 program, 2 muted speakers, 1 non-muted speaker, 1 cue bus for accessory amplifier/speaker.

IMPEDANCES: Microphones —30/50 or 150/250 ohms, balanced; turntable/tape/network/remote—600 ohms balanced. Programming output 600 ohms, balanced. Monitor speakers 8 ohms, balanced. Note: where more than 3 loudspeakers are used, see ordering information for additional transformers.

GAIN: (Maximum) Microphone input to program line output, 100 dB. Turntable/tape/network (medium level) input to program line output 60 dB. All measurements ±2 dB.

RESPONSE: Program and monitor circuits ±1 dB 30 to 15,000 Hz.

DISTORTION: Program circuit 1% or less between 30-15,000 Hz at +8 dBm ouput level. Monitor amplifier 1% or less at 40-15,000 Hz at +40 dBm (10 watts).

NOISE: Program circuits: 70 dB or better below +18 dBm output with −50 dBm input (equivalent input noise is −120 dBm.)

MONITOR CIRCUITS: More than 70 dB below +40 dBm output.

CROSSTALK: Less than 10 dB above noise level with normal control gain settings for proper programming.

POWER: 117 volts (as shipped)/234 volts, 50/60 Hz. Power consumption: 25 watts maximum.

CABINET DATA: Size: 24" wide, 8" high, 18" deep. Finish: Front panel—satin natural anodized aluminum with black markings. Cabinet—beige-gray with pebble texture. Weight: 46 pounds, unpacked.

SHIPPING DATA: Packed weight: (domestic) 75 lbs.; (export) 120 lbs. Cubage: 5 cubic feet.

ORDERING INFORMATION

Studioette 80 transistor audio console	994-6769-001
Recommended spare parts kit (100% semi-conductors, fuses, pilot lights)	994-6905-001
Isolation transformer	478-0009-000
Monitor speaker tranformers:	
For one speaker	478-0291-000
For three speakers	478-0290-000
Cueing amplifier with built-in speaker	994-5377-001

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HARRIS INTERTYPE CORPORATION

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Product Information Bulletin

4-CHANNEL TRANSISTOR AUDIO CONSOLE

STUDIOETTE 80

A successor to Gates' famous Studioette, in use in over 1,000 radio stations, the Studioette 80 is a solid-state, four-mixer monophonic console that provides a high degree of flexibility through the use of 13 input selector switches.

Although compact in size, the Studioette 80 offers a wide range of facilities, and is ideal as a main console in medium and smaller-size stations. In larger stations, the Studioette 80 will find application as a production console, or may be used for independent programming from a second studio. It is also excellent for use in mobile units and at other remote locations.

OPERATION: One of the design objectives in the engineering of the Studioette 80 was to enhance the console's versatility. Although a small console, the Studioette 80 has a great number of input facilities. It provides 4 mixing channels with channel keys and a row of 13 input keys for multiple circuit combinations. Three utility keys are provided for specialized station needs and may be wired into any input. The channel attenuators are high quality step-type controls. Channels 3 and 4 include a cue position attenuator. In addition, the inputs and outputs have isolation transformers which prevent ground loops and subsequent system problems.

Four microphones may be key-selected into two preamplifiers. Three turntables, two reel-to-reel and one cartridge machine, two remote lines and network are also accommodated. A 10-watt monitoring amplifier, the same high-quality product found in larger Gates' consoles, is standard equipment.

ADDITIONAL FACILITIES: A monitor-selector key switches the monitoring amplifier input to: (1) program circuit, (2) terminals for an external source, and (3) audition circuit. A headphone jack is always available across the program line. The 4-inch illuminated VU meter has modern scale and bezel styling. This meter is connected to the program line, indicating +8 VU output at "0" scale reading. A special cueing amplifier/speaker system is available and can be ordered as an accessory item. The Studioette 80 is designed for 117/234 VAC, 50/60 Hz.

MECHANICAL FEATURES: Silicon transistors are used throughout the Studioette 80. Mounted in a smartly-styled, all-metal housing, the console is finished in dark-gray pebble texture. The Studioette 80, which features hinged cover and front panel for ease of maintenance, is equipped with specially designed "feel-of-the-board" VA knobs, similar to those used on Gates' larger consoles.

HARRIS-ALLIED USED EQUIPMENT INVENTORY LISTING
PHONE (317) 962-8596 OR FAX (317) 962-8961

ALL ITEMS ARE SUBJECT TO PRIOR SALE

MAKE	MODEL	PRICE	COMMENTS
TECH	SP-10 W/BASE & ARM	395.00	
TECH	SP-10 W/BASE & ARM	395.00	
TECH	SP-15 PARTS ONLY	150.00	
TECH	SP-15 W/BASE & ARM	395.00	
TECH	SP-25	295.00	SPEED PROBLEMS
TECH	SP-25	395.00	
TECH	SP-25	350.00	
TECHNICS	SP-15	495.00	NEW
TECHNICS	SP-15 W/ARM	395.00	
** UPS			
CLARY	2500 WATT UPS SYSTEM	1595.00	
CLARY	2500 WATT UPS SYSTEM	1595.00	

HARRIS-ALLIED USED EQUIPMENT INVENTORY LISTING
PHONE (317) 962-8596 OR FAX (317) 962-8961

ALL ITEMS ARE SUBJECT TO PRIOR SALE

MAKE	MODEL	PRICE	COMMENTS
MICROWAVE DEV.	578A9 DIR. COUPLER	150.00	3 1/8 IN. X 11 W/ FLANGE NEW
MICROWAVE DIV.	578A10 DIR. COUPLER	150.00	3 1/8 IN X 11 W/ DIR. COUPLER W/ FLANGE NEW
** TRL			
MOSELEY	TRL-1 TELEM RETRN LINK	2195.00	
MOSELEY	TRL-1 TELEM RETRN LINK	2195.00	XMITR AND RECVR ON 455.02MHZ
MOSELEY	TRL-1 TELEM RETRN LINK	2195.00	XMITR AND RECVR ON 455.02MHZ
MOSELEY	TRL-1 TEMEM RETRN LINK	2195.00	
** TURNTABLE ACCES			
ALLIED	SA-240E IV TONEARM	200.00	NEW
AUDIOM	PA-1 STEREO PREAMP	100.00	
AUDIOM	PA-1 STEREO PREAMP	100.00	
AUDIOM	TP-84	125.00	
AUDIOMETRICS	TP-84 STEREO PREAMP	100.00	
AUDTEC	ATP-12 TONEARM	125.00	NEW (ON LOAN-SEE JEFF)
HENRY	SYNCHROSTART	215.00	
HENRY	TURNTABLE CONTROLLER	100.00	NEW
HENRY	TURNTABLE CONTROLLER	100.00	NEW
HENRY	TURNTABLE CONTROLLER	100.00	NEW
MICROTRAC	TONE ARM	50.00	
RAKO	12" TONEARM	50.00	ON LOAN (SEE JEFF)
RCA	MI-11894C 12 IN ARM	100.00	4 AVALABLE
REKO	12" TONEARM	50.00	
RUSSCO	FIDELITY MASTER	75.00	
SHURE	A68P MONO PREAMP	30.00	W/SCRATCH FILTER
SHURE	M-64 PREAMP	50.00	
STANT	310-B PRE AMP	100.00	
STANT	310-B PRE AMP	100.00	
STANT	310-B PRE AMP	100.00	
STANTON	310B PRE-AMP	125.00	NEW
TECHNICS	15B3 TT BASE	200.00	NEW
TECHNICS	EPA-A501E TONEARM	200.00	NEW
TECHNICS	EPA-B500 TONEARM	200.00	NEW
TECHNICS	SH-15B2 TT BASE	200.00	NEW
TECHNICS	SH-15B2 TT BASE	200.00	NEW
TECHNICS	SH-15B2 TT BASE	200.00	NEW
TECHNICS	SH-15B2 TT BASE	200.00	NEW
UREI	STEREO PREAMP	75.00	NEEDS 15V PS
** TURNTABLES			
HARRIS	1201 W/ 303 TONE ARM	175.00	
NUMARK	3000 TURNTABLE	350.00	NEW
TECH	SP-10	395.00	
TECH	SP-10	395.00	
TECH	SP-10	395.00	
TECH	SP-10	350.00	

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ALL ITEMS ARE SUBJECT TO PRIOR SALE

MAKE	MODEL	PRICE	COMMENTS
GENTNER	PEOPLE LINK	1795.00	ACUSTIC TELEPHONE INTERFACE
GENTNER	TELEMIX 2000 SYSTEM	1795.00	INTERFACE,CALL DIRECTOR,CONTROL PANEL 18 LINE
GENTNER	TELEMIX 9 PWR SUPPLY	100.00	
GENTNER	TELEPROCESSOR	295.00	
GENTNER	TELEPROCESSOR	295.00	
GENTNER	TELEPROCESSOR	295.00	
GENTNER	TELESWITCH	595.00	
SYMETRIX	TI-101	275.00	
SYMMETRIX	108	2295.00	W/ FOUR CONTROL HEADS
TELLABS	4008 WITH 1913 CASE	350.00	STEREO
TELLABS	TLB4425	140.00	DUAL REPEAT COIL
** TEST EQ			
B&W	DISTORTION METER	100.00	
BIRD	10K MODULOAD 8631-1156	3995.00	WATER COOLED
BK	1480 OSCILLOSCOPE	250.00	10MHZ, SINGLE TRACE
BK PRECISION	1405 SCOPE	75.00	
BK PRECISION	1405 SCOPE	75.00	
BK PRECISION	1405 SCOPE	75.00	
BK PRECISION	2007 RF STEREO GEN	150.00	
DELTA	OIB-1 IMPEDANCE BRIDGE	1895.00	
FLUKE	8840-A DVM	395.00	
GENERAL RADIO	BRIDGE OSCILLATOR	100.00	
H/P	400AL AC	295.00	
H/P	400EL AC	295.00	
H/P	400EL AC	295.00	
H/P	400GL AC	295.00	
H/P	432 POWER METER	295.00	
HATACHI	40 MHZ DUAL TR SCOPE	795.00	—
HEATHKIT	VOLTMETER	25.00	
HEWLETT PACKARD	OHM-METER	25.00	
KLARK-TECHNICS	DN 360 RTA W/ MIKE	2695.00	
LEADER	LAG-120 AUDIO GENERAT	195.00	
LEADER	VECTORSCOPE (PAL)	995.00	MODEL 5851A
POTOMAC	FIM-21 FIELD STR METER	2295.00	
POTOMAC	FIM-71 FIELD STR METER	5995.00	
SENCORE	Z METER, (CAP, INDUCT)	395.00	
TEKTRONIX	2215 OSCILLOSCOPE	895.00	60 MHZ, DUAL TRACE
TEKTRONIX	2225 50MHZ DUAL TRACE	995.00	
TEKTRONIX	FRAME, ANALYZER, OSCIL	3295.00	TM 503 FRAME, AA501 ANALYZER, SG501 OSCIL
TEKTRONIX	TM-515 4CH FRAME	395.00	PORTABLE VERSION
TELEQUIPMENT	S540 OSCILLOSCOPE	300.00	
** TRANS. LINE ACC			
MICROWAVE DEV.	578A10 DIR. COUPLER	150.00	3 1/8 IN. LINE SECTION W/ DIRECTIONAL COUPLER 11 IN. W/

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MAKE	MODEL	PRICE	COMMENTS
MOD SCI	SIDEKICK	2195.00	67 KHZ
MOD SCI	SIDEKICK	2195.00	
MOD SCIENCE	SIDEKICK	2195.00	67 KHZ
MOSELEY	SCG-8	795.00	
MOSELY	SCM-1 MAINFRAME	495.00	185 KHZ
MOSELY	SCM-1 MAINFRAME	495.00	185 KHZ
MOSLEY	SCD-8 SUBC DEMOD	695.00	
MOSLEY	SCM-1 SUBC MFRAME	395.00	
OBERON	SCA GENERATOR	595.00	57 KHZ
TFT	730 SCA MONITOR	595.00	
TFT	730A SCA MONITOR	595.00	
TFT	730A SCA MONITOR	595.00	
** STL			
MARTI	STL 10 W/ DUPLEXER	5995.00	LEFT & RIGHT W/DUPLEXER 951.675 & 946.675
MARTI	STL-10	2600.00	946.125
MARTI	STL-10	2600.00	945.875
MARTI	STL-10 XMITR	1095.00	950.875
MARTI	STL-8 RECVR	795.00	NEEDS WORK, NO AUDIO
MOSELEY	505C XMITR ONLY	895.00	945.0 MHZ
MOSELEY	DSP 6000 D&E 2	4000.00	
MOSELEY	PCL 505	1495.00	951.500
MOSELEY	PCL 505 MONO SYSTEM	1695.00	
MOSELEY	PCL 505 MONO SYSTEM	1695.00	
MOSLEY	TPT-2 XMITR XFER PANEL	495.00	
TFT	7700 COMPOSITE XMITR	1495.00	NOT TYPE ACCEPTED BROKEN, PLL PROBLEMS
TFT	7700 COMPOSITE XMITR	1495.00	NOT TYPE ACCEPTED
TFT	7700 COMPOSITE XMITR	1500.00	NOT TYPE ACCEPTED
TFT	7700 COMPOSITE XMITR	1500.00	NOT TYPE ACCEPTED
TFT	7770 STL XMITR SWITCH	395.00	
TFT	8600 DUAL DISCRETE	3895.00	951.375 MHZ & 950.625 SN 1060318
** TELEPHONE			
COMREX	LX-L AUTO LEVELER	395.00	
ELGIN	RECORDER CONNECTOR	150.00	
ELGIN	RECORDER CONNECTOR	150.00	
ELGIN	RECORDER CONNECTOR	150.00	
ELGIN	RECORDER CONNECTOR	150.00	
FONE BOX	SINGLE HYBRID	195.00	
FONE BOX	SINGLE HYBRID	195.00	NOT WORKING
FONE BOX	SINGLE HYBRID	195.00	
GENTNER	EFT BETTERY BACKUP	295.00	
GENTNER	MICROTEL	175.00	
GENTNER	PEOPLE LINK	1795.00	ACOUSTIC TELEPHONE INTERFACE

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MAKE	MODEL	PRICE	COMMENTS
BE	AX-10 AM EXCITER	1695.00	1985 MODEL
BE	FS-30 STEREO GEN	1200.00	MANUFACTURED 10/82
BE	FS-30 STEREO GEN	1195.00	
BE	FS-30 STEREO GEN	1195.00	
BELAR	RFA-1	375.00	91.1
BEXT	PJ-250	2195.00	250 W RF AMP
COLLINS	310 Z1	595.00	W/ STEREO GEN
CSI	EX 20 F	1895.00	90.5
CSI	SG-1E STEREO GEN	595.00	
DELTA	AMC-1 MOD CONTROLLER	1195.00	
DORROUGH	80-B STEREO GEN	495.00	
DORROUGH	80-B STEREO GEN	495.00	NEEDS WORK
HARRIS	STEREO GEN	895.00	
LPB	AM-30 AM XMITR	995.00	WITH TCU-30
MCMART	TBM 3500 MOD MONITOR	395.00	SET ON 92.3
MOSELEY	SCG-9A STEREO GEN	895.00	
POTOMAC	A-19 ANTENNA MON	2995.00	6 TOWER, DIGITAL, SINGLE PATTERN
POTOMIC PANEL	RMP-19(200)	195.00	
TEPCO	J 319-1	895.00	1 WATT AMPLIFIER 4 OUTPUTS
TEPCO	J 319-1	695.00	2 OUTPUT 1 WATT AMPLIFIER
TEPCO	J-316 1 WATT TRANSLATR	1495.00	INPUT 90.9 MHZ, OUT 89.5 MHZ
TEPCO	J-317 10 W TRANSLATOR	1695.00	INPUT 89.3 MHZ, OUT 90.9 MHZ
TEPCO	J-319 RF AMP	695.00	90.9 MHZ, 15 WATT, DUAL OUT
** RF CONNECTORS			
ANDREW	L44W - 1/2" N MALE	15.00	
ANDREW	L44W - 1/2" N MALE	15.00	
ANDREW	L45N - 7/8" N FEMALE	30.00	
ANDREW	L45N - 7/8" N FEMALE	30.00	
CABLEWAVE	3/8" 90 ELBOW #920293	65.00	UNFLANGED, NEW IN BOX
CABLEWAVE	3/8" 90 ELBOW #920293	65.00	UNFLANGED, NEW IN BOX
CABLEWAVE	GROUND KIT 713737-002	10.00	1/2" COPPER GROUND KIT. CROSS REF CWS713796-003.
** RPU			
MARTI	RPT 15	750.00	SINGLE 161.67
MARTI	RPT 25	250.00	4 CH 25W
MARTI	RPT-15 XMITR	695.00	450.15 MHZ
MCMARTIN	RPU-1403	295.00	
MCMARTIN	RPU-1403	295.00	
** SCA			
BELAR	SCM-1 SCA MONITOR	715.00	
BELAR	SCM-1 SCA MONITOR	595.00	67KHZ
CRL	SCA-300A	995.00	NEW
HARRIS	SCA GEN FOR MX-15	495.00	67 OR 41 KHZ
JOHNSON	ST-4A SCA RECVR	75.00	

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MAKE	MODEL	PRICE	COMMENTS
REVOX	PR-99 PLAY ONLY	650.00	
REVOX	PR-99 PLAY ONLY	695.00	
REVOX	PR-99 PLAY ONLY	650.00	
REVOX	PR-99 PLAY ONLY	650.00	
REVOX	PR-99 PLAY ONLY	650.00	
REVOX	PR-99 PLAY ONLY	650.00	
SCULLY	280 STEREO	350.00	NOT WORKING, WITH ROLL CABINET, 2 AVAILABLE
SCULLY	280B STEREO	495.00	WORKS, WITH ROLL CABINET
SCULLY	280B STEREO	395.00	NOT WORKING, WITH ROLL CABINET, 3 AVAILABLE
STUDER	A 80	1895.00	
STUDER	B-67	295.00	NO HEADS
TASCAM	44 OB	1895.00	
TEAC	3340 4-TRACK	595.00	
TEAC	3340S 4 TRK.	695.00	NEW HEADS
** REMOTE METERS			
BURK	TC-8 XMIT ONLY	795.00	
MIXTI	RMC-15	995.00	
MOSELEY	1600 W/1620 UPGRADE	1695.00	NEEDS 4 CONTROL BOARDS ($200 EA) AND 1/2 OF 1620 UPGRADE TO BE COMPLETE
MOSELEY	MRC 2	2895.00	
MOSELEY	TCS-2 SYSTEM	1995.00	TWO TRANSMITTER UNITS AND ONE STUDIO UNIT. FOUR WIRE CONFIG.
MOSELY	DRS-1	1595.00	
MOSELY	MRC-1600	1495.00	NEEDS WORK
MOSLEY	TRC-15	695.00	
MOSLEY	TRC-15	795.00	
MOSLEY	TRC-15	795.00	
MOSLEY	TRC-15 AW	795.00	
TFT	7900 SYSTEM	895.00	WITH LOTS OF EXTRA STATUS INDICATORS
** REMOTES			
OTARI	CB-127 (MX50N)	100.00	
TASCAM	RC-402	100.00	
TASCAM	RC-402	100.00	
TASCAM	RC-402	100.00	
TASCAM	RC-402	100.00	
TASCAM	RC-71	65.00	
TASCAM	RC-71	50.00	
TASCAM	RC-71	65.00	
** RF			
BE	AM STEREO EXCITER/MON	3495.00	BE AX-10 AND AS-10 PACKAGE

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MAKE	MODEL	PRICE	COMMENTS
ORBAN	787 MIC PROCESSOR	1695.00	MASTER AND SLAVE UNITS (WITH REMOTE)
ORBAN	8100A OPTIMOD	3295.00	
ORBAN	9100 NRSC CARD	150.00	
STUDIO TECH	AN-2 STEREO SIM	150.00	NEW
SYMMETRIX	525 COMP/LIM/GATE	295.00	STEREO
SYMMETRIX	SX206 MULTI DYNAMICS	295.00	STEREO PAIR W/ RACK MOUNT
TECHNICS	SH-8040 SPACE DIM CONT	195.00	NEW
TEXAR	PRISM	895.00	
TEXAR	PRISM	895.00	
TEXAR	PRISM-AM VERSION	895.00	WITH EAGLE CLIPPER
TEXAR	RCF-1 CARD FIVE	250.00	
V/P	400 MIC PROC	350.00	
V/P	400 PARTS ONLY	395.00	PROBLEMS
V/P	430 DYMAMITE	250.00	
V/P	DYNA-MIKE	295.00	
** RACKS			
DENON	950FA RACK MOUNT	50.00	HOLDS TWO MACHINES
ITC	ITC 99B RACK MOUNT	50.00	
MISC	6UNIT WOODEN RACK	25.00	
OTARI	ROLLING RACKS	150.00	
PRO RACK	LAZY SUSAN CART RACK	150.00	NEW
** REEL TAPE			
AMPEX	GRAND MASTER 2"x2500'	75.00	NEW
** REEL TO REELS			
AMPEX	440 C STEREO	695.00	10 AVAILABLE
AMPEX	ATR 100	595.00	AS IS, NO HEAD STACK, IN ROLLING RACK
AMPEX/INOVONICS	350 MONO	495.00	
FOSTEX	A-4 4 TRACK	895.00	
INOV	370 REC AMP	395.00	
INOVON	375	150.00	
INOVONICS	370 MONO REC AMP	295.00	NEW
INOVONICS	375	100.00	
INOVONICS	375	100.00	
OTARI	ARS 1000	695.00	
OTARI	ARS-1000	650.00	
OTARI	MX 70	6500.00	16 TRACK 1 INCH W/ AUTO LOCATOR
OTARI	MX50-50 BQII	2195.00	
OTARI	MX50-50 BQII	2195.00	
OTARI	MX50-50 BQIII	2695.00	4 TRACK
OTARI	MX50-50 MKIII-4	3295.00	WITH ROLLING RACK, 1/2" TAPE
REVOX	PR 99 PL	595.00	
REVOX	PR 99 PL	595.00	

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MAKE	MODEL	PRICE	COMMENTS
CRL	SPP-800	695.00	NEEDS WORK
CRL	SPP-800	695.00	
DAP	310	295.00	
DAP	610-FM	495.00	
DBX	140A NR	195.00	NEW
DBX	163X/463X	250.00	OVER EASY NOISE GATE AND DOWNWARD EXPANSION
DBX	224X	195.00	
DBX	563X SILENCER	100.00	
DBX	563X SILENCER	100.00	
DBX	TYPE II NR SYSTEM	150.00	NEW
DORROUGH	DAP 610 FM	695.00	
DORROUGH	DAP-610 FM	695.00	
EVENTIDE	H-949 HARMONIZER	595.00	
EVENTIDE	H-949 HARMONIZER	595.00	
EVENTIDE	H-949 HARMONIZER	595.00	
EXR	EX-IV DUAL MIC PROCES	495.00	
GATES	SOLIDSTATESMAN AM LIM	295.00	
GATES	SOLIDSTATESMAN AM LIM	295.00	
GATES	SOLIDSTATESMAN FM LIM	295.00	
GATES	TOP LEVEL	50.00	
GENTNER	PRISM	995.00	
GENTNER	PRISM	995.00	
GREGG LABS	2530 TRI BAND	295.00	
HARRIS	AM LIMITER	350.00	
HARRIS	MSP 100	895.00	
HARRIS	MSP-90 AM LIMITER	295.00	MONO
HARRIS	MSP-90 AM LIMITER	295.00	MONO UNIT
HARRIS	MSP-90 AM LIMITER	295.00	
HARRIS	MSP-90 AM LIMITER	295.00	
HARRIS —	SOLIDSTATESMEN FM LIM.	50.00	MODEL # 994-6631-001
INOV	220 AUDIO LEVEL OPTIMI	295.00	
INOV	220 AUDIO LEVEL OPTIMI	295.00	
INOV	220 AUDIO LEVEL OPTIMI	295.00	
INOV	220 AUDIO LEVEL OPTIMI	295.00	
MOD SCI	CP-803	695.00	
MOD SCI	CP-803 COMP PROC.	695.00	
MOD SCI	STEREO MAX	1795.00	NEW
MOD SCI	STEREO MAXX	1495.00	
MOD SCIENCE	CP 803	650.00	NO RACK MT
MODSCI	STEREO MAXX	1495.00	
ORBAN	111B DUAL REVERB	395.00	
ORBAN	111B DUAL SPRING REVER	395.00	
ORBAN	222A	495.00	NEW
ORBAN	222A	495.00	NEW
ORBAN	222A	495.00	NEW
ORBAN	222A	495.00	NEW
ORBAN	275 STEREO SYNTH	295.00	

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MAKE	MODEL	PRICE	COMMENTS
APHEX	303 COMPELLOR - MONO	495.00	
APHEX	303 COMPELLOR - MONO	495.00	
ART	MDC-2001	350.00	COMPRESSOR,DE-ESSER,EXPANDER, NOISE GATE,EXCITER,CLIPPER
ATI	EM-1000-1 EMPHASIZER	595.00	
ATI	EM-1000-1 EMPHASIZER	595.00	
ATI	EM-1000-1 EMPHASIZER	595.00	
ATI	EM-1000-2 EMPHASIZER	595.00	
B&B	PHASESCOPE	1795.00	NEW
CBS	450 DYNAMIC PRESENCE	150.00	
CBS	AUDIMAX 4440A	150.00	MONO, SLIMLINE
CBS	AUDIMAX III	75.00	
CBS	VOLUMAX 400	40.00	
CBS	VOLUMAX 400	75.00	
CBS	VOLUMAX 400	75.00	
CBS	VOLUMAX 400	75.00	
CBS	VOLUMAX 410, MONO	75.00	
CBS	VOLUMAX 411 STEREO	100.00	TOP DONT WORK
CRL	APP-300	295.00	STEREO WITH 79319
CRL	APP-300	295.00	STEREO W/ 79401
CRL	APP-300A	295.00	
CRL	CC-300	395.00	
CRL	CC-300 COMPOSITE CONT.	295.00	
CRL	CC-300A	450.00	
CRL	CC-300A	495.00	
CRL	MDF-400	300.00	MONITOR DEMPHASIS/FILTER (NRSC DECODER)
CRL	MDF-800 STEREO	495.00	MONITOR DE-EMPHASIS FILTER (NRSC DECODER)
CRL	SEP 400A	295.00	
CRL	SEP 400A	295.00	
CRL	SEP-100	295.00	
CRL	SEP-400A	495.00	
CRL	SEP-400A	495.00	
CRL	SEP-400A	495.00	
CRL	SEP-400B	595.00	
CRL	SEP-400B	595.00	
CRL	SG 800	895.00	
CRL	SMC-600A	250.00	
CRL	SMC-600A	595.00	
CRL	SMC-600A MOD. CONT.	495.00	
CRL	SMC-600A ST MOD CONT	395.00	
CRL	SMP 800	895.00	
CRL	SMP-850	1595.00	
CRL	SMP-850	1595.00	STEREO, 3 BAND AGC/LIM
CRL	SMP-950	1695.00	
CRL	SPP 800	695.00	
CRL	SPP-800	795.00	

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MAKE	MODEL	PRICE	COMMENTS
AMPRO	MONO MAX	75.00	
ATI	DISC-PATCHER	95.00	
EPP	EPP 2000 POWER CENTER	75.00	NEW
EVNT	INSTANT PHASER	250.00	
EVNT	PTC-945 TAPE CONTROL	100.00	
GENTNER	24-SR-TRS-BO-PU	200.00	
HARRIS	DEHYDRATOR	895.00	
HARRIS	DEHYDRATOR	895.00	
HENRY	FAST TRAC	750.00	
HENRY	SUPER RELAY	125.00	NEW
HENRY	SUPER RELAY	125.00	NEW
MISC	ON-AIR LENSES	10.00	1 AVAILABLE
MISC	ON-AIR LIGHT	20.00	2 AVAIL, NEW IN BOX
MOSLEY	DLS-1 DIGITAL LOG SYS	195.00	
MOSLEY	TOLERANCE ALARM	195.00	
RCA	AUDIO SPLITTER	35.00	
SWTCR	PATCHBAY STEREO	295.00	4 BAYS IN ONE RACK MOUNT
SYMMETRIX	SECURITY COVER	15.00	3 AVAIL, NEW
TECH	COVER FOR SLPS-70	10.00	
TELLAB	6888	125.00	
TELLABS	SINGLE UNIT METAL CASE	50.00	
TRISTECH	10 CH STEREO SWITCHER	150.00	CUSTOM MADE ROUTING SWITCHER 10 CH STEREO BI DIR PASSIVE
** MIXERS			
BIAMP	1683	450.00	16 CHANNEL
E/V	ELX-1R	295.00	4 CHANNEL, MIC/LINE, RACK MOUNT
E/V	TAPCO 5212 12 CH	595.00	
GATES	UNIMOTE 70	40.00	
IVIE	804 (4 CHANNEL) —	595.00	
MCGOHA	M 305	35.00	4 MICS 1PHONO INPUT TUBE TYPE POWERD MIXER
PANASONIC	WR-133 8 CH MIXER	595.00	NEW
PERSON	PROGRAMMER 3A	695.00	
PERSON	PROGRAMMER 3A	695.00	
SHURE	M 68 FC	100.00	4 MIC 1 LINE MIC OR LINE OUT
SHURE	M-68FC MIC MIXER	125.00	
TAC	1042 (10x4x2)	1295.00	
TASCAM	M 3500	4500.00	24 CH 8 BUS,STEREO LIKE NEW
TASCAM	M-312B (12x8-4x2)	1695.00	
YAMAHA	PM-180 6 CH RACK MOUNT	395.00	
** PROCESSING			
APHEX	250 AURAL EXCITER	495.00	NEW
APHEX	250 AURAL EXCITER III	495.00	NEW
APHEX	250 AURAL EXCITER III	495.00	NEW
APHEX	303 COMPELLOR	495.00	

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UREI	533 GRAPHIC EQ	295.00	
UREI	537 30 BAND EQ	395.00	
UREI	537 30 BAND EQ	395.00	
UREI	537 GRAPHIC EQ	495.00	
UREI	560 FEEDBACK SUP	195.00	
V/P	PR-2, KEPEX II, GAIN 2	395.00	
V/P	PR10, (3) KEPEX II	695.00	
WEST	KS-20159-L3	50.00	
** HEADPHONES			
AKG	240	75.00	
AKG	270	100.00	
SENH	HD-450 HEADPHONES	50.00	
SENNH	HD-450	50.00	
SENNHEISER	HD 410 SL	45.00	
** MICROPHONE ACCE			
ATI	M-1000 MIC PRE-AMP	195.00	
ATI	M-1000-2 MIC PREAMP	195.00	DUAL
NEUMAN	N452 iG POWER SUPPLY	695.00	
** MICROPHONES			
AKG	C747	275.00	
BAYER	M500 N(C)S	150.00	
CAD	EQUITEK II	295.00	CONDENSER, NEEDS PHANTOM
E/V	664	100.00	
E/V	665	100.00	
E/V	665	100.00	
E/V	CS-15E CONDENSOR	150.00	NEW
MARANZ	EC-3	99.00	
NEUMAN	KMR-821 SHOTGUN	895.00	
NEUMANN	U-87	1395.00	
NEUMANN	U-87	1395.00	
RCA	BK 1A	150.00	NEW IN CASE
RCA	BK 1A	150.00	NEW IN CASE
RCA	JR VELOCITY	200.00	NO RIBBON OR SWIVEL BASE
SENNHEISER	421	195.00	BROKEN
SHURE	55 S ORIGINAL	150.00	
SHURE	ES-50	50.00	9 AVAILABLE
SHURE	SM-33	250.00	
SHURE	SM-33 RIBBON	295.00	
SHURE	SM-82	295.00	NEW
SONY	ECM-44S	100.00	
SONY	ECM-44S	100.00	
TELEX	WIRELESS, NO RECVR	295.00	NEW
** MISC			
ADC	PATCHBAY	100.00	NEW

HARRIS-ALLIED USED EQUIPMENT INVENTORY LISTING
PHONE (317) 962-8596 OR FAX (317) 962-8961

ALL ITEMS ARE SUBJECT TO PRIOR SALE

MAKE	MODEL	PRICE	COMMENTS
BE	4BEM50	195.00	4CH MONO
GATES	DIPLOMAT 8CH DUAL MONO	650.00	NEEDS SOME WORK. SELL FOR $495 AS IS.
LPB	S-15A 8 CH MONO	995.00	
RAMKO	DC5-RA 5CH MONO	295.00	
RAMKO	DC5-RA 5CH MONO	295.00	
RUSSCO	505S	695.00	
SPARTA	CENTURION II 12 CH ST	795.00	THREE BUSS, SLIDE POT
WHEATSTONE	A-500a	14000.0	19CH, 5 MIC, 15 LINE, 3 LINE SELECT, 2 TAPE REMOTES, I TIMER CONT.
** DAT			
JVC	XD-Z507	695.00	LIKE NEW W/REMOTE
RADIO SYSTEMS	RS-700 (SONY 75ES)	895.00	NEEDS WORK
RADIO SYSTEMS	RS-700 (SONY ES-75)	895.00	
RADIO SYSTEMS	RS-700 (SONY ES-75)	895.00	
** EBS			
GORMAN REDLICH	CE TONE GEN	275.00	
GORMAN REDLICH	CEB ENCODER/DECODER	295.00	
MCMARTIN	AMR-1 AM RECVR	100.00	
TFT	760 AM RECVR MODULE	150.00	
TFT	760 TONE DECODER	150.00	
TFT	760 TONE DECODER	150.00	
** EQ			
AKG	BX-5 REVERB - STEREO	495.00	
ALTEC	1653A 1/3 OCTAVE GR.	225.00	
ALTEC	24 BAND PASSIVE EQ	195.00	
CART	463-X NOISE GATE	125.00	LIKE NEW—
DBX	180 NR SYSTEM	195.00	4 AVAILABLE
DOD	834 SERIES II	225.00	3 WAY X OVER
DYNAFEX	D-2B NR SYSTEM	195.00	
DYNAFEX	D-2B NR SYSTEM	195.00	
E/V	XEQ-2 MONO XOVER	295.00	
ERBAN	111B DUAL REVERB	395.00	
EVNT	MONSTERMAT RD-770	150.00	14 AVAILABLE
INOV	241 NOISE SUPP	100.00	
INOV	241 NOISE SUPP	100.00	
ORBAN	111B DUAL REVERB	395.00	
ORBAN	111B DUAL REVERB	395.00	
ORBAN	275A STEREO SYNTH	795.00	
ORBAN	672A EQUALIZER	395.00	
ORBAN	674A 8 BAND EQ	795.00	
SHURE	M-62 LEVEL CONTROL	75.00	
TASCAM	DX-40 dbx NR	200.00	
UREI	530 9BAND DUAL EQ	295.00	

HARRIS-ALLIED USED EQUIPMENT INVENTORY LISTING
PHONE (317) 962-8596 OR FAX (317) 962-8961

ALL ITEMS ARE SUBJECT TO PRIOR SALE

MAKE	MODEL	PRICE	COMMENTS
HARRIS	CRITERION 90 STEREO PL	495.00	
ITC	99-B STEREO R/P/ELSA	2495.00	
ITC	99B	895.00	
ITC	99B STEREO PLAY	895.00	
ITC	DELTA MONO P/L	795.00	
ITC	DELTA MONO REC AMP	495.00	
ITC	DELTA MONO REC AMP	495.00	
ITC	OMEGA STEREO PLAY	795.00	
ITC	PD-II MONO PLAY	295.00	
ITC	PD-II MONO PLAY	295.00	
ITC	RP MONO	595.00	
ITC	RP MONO	595.00	IN STEREO CHASSIS
ITC	RP STEREO	995.00	EXTERNAL POWER TRANSFORMER
ITC	RP STEREO, 3 CUE	995.00	
ITC	RP STEREO, 3 CUE	995.00	WON'T PULL TAPE
ITC	SP STEREO PLAY	495.00	
ITC	STEREO 3D REC AMP	495.00	
OTARI	CTM-10	1495.00	
OTARI	CTM-10	1495.00	
OTARI	CTM-10	1495.00	NO MOTOR
OTARI	CTM-10M	2195.00	
OTARI	CTM-10R	695.00	
UMC	BEAUCART MONO PLAY	350.00	BLOWS FUSES
UMC	STEREO PLAY	395.00	MODEL 103-123-002
** CASSETTE DECKS			
NAKIMICHI	MR-1	495.00	3 HEAD
NAKIMICHI	MR-1	495.00	
NAKIMICHI	MR-1	495.00	
TECH	RS-9900US	395.00	2 PIECE UNIT
** CD PLAYERS			
TECHNICS	SL-1200	795.00	WITH BALANCED OUTPUTS
TECHNICS	SLP 770	175.00	
TECHNICS	SLP-1200	795.00	WITH BALANCED OUTPUTS INSTALLED
** CONSOLES			
AUDIOARTS	R-10 STEREO	3500.00	2 MIC, 8 LINE
AUDITRONICS	110B GRANDSON	2495.00	
AUDITRONICS	110B GRANDSON	2295.00	
AUDITRONICS	200-VC MODULE	100.00	NOISE GATE/COMPRESSOR
AUDITRONICS	200-VC MODULE	100.00	NOISE GATE/COMPRESSOR
AUDITRONICS	382-24 (16 MODULES)	23995.0	382-24 MAINFRAME, 9 MIC INPUTS, 7 LINE INPUTS, 4 TAPE REMOTES, TIMERMODULE, TELEPHONE MODULE, MORE!
AUTOGRAM	IC-10 STEREO	2195.00	

HARRIS-ALLIED USED EQUIPMENT INVENTORY LISTING
PHONE (317) 962-8596 OR FAX (317) 962-8961

ALL ITEMS ARE SUBJECT TO PRIOR SALE

MAKE	MODEL	PRICE	COMMENTS
**		0.00	
		0.00	
** AMPS			
A/B	1200 POWER AMP	795.00	390 W/CH
A/B	1200 POWER AMP	795.00	390 W/CH
APHEX	120A DIST AMP	195.00	1X4 STEREO, NEW
ATI	DUAL LINE AMP	195.00	
BRYSTON	3B 112 WATTS/CH	795.00	LIST PRICE IS $1500
CROWN	MACRO-TECH 600	895.00	EXCELLENT CONDITION
NAD	2600 MONITOR AMP	395.00	150 W/CH
QSC	QSC 3200	450.00	
RADIO SYSTEMS	DA-16	225.00	2X8
RAMKO	DUAL MIC/LINE PREAMP	150.00	
RAMSA	WP9210	495.00	244 W/CH
WOHLER	AMP-1	395.00	
** CART ERASERS			
FID	ESD-10	650.00	
ITC	ESL-V	895.00	
** CART MACHINES			
AUDI-CORD	106 STEREO P, 3 CUE	495.00	NEEDS BEARINGS
AUDI-CORD	CART MACHINE	595.00	
AUDI-CORD	S-11 MONO/PLAY	650.00	MONO PLAY, 3 TONES
AUDI-CORD	TWO STACK STEREO	695.00	S-SERIES
BE	3400 MONO R/P	695.00	
BE	3D MONO REC AMP	395.00	
BE	3D MONO REC AMP	395.00	
BE	3D STEREO REC AMP	495.00	
BE	DURATRACK 90	1500.00	NO MANUAL
BE	DURATRACK 90 ST PLAY	1095.00	
BE	DURATRACK 90 ST R/P	1695.00	
BE	DURATRAK 90 ST PLAY	1895.00	
FID	124 STEREO R/P	2395.00	EXCELLENT CONDITION
FID	CTR-11 MONO PLAY	695.00	3 CUE, FF
FID	CTR-11 MONO PLAY	695.00	3 CUE, FF
FID	CTR-11 MONO PLAY	695.00	3 CUE, FF
FID	CTR-112 STEREO PLAY	1195.00	FACTORY REFURB
FID	CTR-112 STEREO PLAY	1195.00	FACTORY REFURB
FID	CTR-12	895.00	
FID	CTR-12	895.00	
GATES	CRITERION 1 MONO PLAY	295.00	
GATES	CRITERION 80 MONO PLAY	295.00	
HARRIS	COMPACT 80	392.00	STEREO PLAY
HARRIS	CRITERION 90	695.00	

FIRST CLASS
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Quincy, Illinois

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GATES RADIO COMPANY
A Division of Harris-Intertype Corporation
QUINCY, ILLINOIS 62301

Attention: Product Marketing

HARRIS INTERTYPE CORPORATION

GATES RADIO COMPANY

A DIVISION OF HARRIS-INTERTYPE CORPORATION

123 HAMPSHIRE STREET • QUINCY, ILLINOIS 62301 • 217-222-8200

MR. G. PETERSEN
PRESIDENT
ASTRONAUT ELECTRONIC
161 E. GOEBEL DRIVE
LOMBARD, ILLINOIS 60148

Dear Sir:

Thank you for your request for information. Your interest in Gates products and systems is sincerely appreciated. Enclosed is the literature you requested on TE-201 LIVE COLOR CAMERA.

To acknowledge receipt of the requested information, and to allow us to supply you with further technical information, would you kindly fill out the form below, fold, staple, and return to us. Thank you.

Cordially yours,

E. S. Gagnon

E. S. GAGNON
MANAGER, PRODUCT MARKETING

My initial interest in your product is for:

☐ Present use
☐ Specific future use
☐ Possible future use
☐ Information only

I would appreciate further contact regarding your product:

☐ Now ☐ In 30 days ☐ In 3 months

My complete address is:

Name _____

Title _____

Company Name _____

Street Address _____

City _____ State _____ Zip Code _____

I WOULD LIKE INFORMATION ON OTHER GATES COMPANY PRODUCTS

☐ AM Transmitter, Power ____KW
☐ FM Transmitter, Power ____KW
☐ VHF TV Transmitter, Power ____KW
☐ UHF TV Transmitter, Power ____KW
☐ HF Transmitter, Power ____KW
☐ SSB Transmitter, Power ____KW
☐ Other _____

☐ Audio Consoles
☐ Remote Amplifiers
☐ Audio Amplifiers
☐ Program Automation
☐ Turntables
☐ Tape Cartridge Machines

TOTALS

Transmitter	$1,636.50
Antenna Equipment	237.03
Studio Equipment	2,459.22
TOTAL, FOR 10 WATT EDUCATIONAL FM BROADCAST STATION	$4,332.75

PRICES F.O.B. QUINCY, ILLINOIS

GATES RADIO COMPANY RESERVES THE RIGHT TO CHANGE PRICES AND SPECIFICATIONS WITHOUT NOTICE.

STUDIO EQUIPMENT

1	Gates Studioette 80 4-Channel Monaural Transistorized Console	$1,295.00
2	CB-77, 12" Turntable @ $199.50	399.00
2	M-6244B Transistor Preamplifier @ $130.00	260.00
2	M44-7 Shure Phono Cartridge @ $19.95	39.90
2	Gates TA-12 Tone Arm @ $69.50	139.00
2	Gatespeakers GRS-8, 8" PM Type @ $8.95	17.90
2	Speaker Matching Transformers for GRS-800 @ $5.25	10.50
2	DWB-8A Wall Cabinets for Speakers @ $6.40	12.80
1	Gates G-700 Microphone	57.30
1	Gates G-600 Microphone	48.50
1	Atlas BS-36 Boom Stand	59.85
1	Atlas MS-25 Floor Stand	24.00
1	Atlas DS-7 Desk Stand	4.92
2	Cannon XLR-3-35 Wall Receptacle for Microphones @ $7.10	14.20
3	Cannon XLR-3-12C Microphone Plugs @ $1.90	5.70
3	Cannon XLR-3-11C Connectors @ $2.15	6.45
100Ft.	Belden 8412 two-conductor #20 Microphone Cable, rubber jacketed @ 26¢ per ft.	26.00
1	Trimm Type 107 Headphone	7.20
1	No. 511 Phone Plug for Headphone	.80
500Ft.	SH-2-20 Two-conductor Shielded Audio Wire @ $.06 per ft.	30.00
		$2,459.22

TRANSMITTER

1	Gates Model BFE-10C, 10 Watt FM Broadcast Transmitter	$1,495.00
1	100% Set Spare Tubes for BFE-10C Transmitter, TK-391	54.00
1	NE-91 Spare Oven and Crystal for BFE-10C Transmitter	87.50
		$1,636.50

ANTENNA EQUIPMENT

1	Gates FM-11 Single Ring Antenna, Power Gain .8	$210.00
	(Optional - to replace FM-11 above, Gates FM-22, 2-Ring Antenna, Power Gain 1.6 @ $420.00)	
100Ft.	Type RG-8A/U Coaxial Cable	23.00
1	PL-259A UHF Cable Plug (to terminate coax at antenna)	1.53
1	Type N Connector (transmitter end)	2.50
		$237.03

NOTE: Mounting pole not included with above antennas. 2" diameter pipe, or equivalent, required.

This presentation has been prepared to assist you in the planning of an educational FM broadcast facility. This is not the only possibility, but a guide which may have any number of substitutions.

We have made every effort to include all items that might be required to construct an educational station, many of which can be easily overlooked. We hope that this thoroughness will be helpful.

We strongly recommend a contingent order policy for those who are filing with the F.C.C. for a new FM station. Our District Manager will gladly explain the advantages and prepare a contingent order form in accordance with this proposal, or any revision that you may desire, and submit it to you for signature. There is no obligation of any kind to take delivery of equipment until a construction permit is issued by the F.C.C.

EQUIPMENT LIST

FOR

EDUCATIONAL FREQUENCY MODULATION

BROADCAST STATION

USING 10 WATT TRANSMITTER

Prepared by -

Product Marketing Department
Gates Radio Company
Quincy, Illinois

GATES

am-fm radio profiles

STATION WSIE-FM

Southern Illinois University
Edwardsville, Illinois

The WSIE Story

On-campus radio is not what it used to be.

From the typical 10-watt, 4-hour-a-day college or university operation of a few years ago, broadcasting mostly music and school news, a new breed of educational FM station has evolved. Public-service minded, sophisticated in both programming and equipment, these stations are now reaching out to growing audiences, both on and off campus, across the country.

WSIE-FM, Edwardsville, Illinois is one of these new stations. A part of the Broadcasting Service Department at Southern Illinois University-Edwardsville, this 50,000-watt all-stereo directional FM station blankets an area that takes in metropolitan St. Louis, and includes almost 3,000,000 people.

In serving this major market area, WSIE has wisely chosen not to compete with local commercial radio stations by duplicating the type of programming already available. Instead, it has come up with a unique schedule that is both informative and entertaining—designed to furnish on-the-air services that would not otherwise be available to listeners.

Cultural and Informational Programming

According to Fred Criminger, General Manager of WSIE, community service was one of the major goals set up in the planning of the University station. Established primarily as a training ground for students preparing for a career in the field of communications, WSIE is also looked on by Mr. Criminger as a means of furnishing the surrounding communities programming of a cultural and informational nature.

"We feel that we fulfill a need by furnishing something that is unlike anything being done in the area", says Mr. Criminger. "At the same time WSIE provides a practical broadcast laboratory for students."

The combination is proving to be quite a success. SIU students are learning all aspects of broadcasting by handling most of the production, announcing, writing and editing at WSIE. At the same time, area listeners are treated to an extremely interesting and widely varied type of programming.

This format includes extensive national and local news coverage, book and movie reviews, sports events, music (from classical to rock), talk shows, public affairs shows, agricultural and scientific features, lectures, interviews and press conferences.

Many of the programs are written and produced by students, under the supervision of Mr. Criminger, and are original, interesting and informative. For instance, Mary Chance, of St. Louis, a junior in the Mass Communications Sequence, writes, produces and conducts a weekly show called "Majority Woman", which takes a look at the domestic world, with information on cooking, interior decorating, sewing, child rearing and general tips on efficient homemaking.

Another student, Earlwayne Stumpf, a junior majoring in radio, produces "Farming Today", an agricultural show which covers general information of interest to the many farmers and rural communities in the area.

Mr. Fred Criminger, General Manager of WSIE, has guided the station from its initial planning stage to its present 7-day-a-week operation.

Through this type of student participation, the staff is exposed to all facets of broadcasting, from script writing to announcing. Although commercials are not aired on WSIE, students become acquainted with the commercial style through writing and producing the many public service announcements that are scheduled.

WSIE Almost Entirely Gates Equipped

As broadcast equipment is of the utmost importance to any radio station, students are also familiarized with the operation of everything from the transmitter to the consoles to the tape cartridge machines, under the guidance of Chief Engineer Hugh Nenninger, and Station Engineer Bert Pike.

At WSIE almost all of the equipment is Gates'. The original package from Gates included an FM-10H, 10kW FM transmitter; Dualux II, President and Producer audio consoles; Criterion tape cartridge machines; CB-77 turntables; FM limiters; an RF amplifier; a stereo modulation monitor; an FM frequency monitor; a pilot-SCA frequency comparator and an SCA modulation monitor adapter for the planned addition of an SCA channel.

Later, a 3-rack Gates automation system was added, and at present it handles about 6 hours of the daily schedule—which stretches from 6:00 a.m. to 12:10 a.m. Monday through Friday, with a somewhat shorter program day on week-ends.

The addition of Gates automation serves two purposes. First, it allows greater flexibility and tighter control in programming. Through automation, the more experienced student announcers can be used throughout the day, no matter what their class schedules, to maintain a professional sound. And, second, the use of automation allows students to gain experience in the operation of equipment that they are almost certain to see again, once they have graduated and gone to work for commercial stations.

The Gates automation system, although providing extremely sophisticated capabilities, is easy to load and program, and students have had no difficulties in catching on to its operation.

According to Mr. Pike, no difficulties have been encountered with any of the equipment. He says, "I've been working in radio stations for quite a few years, and I'm happy we are Gates equipped. I've always found Gates hard to beat, whether you're talking about studio equipment or transmitting equipment."

Southern Illinois University-Edwardsville

WSIE first went on the air September 4, 1970, broadcasting from its spacious studio facilities in the Communications Building on the SIU campus. This modernistic new building is the center of the original five buildings on the Edwardsville campus, which is indicative of the importance placed on the communications curriculum by school officials.

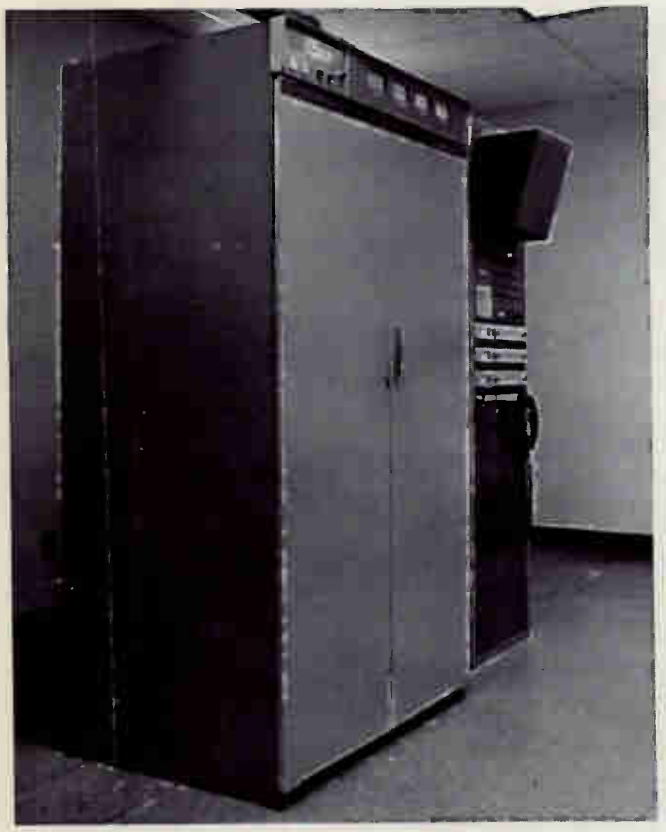
Most of the live studio shows at WSIE originate here, in the main control room. Shown in the foreground are the Gates' 8-channel mono/stereo Dualux II audio console, Criterion record/playback system and CB-77 turntable.

The campus itself encompasses some 2,600 acres of picturesque rolling meadows and wooded areas near the Mississippi River, some twenty miles northeast of St. Louis. Although the school has been in existence at this location less than ten years, it has grown from a few buildings and two thousand students, to a large, handsome complex that now offers comprehensive academic programs in a wide number of fields to its fourteen thousand students. It is one of the fastest growing universities in the nation.

To keep pace with the dynamic expansion program at SIU-Edwardsville, school officials called on Mr. Criminger, in 1967, to join the faculty, and set up a top-quality, university-connected FM operation. As his previous assignment (at the SIU-Carbondale campus) had included supervision of an educational FM station, Mr. Criminger was well qualified to meet the challenge.

Planning and Building WSIE

Working initially under Mr. Buren Robbins, Director of Broadcasting Service at Carbondale and later under Dr. John Rider, Director of Broadcasting Service and Chairman of the Mass Communications Depart-



The Gates FM-10H transmitter, and a five-bay directional FM antenna array (also supplied by Gates), provide WSIE a 50,000-watt stereo signal.

Student Mary Chance programs the Gates automation system, which carries the programming on WSIE for approximately 6 hours of the station's 18-hour broadcast day.

WSIE studios and offices are located in the handsome new Communications Building on the Southern Illinois University-Edwardsville campus. The building also houses offices for the Mass Communications faculty, classrooms, a complete television facility and a film laboratory.

ment, Mr. Criminger carefully laid the groundwork for developing both a student training ground, and a community-service oriented radio station.

His ideas that programming should not only be entertaining, but should reflect the ideals of the University and offer worthwhile services to a wide variety of listeners, were incorporated into the comprehensive planning.

Just one of these services—designed to keep the public informed on local community and campus news—is a system set up to allow various news media to dial a certain phone number and be connected with a recorded rundown on various happenings in the area. These news tapes are produced by the students, and are updated about once every hour. Many of the local commercial stations and newspapers use the service extensively—passing the news items on to area residents.

Again, much planning went into the equipment phase of WSIE, and the entire FM package was ordered from Gates well in advance of the completion of the transmitter building. Once this building, located some two miles from the studios, was ready, all of the equipment was delivered and installed in a short time, and WSIE went on the air as scheduled.

Thanks to careful planning, the station, at 88.7 on the FM band, has been a success almost from the start. It has a professional sound that is a credit to both station management and students. And through the variety of programming the public interest is well served. As an example of this variety, several weeks ago the station presented a live press conference with Germaine Greer, the controversial authoress of "The Female Eunuch", from the National Press Club in Washington, D.C. The same week the station broadcast a "Special" originating on the Kent State campus, on the one-year anniversary of the tragic student-National Guard confrontation that took four lives. During the NCAA baseball finals, WSIE sent a two-man team to cover the series—providing still another exclusive to area listeners.

A second "plus" factor in the station's success is the strong, clear stereo signal that rivals that of the largest commercial FM stations in the area. Coverage extends some 80 to 90 miles to the east and south of Edwardsville, and 40 to 50 miles to the west—which takes in almost every type of listening area, from rural to metropolitan.

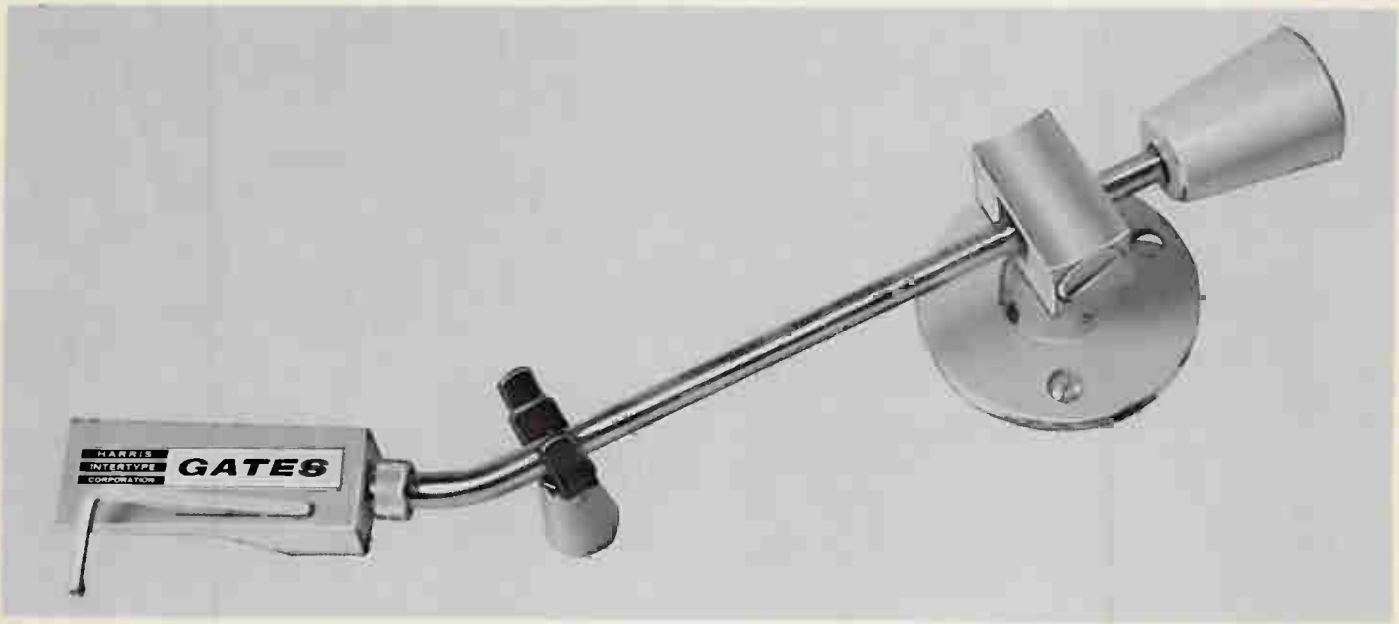
In an era when relations between campuses and communities across the nation are severely strained, WSIE, through its community-service orientation, is helping to bring about a better understanding between students and area residents. The station is genuinely dedicated to this "service" goal, and in reaching out with its unique type of programming, it is helping to prove that the higher educational process in this country, though under fire from many quarters, is still one of the most worthwhile endeavors in our society.

HARRIS INTERTYPE CORPORATION

GATES
A DIVISION OF HARRIS-INTERTYPE

Product Information Bulletin

12-INCH PROFESSIONAL TONE ARM



MODEL TA-12 TONE ARM

FEATURES

- High quality rugged arm.
- Tracks with as low as one gram pressure.
- Resonance less than 15 Hz.
- Arm rest with lock.
- High strength nickel plated steel for excellent RF shielding.
- Rapid cartridge installation or change.
- Separate vertical and horizontal pivots.
- Contemporary styling.
- Shell accepts all available standard cartridges.
- Adjustable rear weight.
- Fluid anti-skate mechanism.

Gates' TA-12 transcription tone arm, the product of established designers of quality audio equipment, has been developed to meet broadcasting's critical tracking requirements for fine groove stereophonic recordings.

Precision manufacturing, extensive quality control and rigid testing procedures are guarantees that this tone arm will fulfill broadcasting needs for micro pressure cartridges.

The Gates' TA-12, which tracks as low as one gram without skipping, faithfully reproduces stereo records by minimizing the effect of the tone arm on sound reproduction and by reducing excessive record wear.

Because of the advance design of the tone arm, resonance is less than 15 Hz, well outside the operating frequency range of the system. Distortion due to tracking error in the arm and pickup is reduced to a minimum by separate horizontal and vertical pivots.

Accurate tracking pressure is further achieved by rearweight adjustment with a calibration of approximately one gram per revolution. This reliable tracking allows for lower pressure on the stylus adding to the record and stylus life.

Gates' TA-12 transcription arm features an arm rest with a lock which considerably reduces accidental damage to the stylus. The arm is fabricated with rugged simplicity from nickel plated steel which provides excellent RF shielding.

Designed for modern cartridges, Gates' TA-12 tone arm incorporates mechanical features which permit easy installation and rapid shell and cartridge change.

The cartridge shell will accept all standard cartridges. Other features include clean, contemporary styling and a fluid anti-skate mechanism.

The tone arm is provided with mounting hardware, mounting template, anti-skate fluid, two one-gram weights, four feet of audio cord and complete instructions.

The TA-12 tone arm is ideal as a companion with Gates' CB-77 turntable.

The TA-12 tone arm is shown installed on the Gates' CB-77 turntable.

SPECIFICATIONS

DIMENSIONS:

Overall length ..... 12-1/2 inches
Pivot to rear ..... 3-3/8 inches

OVERHANG:

0.682 inches. Spindle center to stylus.

PIVOT TO SPINDLE:

8-5/16 inches.

TRACKING ERROR:

3.00 inch radius	0 degree 00 min.
3.75 inch radius	1 degree 28 min.
4.75 inch radius	0 degree 0 Min.
5.50 inch radius	2 degree 0 min.

RESONANCE:

Below 15 Hz at 1 gram with 30 by 10 cm/dyne compliance.

WEIGHT:

18 oz.

ACCESSORIES:

Turntable preamplifier 994-6244-004

ORDERING INFORMATION

TA-12 Transcription Tone Arm ---------- **723-0317-000**

HARRIS INTERTYPE CORPORATION
GATES
A DIVISION OF HARRIS-INTERTYPE
QUINCY, ILLINOIS 62301 · U.S.A.

HARRIS INTERTYPE CORPORATION

GATES
A DIVISION OF HARRIS-INTERTYPE

PRODUCT INFORMATION BULLETIN

G-600 MICROPHONE

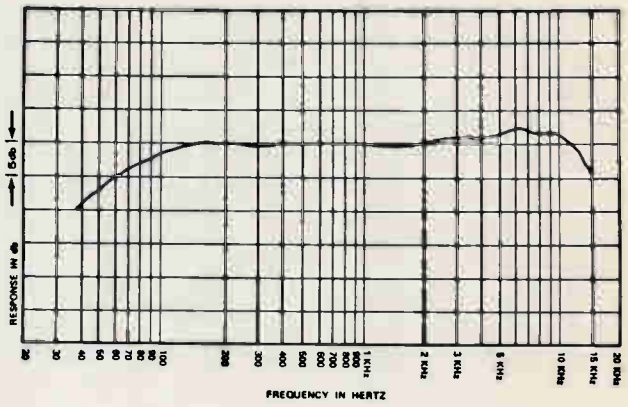


Figure 1—Frequency Response

DESCRIPTION AND APPLICATIONS

The Gates Model G-600 is a dynamic, omnidirectional microphone designed for exacting professional applications. It is ideally suited for film production, recording, FM, AM, and TV broadcasting, and for the more demanding PA applications.

The model G-600 is supplied with the model 310 stand clamp adapter. The non-reflecting fawn finish is ideal for "on camera" use. The high output level and low sensitivity to mechanical shock make it excellent for interviews, for pass-around use in audience participation, for hand-held use by vocalists, or as a lavalier.

The microphone features a diaphragm which permits very smooth response over a wide frequency range, and it withstands high humidity and temperature extremes, corrosive effects of salt air, and severe mechanical shocks. It is practically indestructible with normal use.

A four-stage pop and dust filter insures completely pop-free performance and virtually eliminates the need for an external windscreen for outdoor use.

An internal shock absorber effectively reduces pickup of cable and other noise generated by external contact.

SPECIFICATIONS

Element:	Dynamic
Frequency Response:	80 – 13,000 Hz
Polar Pattern:	Omnidirectional
Impedance:	Low (150 ohms)
Output Level:	−55 dB (0 dB = 1 mw/10 dynes/cm²)
EIA Sensitivity Rating:	−149 dB
Case Material:	Steel
Dimensions:	5-15/16" l. x 1-13/32" dia.
Finish:	Fawn
Net Weight:	6 ounces, without cable
Switch:	None
Cable:	18', 2-conductor, shielded, broadcast type synthetic rubber-jacketed with Switchcraft A3F connector
Accessories:	Lavalier neck cord assembly and 310 clamp furnished

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The microphone shall be a Gates Model G-600 or equivalent. The microphone shall be an omnidirectional dynamic type with wide-range response uniform from 80 to 13,000 Hz. It shall have a nonmetallic diaphragm and a four-stage pop filter and magnetic shield to prevent dust and magnetic particles from reaching the diaphragm. The

impedance shall be such that the microphone will match 50, 150, and 250 ohm inputs. The line shall be balanced to ground and phased.

The output level shall be −55 dB with 0 dB equalling 1 mw/10 dynes/cm^2. EIA sensitivity rating shall be −149 dB. The magnetic circuit shall be a nonwelded circuit and employ Alnico V and Armco magnetic iron. The case shall be made of steel.

The microphone shall have a maximum diameter of 1-13/32 inches, a length of 5-15/16 inches, and a weight, without cable, of 6 ounces. Finish shall be non-reflecting fawn. An 18-foot, 2-conductor, shielded, neoprene rubber-jacketed, broadcast type cable shall be provided with a Switchcraft A3F or equivalent connector installed. The microphone shall have a built-in connector similar or equivalent to the Switchcraft A3M. The microphone shall include a stand coupler with a 5/8"–27 thread. The Gates Model G-600 is specified.

WARRANTY

The Model G-600, like all Gates professional microphones, is guaranteed unconditionally against malfunction for one year from date of purchase. Within this period, Gates will, at its option, repair or replace any G-600 exhibiting any malfunction, regardless of cause, including accidental abuse. This warranty does not cover finish or appearance. In addition, the model G-600 is guaranteed for its life against defects in the original workmanship and materials, and will be repaired or replaced at no charge if exhibiting malfunction from this cause. Microphones for warranty repair must be shipped prepaid to Gates Radio Company, Quincy, Illinois.

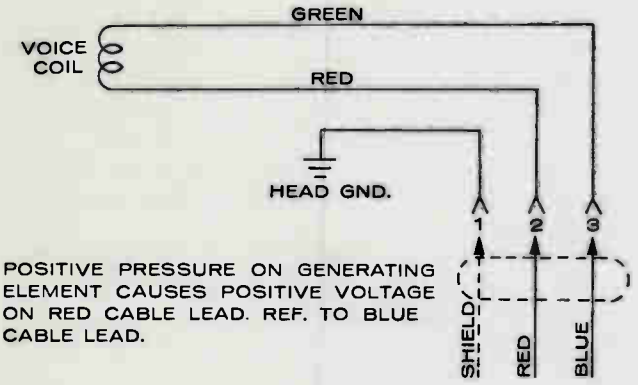


Figure 2—Wiring Diagram

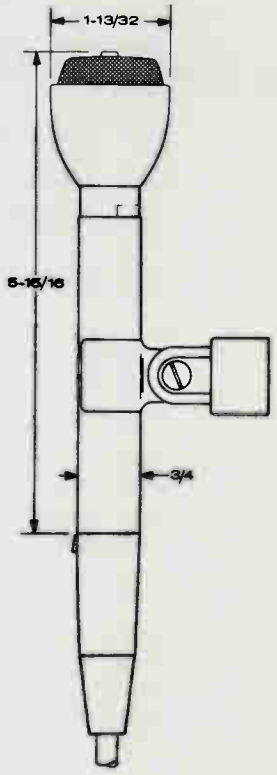


Figure 3—Dimensions

ORDERING INFORMATION

Gates' G-600 Microphone 720-0267

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HARRIS INTERTYPE CORPORATION

GATES
A DIVISION OF HARRIS-INTERTYPE

PRODUCT INFORMATION BULLETIN

G-800 MICROPHONE

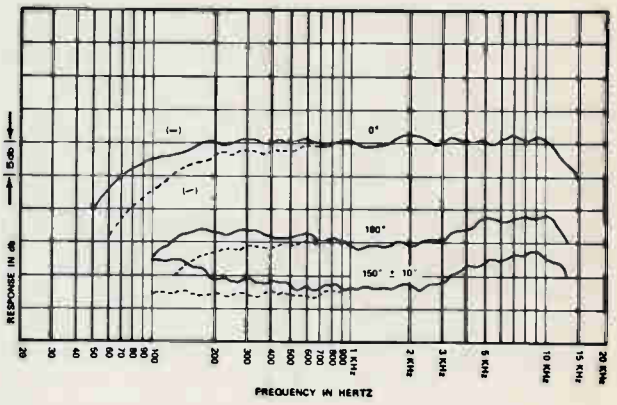

Figure 1—Frequency Response

DESCRIPTION AND APPLICATIONS

The Gates Model G-800 is a dynamic cardioid microphone created especially for professional applications requiring a sharply controlled super-cardioid directional pattern. The G-800 possesses a degree of directional control so effective that frequency response is virtually independent of location of sound source. The result is a microphone that generates little or no off-axis coloration, yet provides the greatest possible rejection of unwanted sounds. A super cardioid, the G-800 provides greatest rejection at 150° off axis. (Typical cardioids provide greatest rejection at 180°.) This assures greatest rejection in the horizontal plane when the microphone is tilted in its most natural position, 30° from horizontal, as on a boom or floor stand. An easily operated "bass-tilt" switch corrects spectrum balance for boom use and other longer reach situations.

Using the mechanical nesting concept of design – by means of which the internal transducer parts are nested one within another – the G-800 transducer is a nearly solid mechanical structure that is highly resistant to damage from mechanical shock. The diaphragm is virtually unaffected by extremes of atmospheric conditions. A carefully designed steel outer case provides excellent magnetic shielding and additional mechanical protection. Finish is fawn.

SPECIFICATIONS

Element:	Dynamic
Frequency Response:	90 – 13,000 Hz
Polar Pattern:	Super-Cardioid
Impedance:	Lo-Z (150 ohms nominal)
Output Level:	−56 dB (0 dB = 1 mw/10 dynes/cm^2)
EIA Sensitivity Rating:	−150 dB
Case Material:	Steel
Dimensions:	6¾" long, 1-3/8" dia. (¾" shank diameter)
Finish:	Fawn
Net Weight:	6 ounces without cable
Cable:	18', 2-conductor, shielded, synthetic rubber-jacketed, broadcast type
Accessories Furnished:	Model 310 stand adapter and protective metal carrying case
Optional Accessories:	Model 311 "snap-out" stand adapter, Model 421 or 422 desk stand, Model 307 suspension mount, Model 314 windscreen

WARRANTY

The Model G-800, like all Gates professional microphones, is guaranteed unconditionally against malfunction for one year from date of purchase. Within this period, Gates will, at its option, repair or replace any G-800 exhibiting any malfunction, regardless of cause, including accidental abuse. This warranty does not cover finish or appearance. In addition, the model G-800 is

guaranteed for its life against defects in the original workmanship and materials, and will be repaired or replaced at no charge if exhibiting malfunction from this cause. Microphones for warranty repair must be shipped prepaid to Gates Radio Company, Quincy, Illinois.

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The microphone shall be a super-cardioid dynamic type with wide-range response uniform from 90 to 13,000 Hz. Response at any angular position away from the major axis shall be essentially similar to the response on the major axis, attenuated uniformly at all frequencies by an amount appropriate to that angular position. Attenuation at all frequencies from 200 to 3,000 Hz (referred to major axis signal value) shall exceed 20 dB at 150° from major axis in any plane. Attenuation above 3,000 Hz shall exceed 18 dB. Attenuation at 180° from major axis in any plane at frequencies from 100 to 3,000 Hz shall exceed 13 dB. Attenuation above 3,000 Hz shall exceed 10 dB. Polar characteristic shall be sufficiently uniform in all planes so that it is, effectively, a super cardioid of revolution.

An integral passive filter network shall be provided such that when filter switch is in the "on" position, low-frequency response shall be so deviated from "flat" response that a fall of 6 dB from 1000 to 100 Hz shall be effected. With switch in the "off" position, the microphone shall be essentially "flat" from 150 to 10,000 Hz, with an 8 dB rise in response from 50 to 150 Hz. Output level shall be −56 dB (0 dB = 1 mw/10 dynes/cm^2), and EIA sensitivity rating shall be −150 dB. The diaphragm shall be nonmetallic and shall have a magnetic shield to prevent dust and iron particles from reaching the diaphragm.

The case shall be made of steel. The microphone shall have a maximum diameter of 1-3/8 inches (with ¾-inch diameter shank) and a maximum length of 6¾-inches, not including cable connector. Case finish shall be fawn. An 18-foot, 2-conductor, shielded, broadcast type, synthetic rubber-jacketed cable shall be provided with Switchcraft A3F or equivalent connector installed. The microphone shall have a built-in connector equivalent to the Switchcraft A3M. A Model 310A stand adapter and metal carrying case shall be supplied. The Gates Model G-800 is specified.

ORDERING INFORMATION

Gates' G-800 Microphone 720-0269

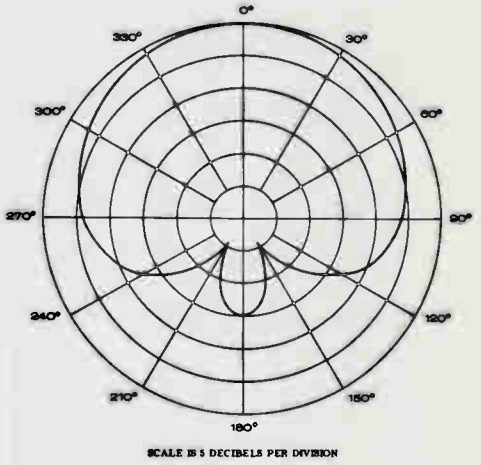

Figure 3–Polar Response

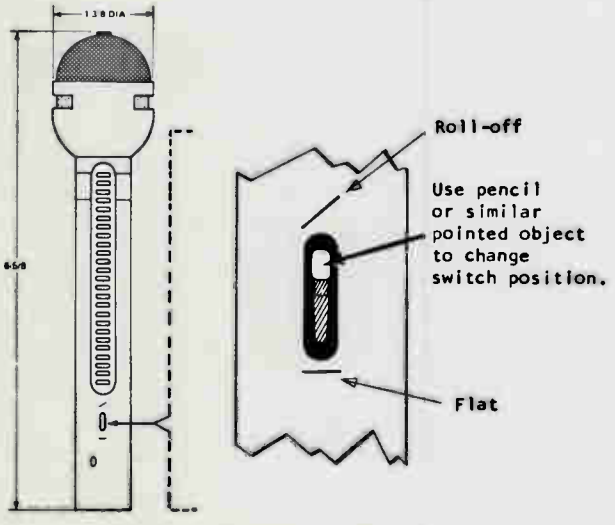

Figure 2–Dimensions

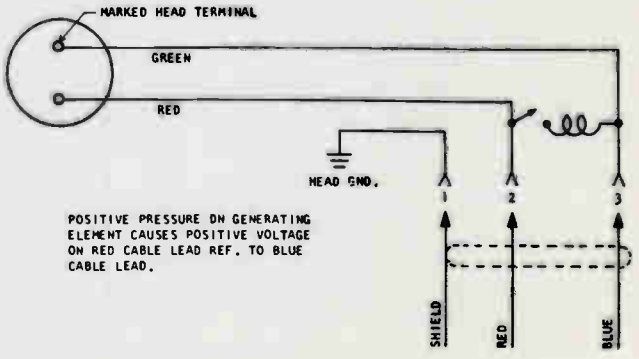

Figure 4–Wiring Diagram

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HARRIS INTERTYPE CORPORATION

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PRODUCT INFORMATION BULLETIN

G-700 MICROPHONE

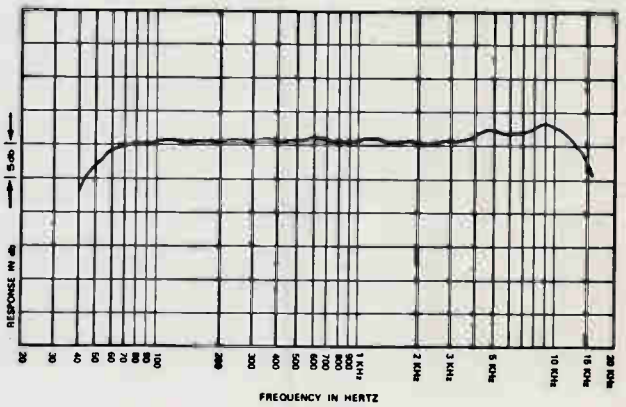


Figure 1—Frequency Response

DESCRIPTION AND APPLICATIONS

The Gates Model G-700 is a dynamic, omnidirectional type microphone designed for professional use, FM, AM, and TV broadcasting, studio remote, PA, and recording. Its slim design is made possible without the necessity for closely associated auxiliary equipment. Wide frequency response, broad pickup range, and light weight make it ideal for TV staging and for pass-around use in audience participation. Used with the convenient accessory neckcord, the G-700 is ideal for lavalier use. This microphone can be worked from any direction with only negligible frequency discrimination.

The Model G-700 is supplied with a lavalier neckcord and the Model 300 stand adapter; thus, it can be used with equal convenience in the hand, on a stand, or as a lavalier.

This microphone features a diaphragm which permits smooth response over a wide frequency range and withstands high humidity, temperature extremes, corrosive effects of salt air, and severe mechanical shocks. It is practically indestructible with normal use.

The case of the Model G-700 is extruded aluminum, reinforced at the connector end by a steel insert. This rugged construction makes possible dependable operation under all conceivable operating conditions. The microphone is finished in nonreflecting gray.

SPECIFICATIONS

Type:	Dynamic
Frequency Response:	Uniform 50 – 15,000 Hz
Polar Pattern:	Omnidirectional, becoming slightly directional with increase in frequency
Output Level:	−57 dB (0 dB = 1 mw/10 dynes/cm²)
EIA Sensitivity Rating:	−151 dB
Impedance:	Matches all low impedances, 50 through 250 ohms. Line balanced to ground and phased.
Magnetic Circuit:	Alnico V in nonwelded circuit
Cable Connector:	Cannon XLR-3-11
Finish:	Nonreflecting gray
Case Material:	Extruded Aluminum
Dimensions:	6-15/16" x 1-1/8" dia.
Net Weight:	7 ounces without cable
Cable:	18', 3-conductor, shielded, synthetic rubber-jacketed, broadcast type
Accessories:	Model 300 stand clamp (adapts to ½" or 5/8"–27 thread) and lavalier neckcord.

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The microphone shall be an omnidirectional, dynamic type with uniform response from 50 to 15,000 Hz. The diaphragm shall have a magnetic shield to prevent dirt and magnetic particles from reaching the diaphragm. The microphone shall match all standard low impedances, 50 through 250 ohms. Line shall be balanced to ground and phased.

The output level shall be −57 dB with 0 dB equalling 1 mw/10 dynes/cm². EIA sensitivity rating shall be −151 dB. The magnetic circuit shall be nonwelded and shall employ an Alnico V magnet.

The case shall be extruded aluminum. The microphone shall have a diameter of 1-1/8-inches, a length of 6-15/16-inches, and a net weight of 7 ounces, less cable. Finish shall be nonreflecting gray. An 18-foot, three-conductor, shielded, synthetic rubber-jacketed broadcast type cable shall be provided. Built-in cable connector shall be a Cannon XLR-3-11 or equivalent.

The microphone shall be equipped with a stand clamp with ½-inch pipe thread, a 5/8"−27 thread adapter, and a lavalier neckcord. The Gates Model G-700 is specified.

WARRANTY

The Model G-700, like all Gates professional microphones, is guaranteed unconditionally against malfunction for one year from date of purchase. Within this period, Gates will, at its option, repair or replace any G-700 exhibiting any malfunction, regardless of cause, including accidental abuse. This warranty does not cover finish or appearance. In addition, the model G-700 is guaranteed for its life against defects in the original workmanship and materials, and will be repaired or replaced at no charge if exhibiting malfunction from this cause. Microphones for warranty repair must be shipped prepaid to Gates Radio Company, Quincy, Illinois

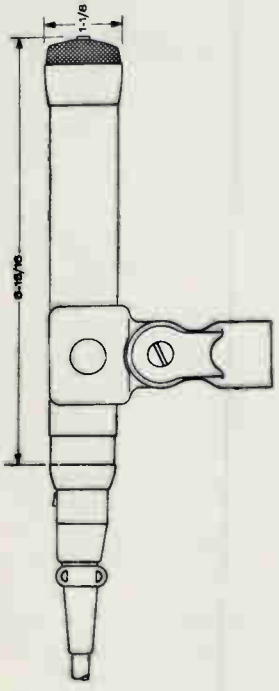


Figure 2—Dimensions

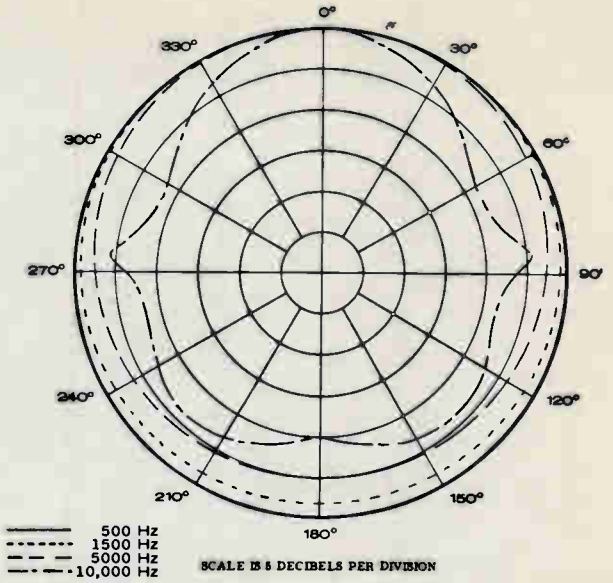


Figure 3—Polar Response

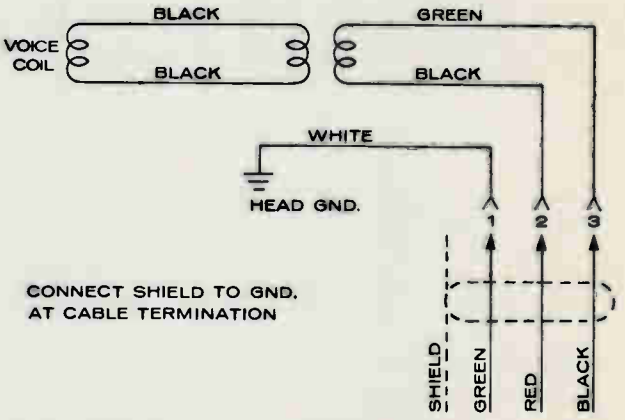
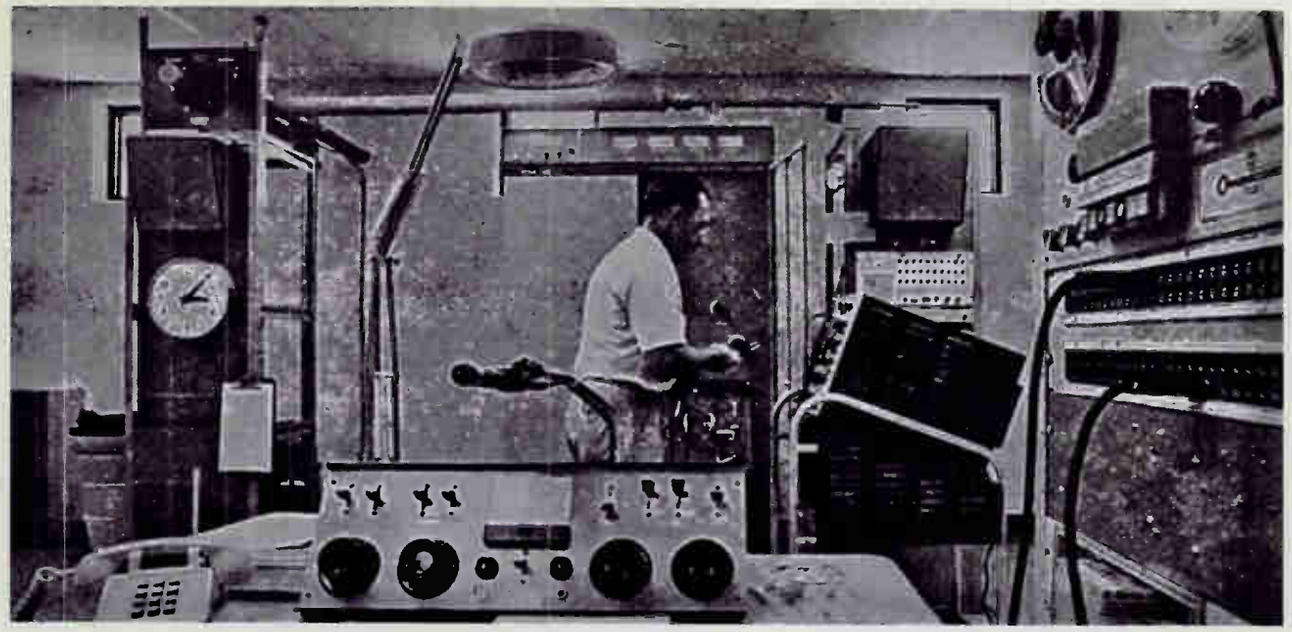


Figure 4—Wiring Diagram

ORDERING INFORMATION

Gates' G-700 Microphone 720-0268



Engineer Bert Pike keeps check on perhaps the best-equipped station in the area.

Campus Station Offers Noncommercial Radio

By WILLIAM C. FOGARTY of the PICTURES Staff

With 18 audio-modulation and 15 frequency-modulation stations in the St. Louis metropolitan area, listeners do not lack for a wide range of musical and educational choices.

Rock, soul, popular and classical music, interspersed with only a bit of news now and then, is the norm among the commercial FM stations. Not so for WSIE-FM.

College broadcasting used to be 10 watts and four hours of operation a day. WSIE, booming out at 50,000 watts for an average of 18 hours, covers 80 to 90 miles east and south and about 50 miles to the west. Above, Steve Duignan and Paul Gender (left), students, do mental combat in a game of chess.

National Public Radio (NPR), as presented by WSIE, the campus station at Southern Illinois University at Edwardsville, offers a surprising variety of programs, including international, national, regional and local news, sports, weather and in-depth informational, educational, cultural and entertainment shows.

NPR is a noncommercial network of more than 90 public radio stations. It is financed by the Corporation for Public Broadcasting — a nonprofit, nongovernmental corporation established by Congress in 1967 to promote and help finance the development of noncommercial radio and television.

WSIE-FM broadcasts at 88.7 on the band and has a power of 50,000 watts to cover an area with about 3,000,000 persons, including the St. Louis area. Fourteen thousand are SIU-E students.

Fred Criminger, general manager, has guided the station from its beginning on Sept. 4, 1970, to its present seven-day operation. He describes the format as "pretty much of a general-store approach with something for every taste.

"We play classical, yes, but not to the saturation point. We must meet mass demand — the familiar, light and melodic. We have more freedom than the commercial station in that we are not bound by sponsor preferences or dictates. Yet our very freedom is in itself a stern taskmaster."

Criminger, News Operations Manager John Harris, News Director Steve Lewis, Chief Engineer Hugh Nenninger and Station Engineer Bert Pike work with some of the fullest and finest equipment in the metropolitan area. They have 15 paid staff members, about 15 volunteers (students learning the broadcasting arts) and about 20 working on news, public affairs and sports.

Students work for a time in one area of the operation, then change to another so they will be competent to move to a commercial station upon graduation.

Area news is covered by six correspondents who report on tape. Their tapes are available to other news media in the metropolitan area and are updated about once every hour. National and international news is provided by United Press International, the UPI Audio Network and the NPR network.

An 11-man sports department, headed by Director Perry Chester, covers school, college and professional sports.

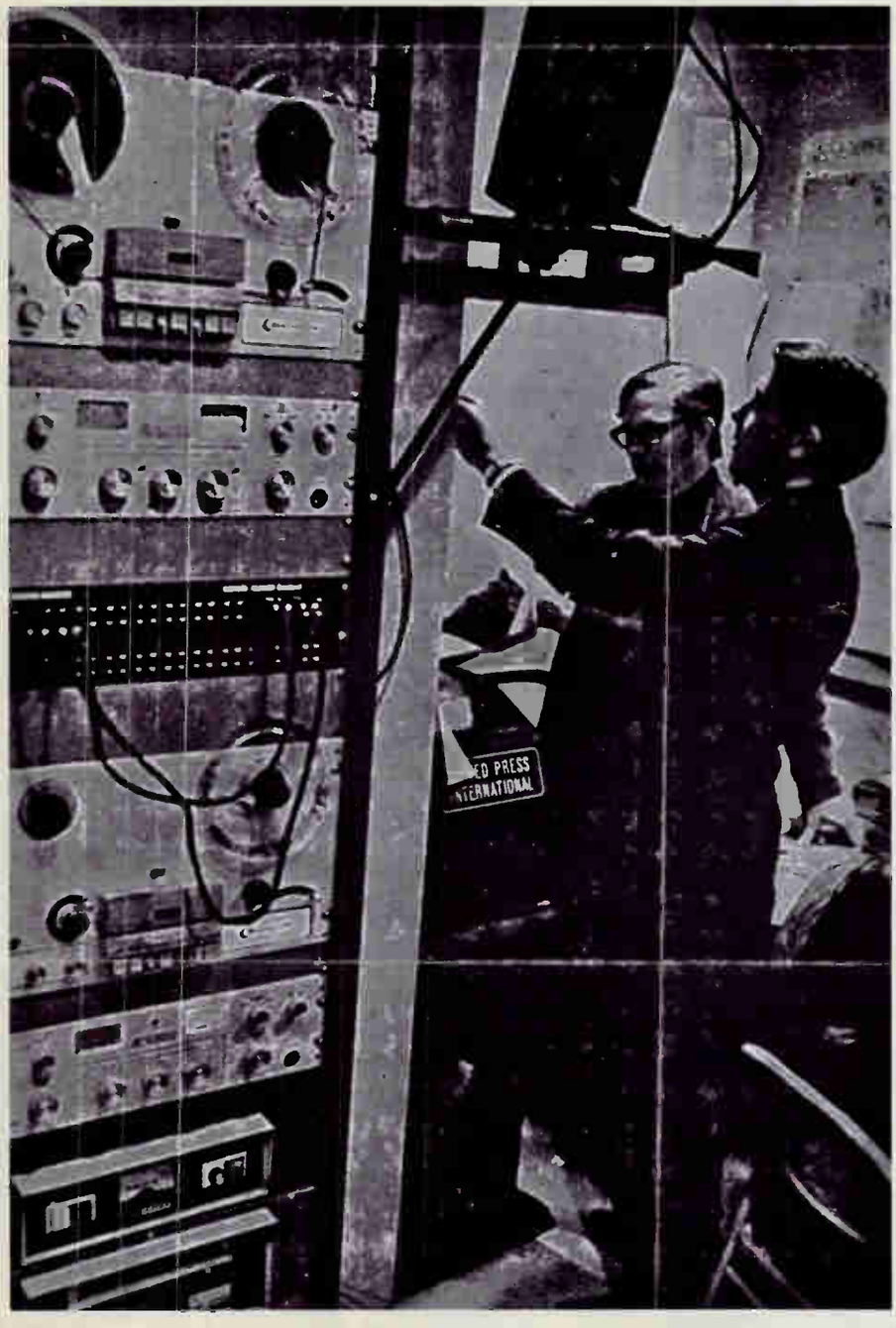
Programs other than news, weather, sports and music include farming; book reviews; interviews with nightclub, theater and film artists; law; Social Security; philosophy; language; the outdoors; billiard tips; education; consumer reports and theater reviews.

News Director Steve Lewis, a student who devotes 30 hours a week to the operation, says the faculty and student staff members are not content with the status quo, however.

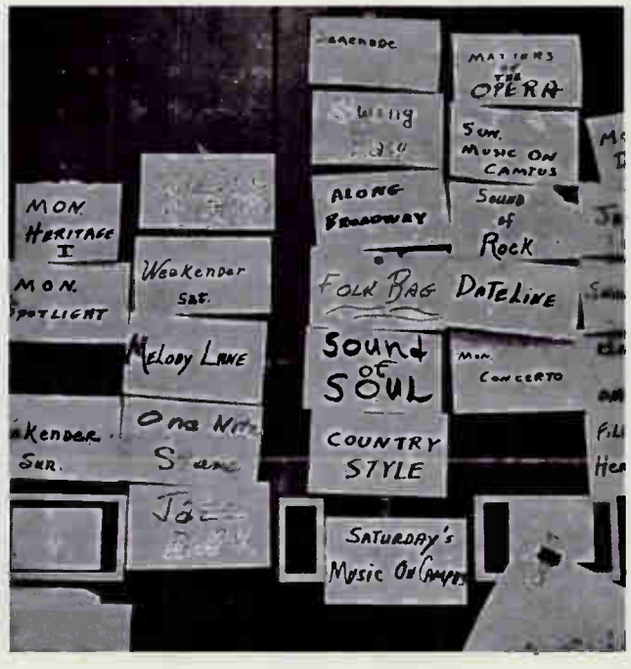
"We are going to take our own survey of listeners in about a month and a half," he said. "You can't lock into any format and sit with it. People change. Tastes change. We want to find out what our listeners like and want."

Photos by SCOTT C. DINE of the PICTURES Staff

Upper left, Stephen Lewis (background) and Steve Kinser present a news broadcast. Above, Pam Witherow, production and staff announcer, turns the knobs to activate the "Spotlight" program. Below, Steve Lewis (left) and Fred Criminger check news wire copy.



Greg McGee checks the automation system that carries WSIE's programming for about six hours a day. Automation allows greater flexibility and tighter control in programming. It also permits the use of student announcers all day, whatever their class schedules.



Program titles on the bulletin board show the diversity of the station's efforts. The programming departs from the heavy educational and cultural fare that many college radio stations have been offering listeners.

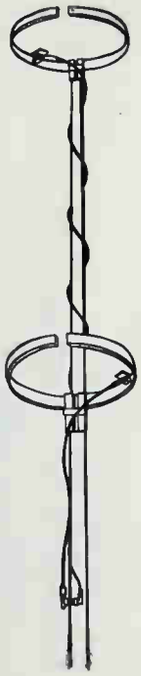
They learn from the best combo* on campus

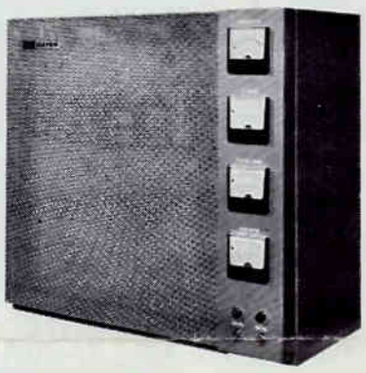
More college radio stations educate, entertain and inform students with this great Gates combo than with any other. And every semester the total grows.

Why? Because the Gates BFE-10C is specially designed—and FCC approved—for educational FM broadcasting. It features a reliable, easy-to-understand exciter with direct crystal controlled cascade modulation. And the self-contained BFE-10C is so compact it mounts easily on a wall or desk top.

Add our two-bay FM-22 omni-directional antenna with a power gain of 1.6 and you'll have more than just the best combo on campus. You'll have a station designed for the future—today!

Let's talk it over. For more information on this economical twosome, call (217) 222-8200. Or write Gates, 123 Hampshire Street, Quincy, Illinois 62301.





**Gates' 10-watt BFE-10C FM transmitter and two-bay FM-22 omni-directional antenna.*

HARRIS INTERTYPE CORPORATION

GATES

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HIGH SCHOOL RADIO STATION

School Shop

REPRINT

SEPTEMBER, 1966

Electronics instruction at this school gave the community a

Student-Operated Radio Station

By Wayne P. Lemons
Buffalo, Missouri, High School

KBFL is unusual. It is a high school noncommercial radio station—the first in Missouri and one of a handful of student-operated stations in the country. Located on the Buffalo High School campus, it's the *only* station in the town (population, 1,477).

Three years ago the school introduced a vocational-electronics training program into the curriculum. One area of concern was the need for a better method of communication between the school and the taxpayers. The idea of a radio station, one that would primarily serve the school *and* the community, was entertained. Furthermore, it would serve as a training laboratory, not only in electronics and radio-broadcast technology but also in speech, dramatics, debate, music, and other departments as well.

With all the possibilities to help students learn under more practical and demanding conditions, the school board was persuaded to apply to the Federal Communications Commission for a license to construct and operate an FM broadcast station.

Simply applying to the FCC doesn't tell the whole story. It takes the services (unless you are prepared to endure numerous delays) of a professional engineer trained in the correct procedures of applying. Even with an engineer's service it took us almost 18 months to obtain our final permit. Part of the delay was caused by the FAA (Federal Aviation Agency) not approving a proposed 165′ tower because of our proximity (about 5,500 feet off the end of one runway) to the local airport. After some months of negotiation and compromise, we ended up with a 115′ tower. Although we estimated that the extra 50 feet of tower would have increased our range by about 20 percent, we have not been disappointed by the number of homes which are able to receive our signals with good quality.

When you start talking school radio nearly everyone wonders why FM (frequency modulation 88 to 108 MHz) rather than AM (amplitude modulation 540 to 1600 kHz). There are several reasons: First, and one that overshadows all others, is that there are no noncommercial AM channels available for educational broadcasting. Second, even if AM could be obtained it is impossible to get a license for night-time operation —we wanted night-time service since the Buffalo community is sports-minded. Third, FM is virtually static-free and noise-free and, in addition, is capable of considerably higher fidelity than AM. Last, FM's range per power output is considerably greater and more reliable under all conditions than AM. For example, KBFL, with only 10 watts (that's right, 10 watts), is heard reliably up to 20 miles away and has almost solid "broadcast quality" coverage within a 10-mile radius of the station on receiving sets using only built-in antennas.

The only disadvantage of FM in our case was the lack of FM radios owned by the general public. We felt, however, that the public would purchase FM sets if they considered the programing worthwhile. We were not disappointed—during the last Christmas season alone more than 400 FM sets were sold in Buffalo stores.

Setting Up Classes

Through the assistance of the Missouri State Department of Education, we were able to set up classes in radio-broadcast technology in addition to our already established classes in basic and advanced electronics. To give the students as much help as possible and to provide both technical and programing instruction, another teacher was employed and the radio-broadcast technology was divided into two sections: one for technical instruction (control-board operation, meter reading, log keeping, tape dubbing, record care, remote-broadcast setups, etc.); and one for programing instruction (news gathering and presentation, devising new programs, disc jockeying, program log preparation, keeping disc and tape library records, etc.).

A public-service announcement is read to the community over the airways by a student, Judy Davis, while another student, Mike Lemons, takes transmitter readings. Readings must be logged each half hour. Station KBFL's transmitter, equipment, and studios are located on the high school campus.

Here the high school student, who must have at least a 3rd class FCC license endorsed for broadcast operation, "cues" a record to start a show. A favorite time spot among the students, it's referred to as "board shift."

Student Technicians

Although the students did not build or install much of the original equipment (it was done during the summer prior to granting of our final license from the FCC), they did do quite a few of the modifications and additions to the basic setup as it became necessary or desirable. For example, they built and installed a cue amplifier to listen in on remote lines without having to tie up broadcast equipment. This makes it much easier to provide clean programing up to remote broadcast time.

We have remote lines to the football field, gymnasium, field house, administration offices, and a large meeting room used for community gatherings. There is also a permanent line going to the local telephone office where it can be patched in for remote broadcasts from other cities and towns where our ball teams compete.

Electronics students also built and installed a special dual amplifier used for monitoring KBFL's signal and any

other station from which we take or feed programing. For instance, we take the weather from KTTS-FM in Springfield, Mo., by permission and we feed a daily, local newscast and a religious program to KBLR in Bolivar, Mo., 20 miles away. KBLR takes these programs directly off the air and rebroadcasts them with good quality, which tells something about what 10 watts of FM broadcast radio will do. Using stereo headphones and the dual amplifier mentioned above, the newscaster or minister knows exactly what precedes his going on the air at both KBFL and at the participating station.

In addition, the students devised special remote switching devices and operating procedures for special kinds of programs. They devised wiring harness to permit easier and faster dubbing of records and patter when doing taped shows such as the "Kiddies Hour" or "Mystery Personality Spotlight."

Announcers, Interviewers, D. J.'s . . .

All the students in radio-broadcast technology and basic and advanced electronics were required to have one duty schedule on KBFL during nonschool hours each week. Perhaps the word "required" is too strong. We seldom, if ever, had a student who needed coaxing to be on duty at any time—even overtime—during the entire school year. Some thought the students would become indifferent after the novelty of broadcasting wore off. To be sure, there were some whose enthusiasm waned a bit, but the most gratifying part was that for some students there was an actual increase in fervor as they began to feel at home among the pressures of broadcasting.

We attributed much of this increase to our policy of allowing students to develop special programs within an established but flexible format, and a definite time each week to develop a regular and "personal" program. As a matter of fact, we found that rotating of time schedules for off-duty hours, which seemed like a fair way to do it, was not nearly so satisfactory as assigning each student a specific time in the week to be on duty.

To prevent problems which might have arisen from this latter policy because, say, some student always worked on Saturday night (a big night for the teen crowd in our area), we varied the length of the duty shift according to its desirability and, as much as possible, allowed students to choose their permanent schedule. For example, the "Top Spot" show, which is a favorite of the high school listeners, is also a favorite duty for the students. This is a two and one-half hour duty assignment, while students on Sunday afternoon had only one and one-half hours duty.

KBFL is operated with only cursory adult supervision after the end of the school day; however, experience indicated that we should not allow teen-age visitors in the studio after six PM. We did allow students with licenses to share duty with the regularly scheduled operators as well as to trade duty schedules if they first obtained permission from one of the teachers and signed the program log to show the time they were in the building.

As for programs, the students produce and direct spelling bees, sports programs, uptown interviews, radio games, classroom "open house," senior biographies, science basics, music ventures, short-story reviews, even take-offs on soap opera; in fact, just about anything goes as long as it has imagination, is in good taste, and has either useful entertainment or informational content.

One of the highly gratifying things to the students is the comments they get either in person, by telephone, or in letters when they do a particularly good job or when they have shown improvement. Students, knowing they have a built-in audience, develop a deep sense of responsibility to make each program a little bit better. They learn that an "image" is important and a reality—not just something they read about. They learn firsthand that creativity is hard work and they learn to cope with the urgency of "show business with a stop watch" that radio demands.

Vocational Training for Future Jobs

Job opportunities in small radio stations are numerous throughout the country. Each student operator at KBFL must have a 3rd class FCC license endorsed for broadcast operation. This license will permit the student to routinely operate just about any of the smaller stations anywhere in the U.S.

The 3rd class license with broadcast endorsement is not difficult to obtain for the average high school boy or girl. About 95 percent of our students passed the FCC examination (40 multiple-choice questions) after studying one and one-half hours each day in the classroom for one week.

For the student really serious in entering the broadcast field, a 1st class radiotelephone FCC license and some station experience such as is provided by KBFL is almost a sure passport to a job in the broadcast industry. However, the "1st Phone" ticket is not easy to get for the high school student who must put in a lot of extra hours of study and experimentation above what can be offered in a two-hour, two-year high school course. Some students in my classes do get "2nd Phone" licenses on their first try after the basic and advanced courses are completed.

KBFL has been operating almost a year now. During that time it has developed a sizable audience of steady listeners and has become the talk of the town. We think high school radio has a bright future here . . . we think also that more and more high schools will see its merits as a practical means of taking the students closer to the world of work and parents closer to the world of education.

GATES

HARRIS COMMUNICATION TECHNOLOGY

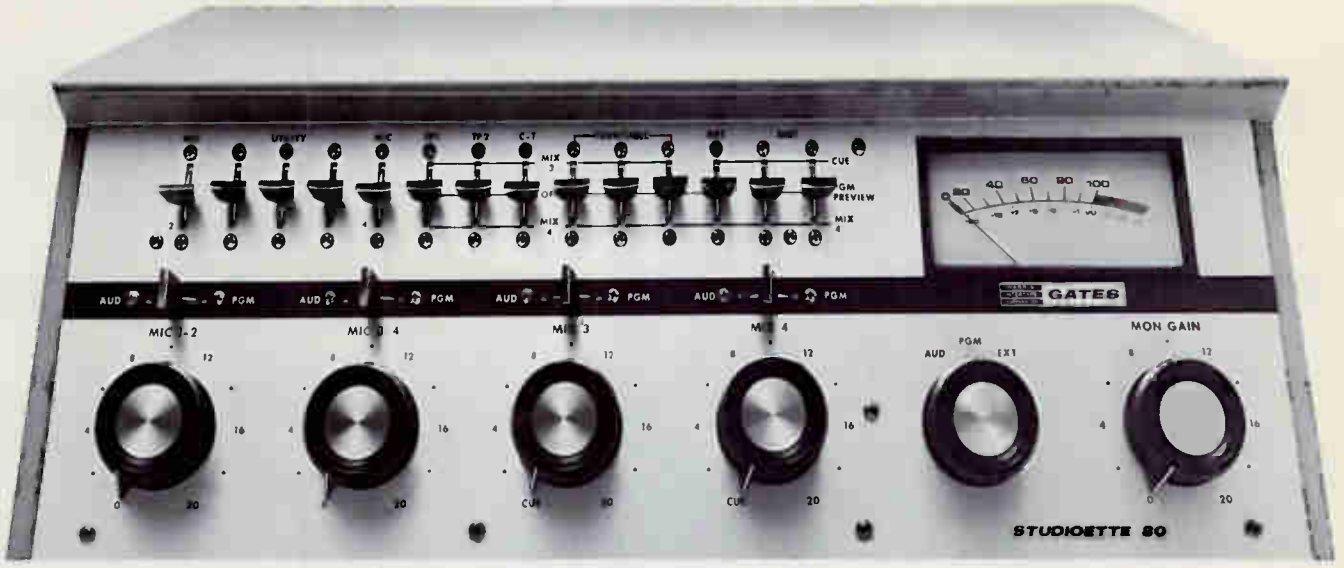
STUDIOETTE 80

Transistor 4-Channel Audio Control Console

HARRIS INTERTYPE CORPORATION

GATES
A DIVISION OF HARRIS-INTERTYPE

STUDIOETTE 80 Solid St



Features:

- All solid state . . . silicon transistors
- 13 inputs into 4 mixing channels
- Inputs and outputs have isolation transformers
- Faders are the reliable step-type attenuators
- Compact size allows portable operation
- Muting relays have shock mounting for low operating noise
- Hinged top front panel and inner chassis for ease of maintenance

A successor to Gates' famous Studioette, in use in over 1,000 radio stations, the Studioette 80 is a solid-state, four-mixer monophonic console that provides a high degree of flexibility through the use of 13 input selector switches.

Although compact in size, the Studioette 80 offers a wide range of facilities, and is ideal as a main console in medium and smaller size stations. In larger stations, the Studioette 80 will find application as a production console, or may be used for independent programming from a second studio. It is also excellent for use in mobile units and at other remote locations.

OPERATION: One of the design objectives in the engineering of the Studioette 80 was to enhance the console's versatility. Although a small console, the Studioette 80 has a great number of input facilities. It provides 4 mixing channels with channel keys and a row of 13 input keys for multiple circuit combinations. Three utility keys are provided for specialized station needs and may be wired into any input. The channel attenuators are high quality step-type controls. Channels 3 and 4 include a cue position attenuator. In addition, the inputs and outputs have isolation transformers which prevent ground loops and subsequent system problems.

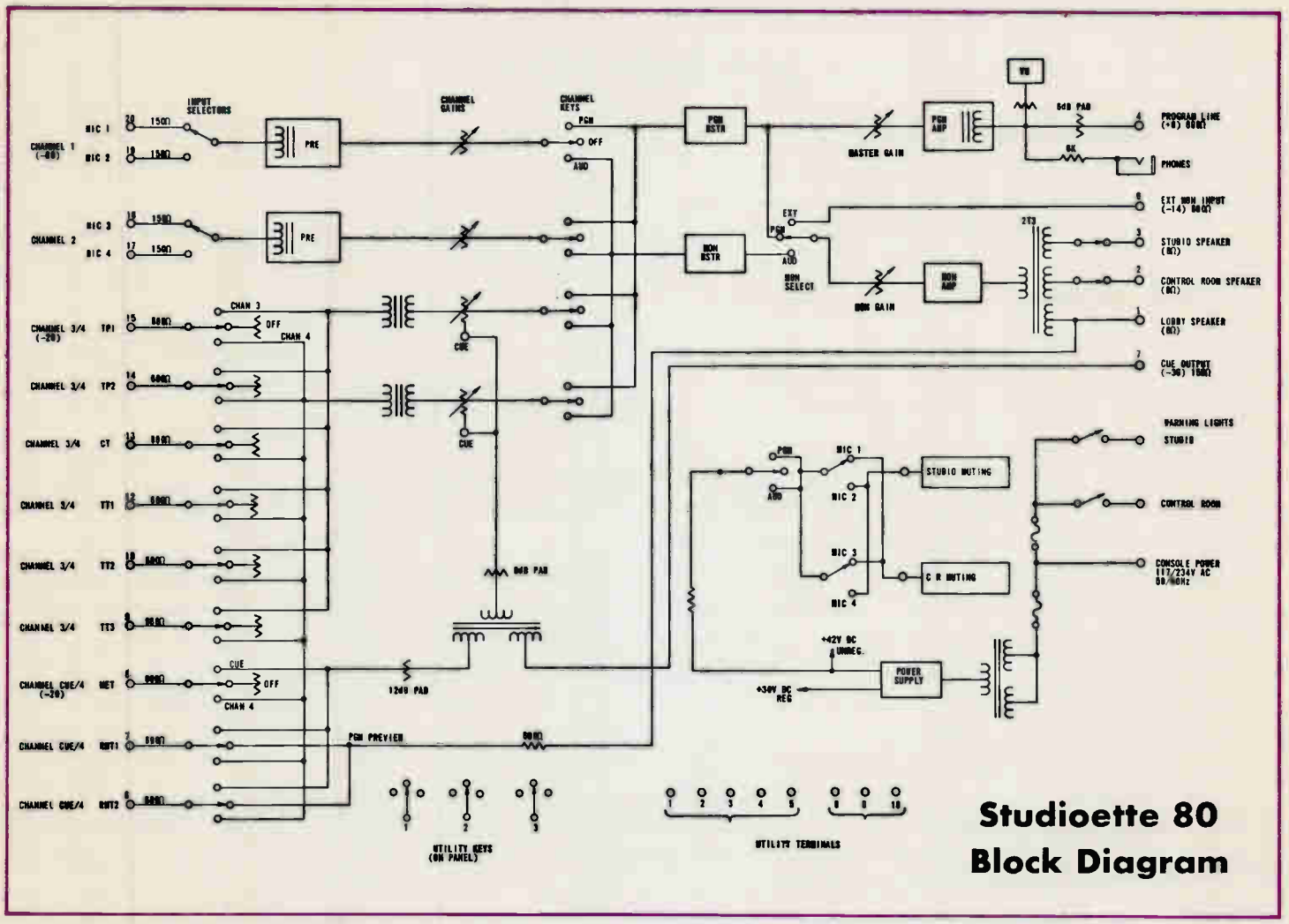
Four microphones may be key-selected into two preamplifiers. Three turntables, two reel-to-reel and one cartridge machine, two remote lines and network are also accommodated. A 10-watt monitoring amplifier, the same high-quality product found in larger Gates' consoles, is standard equipment.

MUTING SYSTEM: Dual muting relays handle speaker and warning-light functions. These relays are shock mounted on a sub-chassis to prevent mechanical noise during switching. As a protective feature, warning lights and amplifier circuitry are fused separately. These relays operate in conjunction with the microphone keys and optional muting arrangements are possible with this design.

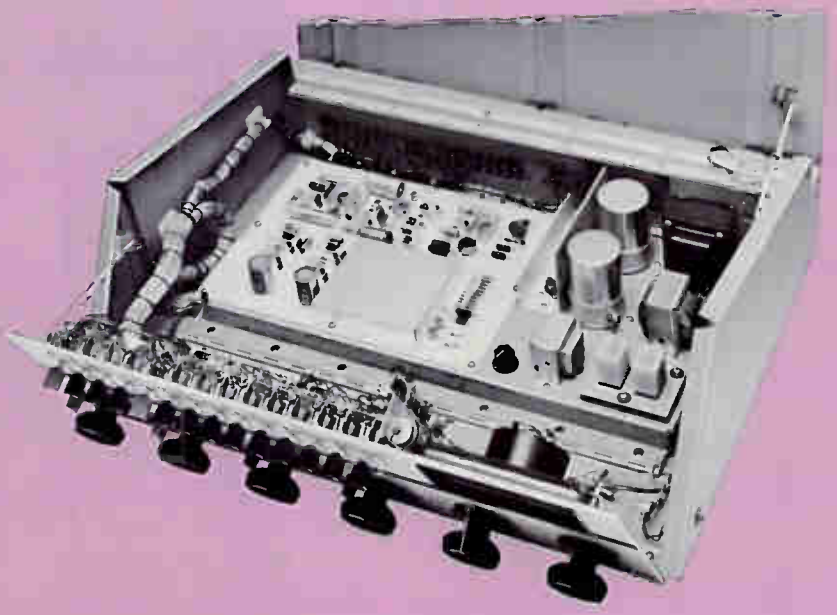
ADDITIONAL FACILITIES: A monitor- selector key switches the monitoring amplifier input to (1) program circuit, (2) terminals for an external source, and (3) audition circuit. A headphone jack is always available across the program line. The 4-inch illuminated VU meter has modern scale and bezel styling. This meter is connected to the program line, indicating +8 VU output at "0" scale reading. A special cueing amplifier/speaker system is available and can be ordered as an accessory item. The Studioette 80 is designed for 117/234 VAC, 50/60 Hz.

MECHANICAL FEATURES: Silicon transistors are used throughout the Studioette 80. Mounted in a smartly-styled, all-metal housing, the console is finished in dark-gray pebble texture. The Studioette 80, which features hinged cover and front panel for ease of maintenance, is equipped with specially designed "feel-of-the-board" VA knobs, similar to those used on Gates' larger consoles.

rate Four Channel Audio Control Console



Studioette 80 Block Diagram



Hinged top cover and front panel swing open for easy access to components

STUDIOETTE 80
Transistor Console

SPECIFICATIONS

MIXING CHANNELS: Total 4. Key selected to program or audition bus. Channels 1 and 2 for microphones, 3 and 4 for multi-input use such as turntables, tapes, etc. Cue position on faders 3 and 4.

AMPLIFIERS PROVIDED: 1 program, 1 monitor, 2 pre-amplifiers.

OPERATING MODE: Single channel monaural.

INPUT CIRCUITS: 4 microphones, 3 turntables, 2 reel-to-reel and 1 cartridge machine, 2 remote lines, 1 network line. (1 external input for the monitor amplifier).

OUTPUT LINES: 1 program, 2 muted speakers, 1 non-muted speaker, 1 cue bus for accessory amplifier/speaker.

IMPEDANCES: Microphones—30/50 or 150/250 ohms, balanced; turntable/tape/network/remote — 600 ohms, balanced. Programming output—600 ohms, balanced. Monitor speakers 8 ohms, balanced. Note: where more than 3 loudspeakers are used, see ordering information for additional transformers.

GAIN: (Maximum) Microphone input to program line output 100 dB. Turntable/tape/network (medium level) input to program line output 60 dB. All measurements ±2 dB.

RESPONSE: Program and monitor circuits ±1 dB 30 to 15,000 Hz.

DISTORTION: Program circuit 1% or less between 30-15,000 Hz at +8 dBm output level. Monitor amplifier 1% or less at 40-15,000 Hz at +40 dBm (10 watts).

NOISE: Program circuits: 70 dB or better below +18 dBm output with −50 dBm input (equivalent input noise is −120 dBm).

MONITOR CIRCUITS: More than 70 dB below +40 dBm output.

CROSSTALK: Less than 10 dB above noise level with normal control gain settings for proper programming.

POWER: 117 volts (as shipped)/234 volts, 50/60 Hz. Power consumption: 25 watts maximum.

CABINET DATA:

Size: 24" wide, 8" high, 18" deep.

Finish: Front panel—satin natural anodized aluminum with black markings. Cabinet—beige gray with pebble texture.

Weight: 46 lbs. unpacked.

SHIPPING DATA: Packed weight: (domestic) 75 lbs.; (export) 120 lbs.
Cubage: 5 cubic feet.

ORDERING INFORMATION

STUDIOETTE 80 transistor audio console	**994-6769-001**
Recommended spare parts kit (100% semi-conductors, fuses, pilot lights)	**994-6905-001**
Isolation transformer	**478-0009-000**
Monitor speaker transformers:	
For one speaker	**478-0291-000**
For three speakers	**478-0290-000**
Cueing amplifier with built-in speaker	**994-5377-001**

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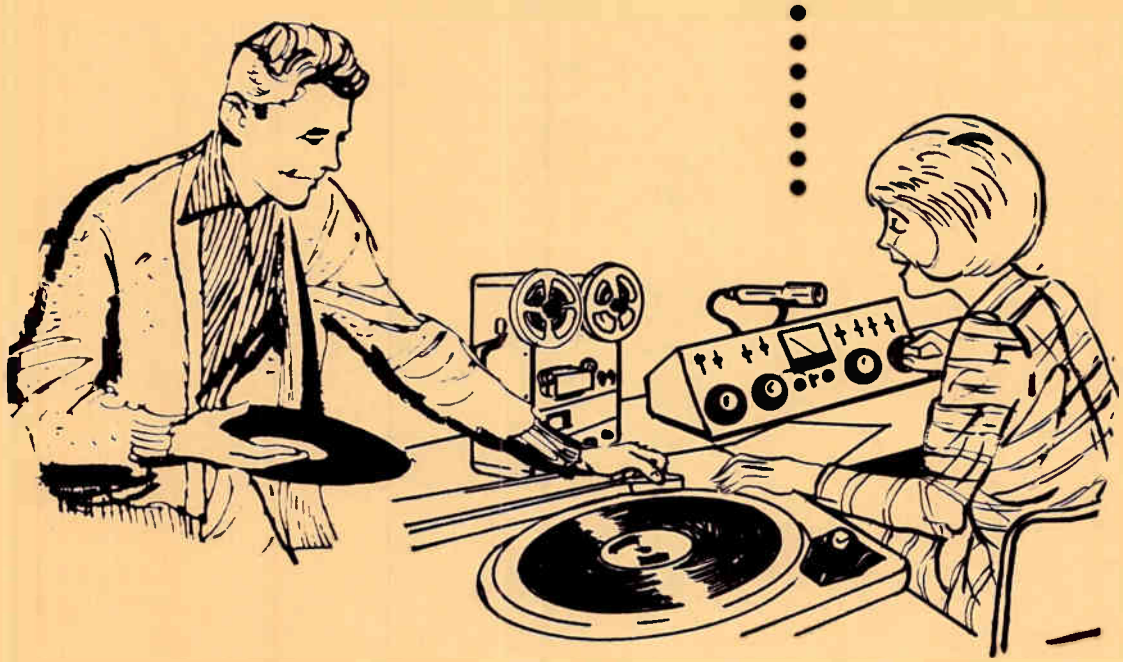
FM EDUCATIONAL BROADCASTING

A brief outline of how to establish an educational FM facility.



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STARTING A LOW POWER CLASS "D" EDUCATIONAL FM BROADCASTING SYSTEM

The FCC has reserved 20 channels in the FM broadcast band between 88.1 and 91.9 megacycles for the exclusive use of educational institutions to establish FM broadcast stations. This provision includes many hundreds of 10 watt FM stations within the United States. The following questions relating to this service represent a compilation of those most frequently asked by educators and school administrators. We have tried to provide concise, factual answers and hope that this information may be of interest and of help to you.

WHY SHOULD YOU START AN FM RADIO STATION?

Most agree that learning is more effective when theory can be put into practice. So, just as you have an orchestra, and present plays, and have laboratories for chemistry and biology, classes in radio instruction can be carried on using an actual broadcasting station as the major tool. In this way you may offer a completely practical modern course in radio broadcasting technique. Many students have great talents which could be put to use effectively in connection with radio broadcasting. They should have the opportunity to explore their talents as a disc jockey, sports announcer, newscaster, writer, producer or actor. An FM radio station would offer an opportunity for students to experience some accomplishment and see the results of their efforts. Moreover, an educational broadcasting station brings the student body and its activities closer to the community, makes full broadcast time available for the school, and establishes it as a community leader.

WHAT HAS AN FM RADIO STATION DONE FOR OTHERS?

Many educational institutions now have 10 watt FM radio stations of their own, and all appear most satisfied with the results. Many students have profited from this means of developing their talents. At the same time, schools have received recognition for the contributions the radio station makes to their communities. The students broadcast programs that present classical and jazz music, educational programs, coverage of school sporting events and other activities.

WHAT EXPERIENCE WOULD BE NECESSARY?

No professional radio station experience is required to operate a 10 watt educational FM station. To maintain and install the FM transmitter, you will need someone with a second-class radio-telephone license, which some students or staff members may already have. Or someone in your community may agree to contract for the responsibility of maintaining the equipment. None of the announcers, or disc jockeys, or other broadcasters will have to be licensed; you are merely required to have a 3rd class operator in charge of the 10 watt transmitting equipment while it is on. The 3rd class license requires no special training and may be obtained easily from your regional FCC office by anyone on the station's staff.

HOW DO YOU OBTAIN A STATION LICENSE?

In order to set up a radio station, you must apply to the U.S. Federal Communications Commission in Washington, D. C. The application form requests information such as the name and address of the applicant, the place you propose to set up the station, and a description of the equipment you intend to use. Since Gates transmitting equipment is built to meet the specifications of the FCC, all you have to do when applying is to list the model number of the transmitter. Any authorized member of the school staff can sign the application forms. You will have to fill out four copies of the FCC qualifications, and a statement of the program service, broadcasting engineering data, and some information about the antenna and site. If you want a copy of the FCC Rules and Regulations dealing with noncommercial educational FM broadcasting, you can write the Superintendent of Documents, Washington, D. C. 20402, and ask for FCC Rules and Regulations, Volume 3. When the application for a radio facility is granted, the commission issues a formal construction permit. After the transmitter is installed and tested, the formal license for operation will be issued. The frequency you applied for will be assigned to you, and Gates will adjust the transmitter at the factory prior to shipment to operate at this frequency. If you do request special call letters, they will be assigned

WOULD A 10 WATT FM STATION REPLACE A CAMPUS CARRIER CURRENT SYSTEM?

No, it would increase its flexibility because:

1. It would replace expensive telephone lines from the studio buildings to other campus buildings with direct off-the-air pickup. A receiving set can be used as program source for the carrier current transmitter in each building.
2. The studio facility now used for the carrier current station can be used to originate programs for the FM transmitter.
3. An off-the-air FM signal in addition to the AM carrier current signal provides two separate signal sources for students who now have AM/FM sets.
4. Separate programming can be provided if desired.

WHAT EQUIPMENT WILL YOU NEED FOR A 10 WATT FM STATION?

You will need three types of equipment; studio equipment, a transmitter and an antenna.

1. **Studio Equipment**—The disc jockeys and announcers normally will operate the studio equipment which includes a console, turntables, microphones, tape recorders, and remote broadcast equipment.
2. **Transmitter**—You will need a 10 watt transmitter, the equipment that transforms the audio signal put out by the studio equipment to a radio frequency signal.
3. **Antenna**—You must have a transmitting antenna mounted on an outside tower or pole. The antenna beams out the transmitter signal "on-the-air" to your audience.

Because of the low transmitter power, the physical size of the equipment is small and is easy to handle. Adjustments are few and easy to make.

HOW MUCH WOULD THIS TECHNICAL EQUIPMENT COST?

A studio can be equipped with console, turntables, speakers, cabinets, microphones and stands, and the necessary accessories for about $2500. You can get a 10 watt FM transmitter, together with a set of spare tubes, extra crystal and oven, and the necessary transmitting antenna equipment (less supporting structure) for about $1850. A complete radio station can be set up for about $4,500 for technical equipment plus additional costs for supplementary equipment, legal fees, building or renovation which might be necessary. In several schools this money has been raised by student fund-raising campaigns. Of course, if your school already has the studio equipment, then all you would need is the 10 watt transmitter and antenna. So you see, a 10 watt transmitter educational FM broadcast station can be established very economically.

HOW ABOUT OPERATING COSTS?

Many schools, some of them operating seven days a week for several hours a day, operate on a budget of about $2500 a year. In many places, this operating budget comes directly from the school board or student activities. You can line up outside financial support, and this has been done in several places.

Further information on operating the educational FM station may be obtained from Gates Radio Company, Quincy, Illinois.

Also, for additional information you may wish to write to the **Intercollegiate Broadcasting System,** Bethlehem, Pennsylvania.

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CRITERION 80 TAPE CARTRIDGE SYSTEM. All solid state. Direct capstan drive comparable to finest reel-to-reel machines. Speed accuracy of 0.2%. No tape skewing. Superb fidelity.

PROFESSIONAL MICROPHONES. Models available with specifications and quality approved by Gates to meet the particular types of service required in studio and remote broadcasting.

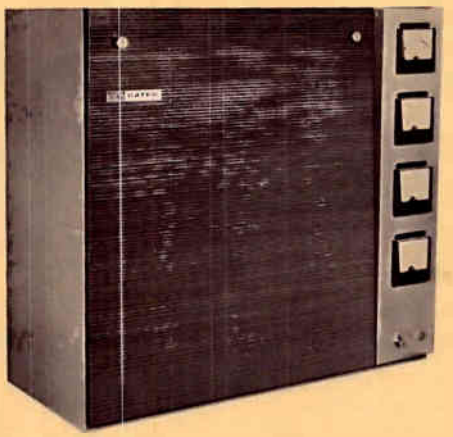
SENTRY II STUDIO MONITOR SYSTEM. Loudspeaker system permits precise monitoring and equalization uncolored by monitor speakers. Quality hardwood cabinet, ready for finishing. Neutral cane grill cloth.

For your every need look to Gates... world leader in radio broadcast equipment

Write for complete information on these Gates products or for other specific equipment and accessories — transmitters, studio consoles and remote amplifiers, tape recorders and remote control units. Or ask for our complete 10-watt educational FM broadcast station proposal.

SINGLE-RING FM ANTENNA. Omni-directional antenna with power gain of 0.8 dB. is designed especially for educational broadcasting, as is the FM-22 two-ring antenna with a power gain of 1.6 dB.

STUDIOETTE FOUR-CHANNEL CONSOLETTE. A single-channel monophonic consolette with 13 inputs into four mixing channels. Attractive, compact. The popular choice of educational broadcasters.



FM TRANSMITTERS. Gates has consistently offered the most complete line of low-powered, wide-band FM transmitters . . . especially designed for educational broadcasting. 10-watt BFE-10C, 50-watt BFE-50C and 50-watt BFR-50C

TRANSCRIPTION EQUIPMENT. Gates 12" and 16" turntables achieve new lows in rumble, wow and flutter—without sacrificing quick cue. Have unique inner-hub drive, smooth-as-silk speed change. High quality tone arms, preamps and cartridges also available, plus handsome walnut formica cabinets.

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GATES

GATES RADIO COMPANY
QUINCY, ILLINOIS 62301, U.S.A.
A division of Harris-Intertype Corporation

CP-1M-271

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to the station, if available. Licenses are issued for three year periods, and can be renewed regularly after that. You will have to give public notice that you are filing for application by running an advertisement in the local newspaper.

WHAT RECORDS WOULD YOU HAVE TO MAINTAIN?

The records required are relatively simple to maintain and of a routine nature. These consist of application, ownership reports, and Program, Operating, and Maintenance Logs. In the Program Log you will have to keep an entry of the time each station identification announcement is made together with a brief description of each program broadcast.

In the Operating Log you will have to enter the time the station begins to supply power to the antenna and the time it stops, together with any interruption of the carrier wave, transmitter signal and its duration.

In the Maintenance Log the licensed second class operator would make notations of operating frequency checks and any adjustments, and repairs made to the transmitting equipment.

You will have to keep these logs for two years, and make them available to any authorized representative of the Federal Communications Commission.

WHAT PROGRAMS COULD YOU BROADCAST?

Your station will be able to transmit programs directed to specific schools In connection with the regular courses and routine and administrative material, and can transmit educational, cultural, and entertainment programs to the public. You will not be required to operate on a regular broadcast schedule, and no minimum number of hours of operation is specified.

There are four basic program sources:

1. "Live" programming—the broadcast of material as it happens. Mostly, this will be the voice of the studio announcer.
2. "Packaged" public service programs are recorded on disc or tape and are available from many sources such as:
   - Federal and State Government Agencies
   - Foreign Broadcasting Services
   - Intercollegiate Broadcasting Service
   - National Association of Educational Broadcasters
   - Other educational institutions and foundations
3. Recorded music on commercially available records and tape will provide the bulk of your musical material.
4. You can record your own program material from campus activities, interviews, lectures and musical events.

Of course, all of these sources can and should be combined to provide the most interesting programming for your audience.

COULD YOU COVER SCHOOL SPORTING EVENTS?

We are all familiar with the live, on-the-air description of sporting events by commercial radio stations. The educational FM station can provide this type of coverage for school athletics.

Events away as well as those on the campus can be covered through the use of telephone lines. Your local telephone company can provide complete information and costs for this activity, which is a normal telephone service.

In addition to football, basketball and baseball, other sporting events such as swimming, track, wrestling, etc. can also be covered.

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PRODUCT INFORMATION BULLETIN

G-700 MICROPHONE

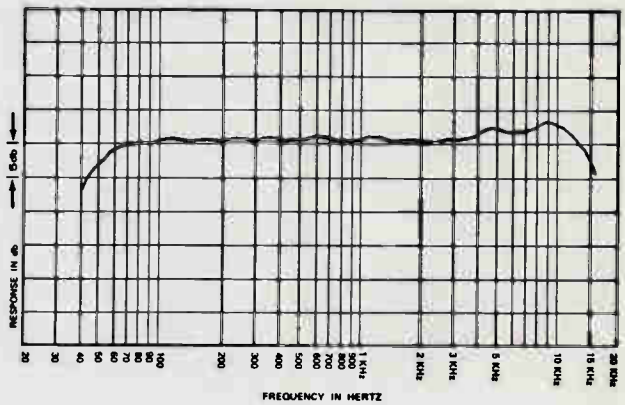


Figure 1—Frequency Response

DESCRIPTION AND APPLICATIONS

The Gates Model G-700 is a dynamic, omnidirectional type microphone designed for professional use, FM, AM, and TV broadcasting, studio remote, PA, and recording. Its slim design is made possible without the necessity for closely associated auxiliary equipment. Wide frequency response, broad pickup range, and light weight make it ideal for TV staging and for pass-around use in audience participation. Used with the convenient accessory neckcord, the G-700 is ideal for lavalier use. This microphone can be worked from any direction with only negligible frequency discrimination.

The Model G-700 is supplied with a lavalier neckcord and the Model 300 stand adapter; thus, it can be used with equal convenience in the hand, on a stand, or as a lavalier.

This microphone features a diaphragm which permits smooth response over a wide frequency range and withstands high humidity, temperature extremes, corrosive effects of salt air, and severe mechanical shocks. It is practically indestructible with normal use.

The case of the Model G-700 is extruded aluminum, reinforced at the connector end by a steel insert. This rugged construction makes possible dependable operation under all conceivable operating conditions. The microphone is finished in nonreflecting gray.

SPECIFICATIONS

Type:	Dynamic
Frequency Response:	Uniform 50 – 15,000 Hz
Polar Pattern:	Omnidirectional, becoming slightly directional with increase in frequency
Output Level:	−57 dB (0 dB = 1 mw/10 dynes/cm^2)
EIA Sensitivity Rating:	−151 dB
Impedance:	Matches all low impedances, 50 through 250 ohms. Line balanced to ground and phased.
Magnetic Circuit:	Alnico V in nonwelded circuit
Cable Connector:	Cannon XLR-3-11
Finish:	Nonreflecting gray
Case Material:	Extruded Aluminum
Dimensions:	6-15/16" x 1-1/8" dia.
Net Weight:	7 ounces without cable
Cable:	18', 3-conductor, shielded, synthetic rubber-jacketed, broadcast type
Accessories:	Model 300 stand clamp (adapts to ½" or 5/8"–27 thread) and lavalier neckcord.

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The microphone shall be an omnidirectional, dynamic type with uniform response from 50 to 15,000 Hz. The diaphragm shall have a magnetic shield to prevent dirt and magnetic particles from reaching the diaphragm. The microphone shall match all standard low impedances, 50 through 250 ohms. Line shall be balanced to ground and phased.

The output level shall be −57 dB with 0 dB equalling 1 mw/10 dynes/cm². EIA sensitivity rating shall be −151 dB. The magnetic circuit shall be nonwelded and shall employ an Alnico V magnet.

The case shall be extruded aluminum. The microphone shall have a diameter of 1-1/8-inches, a length of 6-15/16-inches, and a net weight of 7 ounces, less cable. Finish shall be nonreflecting gray. An 18-foot, three-conductor, shielded, synthetic rubber-jacketed broadcast type cable shall be provided. Built-in cable connector shall be a Cannon XLR-3-11 or equivalent.

The microphone shall be equipped with a stand clamp with ½-inch pipe thread, a 5/8"−27 thread adapter, and a lavalier neckcord. The Gates Model G-700 is specified.

WARRANTY

The Model G-700, like all Gates professional microphones, is guaranteed unconditionally against malfunction for one year from date of purchase. Within this period, Gates will, at its option, repair or replace any G-700 exhibiting any malfunction, regardless of cause, including accidental abuse. This warranty does not cover finish or appearance. In addition, the model G-700 is guaranteed for its life against defects in the original workmanship and materials, and will be repaired or replaced at no charge if exhibiting malfunction from this cause. Microphones for warranty repair must be shipped prepaid to Gates Radio Company, Quincy, Illinois

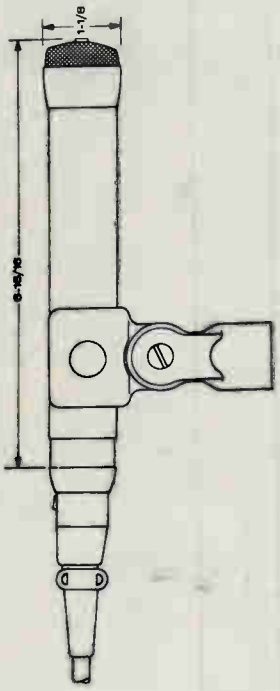


Figure 2–Dimensions

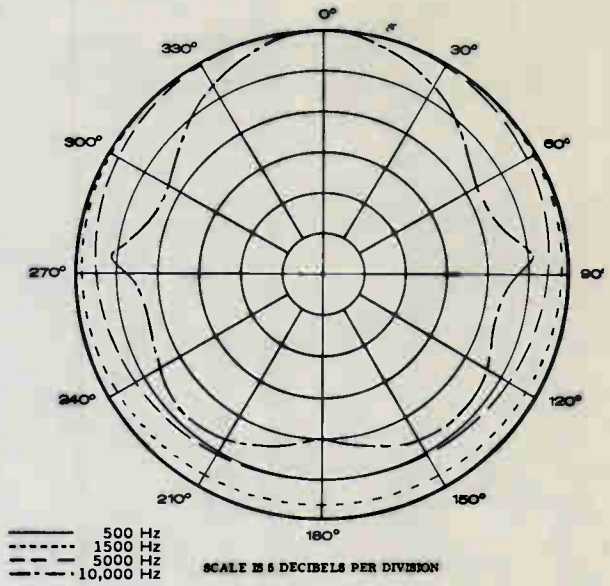


Figure 3–Polar Response

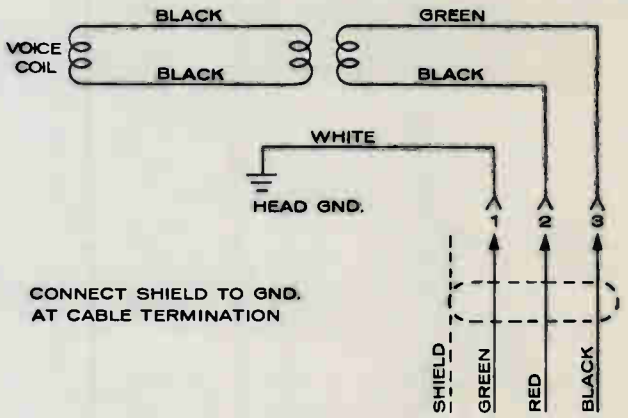


Figure 4–Wiring Diagram

ORDERING INFORMATION

Gates' G-700 Microphone 720-0268

GATES DIVISION
HARRIS-INTERTYPE CORPORATION
123 HAMPSHIRE STREET • QUINCY, ILLINOIS 62301 U.S.A.

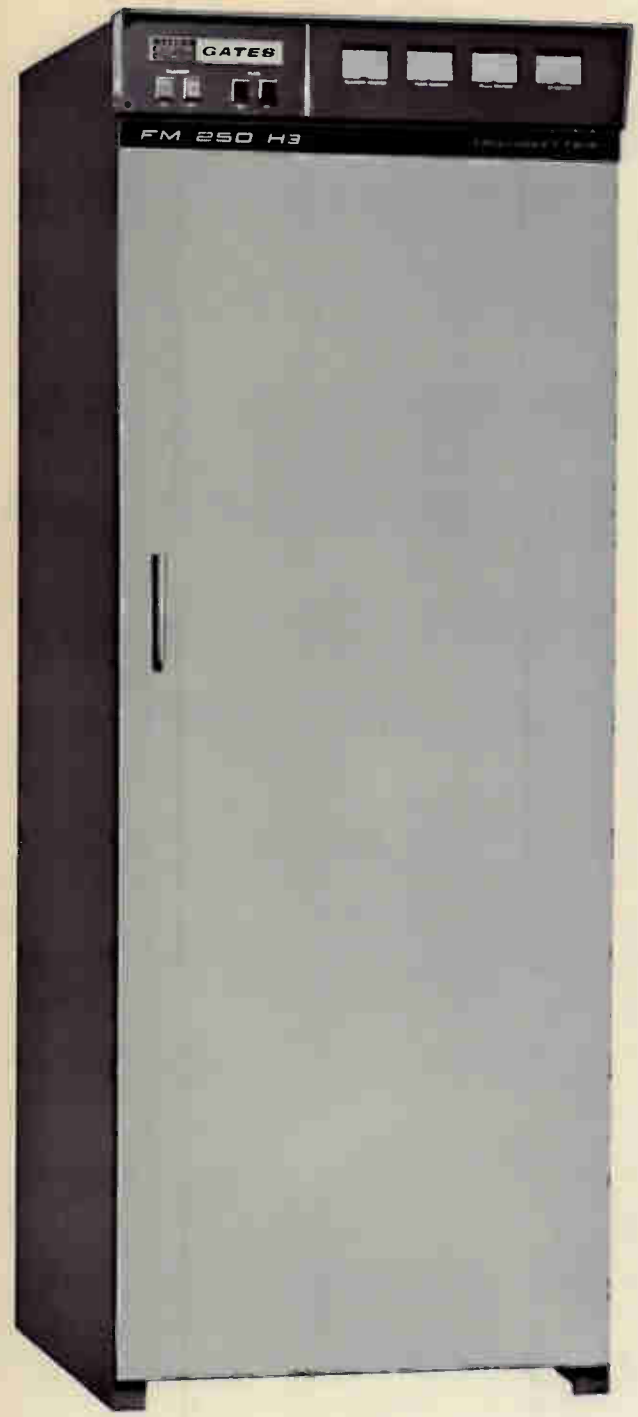
HARRIS-INTERTYPE CORPORATION

GATES

Product Information Bulletin

FM-250H3 250 WATT FM TRANSMITTER

Solid-state design in the FM-250H3 makes possible only one tube for a power output of 250 watts. The transmitter incorporates Gates' new TE-3 solid-state exciter having Digital Automatic Frequency Control and Direct Carrier FM, both pioneered by Gates. With unexcelled stability and DCFM, the FM-250H3 offers the finest in monaural and stereophonic transmission. The complete features of this economical transmitter are . . .



- Conservatively rated, the 4CX250B power tube in the final amplifier is driven by the TE-3 Exciter, and easily delivers a full 250 watts. Both exciter and amplifier are simple and stable in their operation.

- The TE-3 Exciter has design and engineering advancements not found in conventional equipment. Employing Digital AFC and DCFM, this 10-watt exciter has frequency stability unmatched in FM broadcasting today. The most advanced and proven solid-state devices guarantee the TE-3's reliability. An alarm circuit coupled to the Digital AFC will actuate a warning light and turn off the transmitter in the event of a carrier frequency maladjustment.

- The transmitter can be equipped for stereo and/or SCA operation at any time within minutes. Gates' unique modular design of the TE-3 Exciter makes this possible with plug-in units.

- A harmonic filter is contained within the transmitter cabinet as standard equipment. Harmonics are attenuated well below FCC requirements.

- Automatic recycling protects the solid-state high-voltage power supply during periods of momentary overload. This is a feature seldom provided in transmitters of this power output.

- Remote control connections are built in, including a motor-driven control to vary power output. No external components are necessary if the FM-250H3 is used with a Gates remote control system.

- Key operating conditions are monitored continuously by four meters. "ON-OFF" functions for the filament and plate voltages are controlled by two sets of lighted pushbuttons at the top left of the transmitter.

- Power output and standing wave ratio can be read directly by a built-in VSWR meter. This is standard equipment with the transmitter.

SOLID STATE STEREO GENERATOR

Broadcasters who install an FM-250H3 with Gates stereo will recognize the superior results. Separation of 35 dB minimum from 30 Hz to 15 kHz assures truest possible stereo transmission. This optimum channel separation by Gates is due to the exclusive direct carrier frequency modulation (DCFM) as carrier generation and modulation take place "on frequency."

SOLID STATE SCA

The optional 41 kHz or 67 kHz SCA modules are pre-aligned at the Gates factory and can be installed in the exciter within a matter of minutes for instant "on air" service.

Gates engineers in developing "DCFM" achieved a substantial improvement in SCA performance. Crosstalk from main channel is virtually eliminated.

SPECIFICATIONS

GENERAL:

POWER OUTPUT: 250 watts.
FREQUENCY RANGE: 87.5 to 108 MHz, tuned to specified operating frequency.
RF OUTPUT IMPEDANCE: 50 ohms.
OUTPUT TERMINATION: Type N receptacle.
FREQUENCY STABILITY: .001% or better.
TYPE OF MODULATION: Direct Carrier Frequency Modulation.
MODULATION CAPABILITY: ±100 Hz.
AC INPUT POWER: 115 volts, 60 Hz, 950 watts (approximate).
RF HARMONICS: Suppression meets all FCC requirements.
POWER SUPPLY RECTIFIERS: Silicon.
ALTITUDE: 7500 feet.
AMBIENT TEMPERATURE RANGE: −20°C to +45°C.
MAXIMUM VSWR: 1.7 to 1.
OVERALL CABINET SIZE: 24" W. x 70" H x 26½" D.
FRONT DOOR SWING: 24".
FINISH: Two-tone, beige-gray.
WEIGHT & CUBAGE: Export: 1140 lbs. Domestic 510 lbs. 70 cu. ft.

MONAURAL MODE:

AUDIO INPUT IMPEDANCE: 600 ohms balanced.
AUDIO INPUT LEVEL: +10 dBm ±2 dB for 100% modulation at 400 Hz.
AUDIO FREQUENCY RESPONSE: Standard 75 microsecond, FCC preemphasis curve ±1 dB, 30-15,000 Hz.
DISTORTION: 0.5% or less, 30-15,000 Hz.
FM NOISE: 65 dB below 100% modulation (ref. 400 Hz).
AM NOISE: 50 dB below reference carrier AM modulation 100%.

STEREOPHONIC MODE:

PILOT OSCILLATOR: Crystal controlled.
PILOT STABILITY: 19 kHz ±1 Hz.
AUDIO INPUT IMPEDANCE: 600 ohms balanced.
AUDIO INPUT LEVEL: (left and right) +10 dBm ±1 dB for 100% modulation at 400 Hz.
AUDIO FREQUENCY RESPONSE: (left and right) Standard 75 microsecond, FCC preemphasis curve ±1 dB, 50-15,000 Hz.
DISTORTION: (left or right) 1% or less, 50-15,000 Hz.
FM NOISE: (left or right) 60 dB minimum below 100% modulation, reference 400 Hz.
STEREO SEPARATION: 35 dB minimum 50-15,000 Hz.
SUB-CARRIER SUPPRESSION: 42 dB below 90% modulation.
CROSSTALK: (main to sub-channel or sub-to main channel) 42 dB below 90% modulation.

SCA SPECIFICATIONS:

FREQUENCY STABILITY: ±500 Hz.
FREQUENCY: Between 25 and 75 kHz.
OSCILLATOR TYPE: Two colpitts heterodyned to produce desired output frequency.
MODULATION: Direct FM.
MODULATION CAPABILITY: ±7.5 kHz.
AUDIO INPUT IMPEDANCE: 600 ohms balanced.
AUDIO INPUT LEVEL: +8 dBm, ±3 dB for 100% modulation at 400 Hz.
AUDIO FREQUENCY RESPONSE: 41 kHz and 67 kHz, 50 microsecond, modified preemphasis. 67 kHz response modified for proper operation when used with stereo to conform to FCC specifications.
DISTORTION: Less than 1.5% 30-7000 Hz.
FM NOISE: (main channel not modulated) 55 dB minimum (ref. 100% modulation 400 Hz).
CROSSTALK: (sub-channel to main channel): −60 dB or better.
CROSSTALK: (main channel to sub-channel): 50 dB below 100% modulation (ref. 400 Hz).
AUTOMATIC MUTE LEVEL: Variable from 0 to −40 dB below 100% modulation.

ORDERING INFORMATION

FM-250H3 250 watt FM broadcast transmitter with TE-3 exciter	994-6739
Spare tube 4CX250B	374-0081

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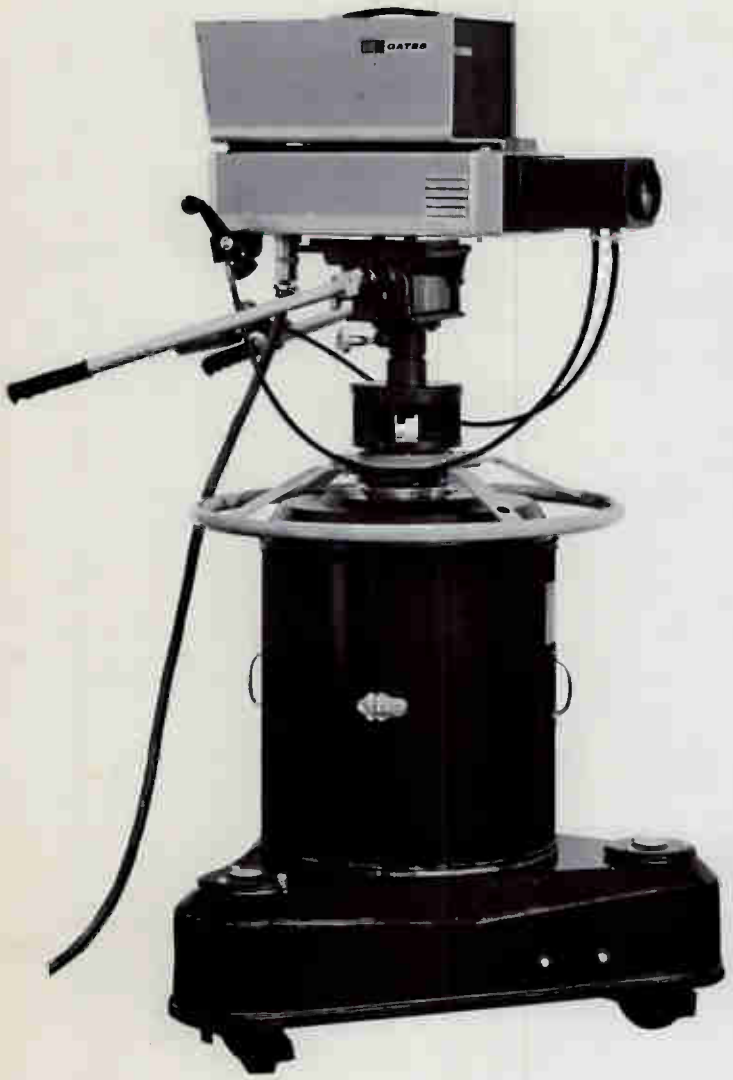
HARRIS
GATES DIVISION
Harris-Intertype Corporation

TE-201
Live Color
TV Camera

TELEVISION

HARRIS
Communications and Information Handling

Gates' TE-201 Live Colo



The Gates TE-201 live color television camera offers a unique combination of complete broadcast quality performance, ease of operation, lifetime economy, and great versatility, all in a lightweight, compact unit.

The TE-201's excellent color fidelity, color matching capability, and all-around low-light-level performance fit it admirably to broadcast applications. Wherever optimum picture quality is required, with moderate investment and long-term economy, the TE-201 can serve broadcasters, remote producers, production firms, CATV originators, and educational, medical, and industrial users.

The TE-201 meets all EIA and FCC broadcast standards when used with an NTSC encoder such as the Gates TV-115. The camera will also operate on 625 line, 50 field PAL or SECAM standards when used with an appropriate encoder.

Picture Quality, Color Fidelity: In picture quality and color fidelity, the TE-201 offers "big camera" performance from numerous state-of-the art design advances.

The outstanding colorimetry of the TE-201 results from many design features. Among these are built-in fixed color masking, a unique AGC (gated white pulse feedback loop) system between the preamplifiers and the processor to maintain color balance, adjustable gamma tracking, separate mesh lead oxide pickup tubes in all three channels, an extended-red tube in the red channel, computer-optimized circuit design, a relay type, dust-sealed optical package, and tight quality control of optical elements. These features also contribute to consistent colorimetry between cameras for fast, easy color matching.

Extremely "clean" pictures result from the use of advanced preamplifiers, which are comparable in quality to those used in "big" live cameras. System signal-to-noise ratio is 48 dB, and advanced first stage design eliminates the high peaker control.

The preamplifiers also are designed to accommodate 500% of normal level, to eliminate overload streaking.

Crisp, sharp picture detail: This is assured by self-contained, phaseless horizontal aperture correction circuits. Noise-clipping is used to keep aperture correction subjectively noise-free.

Printed circuit yokes, which are held to tight tolerances, and all-around circuit stability, provide the TE-201 with precise, stable registration. The subtractive registration technique, thoroughly proven in hundreds of live and film broadcast color cameras, is employed for simple, fast, and accurate registration.

Flare compensation circuits maintain the TE-201's blacks even under extremes of contrast as duty cycle changes.

FEATURES

- **"Big camera" broadcast picture quality and color fidelity, in a compact, 40 lb. unit.**
- **Outstanding low-light-level capability—unequaled signal-to-lag performance.**
- **Long-term stability assures performance economy.**
- **Simple operation—all electrical controls at camera control unit.**
- **Fast, economical maintenance from neat circuit layout, plug-in modules, rear-load pickup tubes.**
- **Camera, lens, viewfinder weigh only 40 pounds—viewfinder unlocks and detaches in seconds—lightweight camera cable.**

TE-201 Specifications

(Continued)

Gamma Correction: Continuously variable from unity to a slope ratio of 10 to 1 for precise gray scale tracking.

Aperture Correction: A self-contained phaseless horizontal aperture corrector with noise clipping is provided. Optional two line vertical aperture corrector with comb filter and noise clipping is available.

Registration: Within 0.15% of picture height in a circle within a diameter of 80% of picture height; 0.3% of picture height in a circle with a diameter of picture width.

Registration Method: Subtractive signal registration.

Viewfinder: 8″ (203 mm), diagonal dimension. Controls for contrast, brightness. Detachable from camera.

Intercom: Amplifiers provided. Dynamic microphone used with balanced party line. Each station has adjustable side tone and level.

SERVICE CONDITIONS

Ambient Temperature: —20°C to +40°C (—4°F to +104°F).

Ambient Humidity Range: 0 to 95% relative humidity.

Altitude: Sea level to 10,000 ft. (305 meters).

ELECTRICAL

AC Input Power: 95—130 Volts, 60 Hz. (50 Hz available with optional alternate transformer; other voltages available on special order.)

AC Power Consumption: Camera, 100 watts; viewfinder, 50 watts.

DIMENSIONS

Camera Head (with lens, without viewfinder): 9″ (230 mm) W x 5½″ H (140 mm) x 25″ (635 mm) L. Weight: 25 lbs. (11.3 kg).

Viewfinder: 9″ (230 mm) W x 8″ (200 mm) H x 16″ (410 mm) L. Weight: 15 lbs. (6.8 kg). Removable.

Camera Control Unit: 19″ (480 mm) W x 5¼″ (133 mm) H x 22″ (560 mm) L. Weight: 18 lbs. (8.2 kg).

Local Control Panel: 19″ (480 mm) W x 1¾″ (44 mm) H.

Rectifier Panel: 19″ (480 mm) W x 5¼″ (133 mm) H x 9″ (230 mm) L. Weight: 25 lbs. (11.3 kg).

Camera Cable: 0.68″ (17.3 mm) outside diameter. Weight: ¼ lb. (.11 kg.) per linear ft. 50 conductors, including 6 coaxial cables.

Ordering Information

TE-201 basic color camera, including camera head (less lens and tubes), control drawer, interconnection panel, interconnection harness, local control panel, rectifier panel, viewfinder 994-7200

TK-716 broadcast grade tube set including (1) XQ-1070 green, (1) XQ-1070 blue, and (1) XQ-1073 extended red 990-0716

TK-715 intermediate grade tube set including (1) XQ-1071 green, (1) XQ-1071 blue, and (1) XQ-1074 extended red 994-0715

Zoom lens, 15-150 mm, f/2.8 (max.), with remote iris, manual zoom and focus 938-7000

Zoom lens, 20-200 mm, f/2.1 (max.) with remote iris, manual zoom and focus 938-6619

TV-115 NTSC encoder, with built-in color bar generator 994-7210

Extender board for TV-115 952-7240

Camera cable, 50′—(also available in 100, 150 & 200 ft. lengths) 928-1146

Single headset 721-0076

Service engineering checkout available.

GATES DIVISION

HARRIS-INTERTYPE CORPORATION

123 HAMPSHIRE STREET • QUINCY, ILLINOIS 62301 U.S.A.

r Television Camera . . . Top Color Per

Operating Simplicity—With all TE-201 electrical operating controls at the camera control unit, the cameraman has only to frame, focus, and compose the picture. The zoom lens control is at right, the focusing control at left. Viewfinder brightness and contrast controls are set in under the viewfinder. At top is the viewfinder carrying handle.

The TE-201's excellent gray scale tracking is facilitated by the use of a single null meter, at the camera control unit, which sets black and white balance on each channel to within 0.5%.

The use of lead oxide pickup tubes in all three channels restricts extreme highlights from "blooming" to many times their normal size, as can happen with certain other types of pickup tubes.

The three lead oxide pickup tubes are all the separate mesh type, for flatter field and improved resolution.

The camera cable is immunized against interference pickup from electrical equipment by differential amplifiers for each channel as the first stage of the processor.

Outstanding Low-light-level Capability: The TE-201 offers incomparable all-around low-light-level capability. The camera's excellent sensitivity is made usable by its industry-leading signal-to-lag ratio, its high signal-to-noise ratio, and its color balance at all gain settings. These features enhance the camera's performance at all light levels.

The TE-201 provides full video for usable pictures at less than 10 foot candles, in the 4X gain maximum sensitivity mode, with an f/2.1 lens.

A single switch control selects 1X, 2X, or 4X gain sensitivity modes, and automatically maintains correct color balance at all light levels with no other adjustment required.

The TE-201's high signal-to-noise ratio of 48 dB, under normal lighting, remains proportionally high as camera sensitivity is increased for low-light-level operation. Noise is continually suppressed, for a cleaner, more usable picture.

The TE-201's industry-leading lag performance makes a 10-foot-candle picture usable even on fast sports action. In the 4X gain mode, the green channel signal-to-lag ratio is 32 dB. Image reduction on the red and blue tubes closely matches this figure, for minimal, balanced lag performance.

Long-term Stability: The TE-201's long-term, built-in stability assures both consistent performance and operating economy extending over the life of the camera. Numerous state-of-the-art design features contribute to stability.

Color balance stability is maintained by a unique automatic gain control system (gated white pulse feedback loop) between the preamplifiers and the processor. A calibrated reference white signal is injected into the preamplifiers during the vertical blank-

ormance, Great Operating Economy

ing interval. The processor senses this signal, and automatically adjusts the gain of the system accordingly.

V-Interval Keyed Clamp: With this circuit, noise appearing during horizontal blanking is restricted from shifting black level reference. This design feature immunizes the system to noise by a factor of 20 to 1 or more.

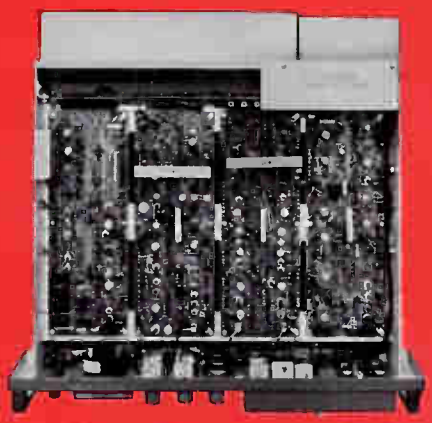
Most DC voltages in the camera are regulated three times before they are used. Linear integrated circuits are used throughout the system, permitting negative feedback loops to render circuit groups more stable and linear. Class A/B amplifiers with stabilizing feedback are used for all sweep circuitry.

Pickup tube filament voltage is regulated for stable tube performance and longer tube life. Further assurance of stable operation results from regulation of focus current to within one-tenth of one per cent.

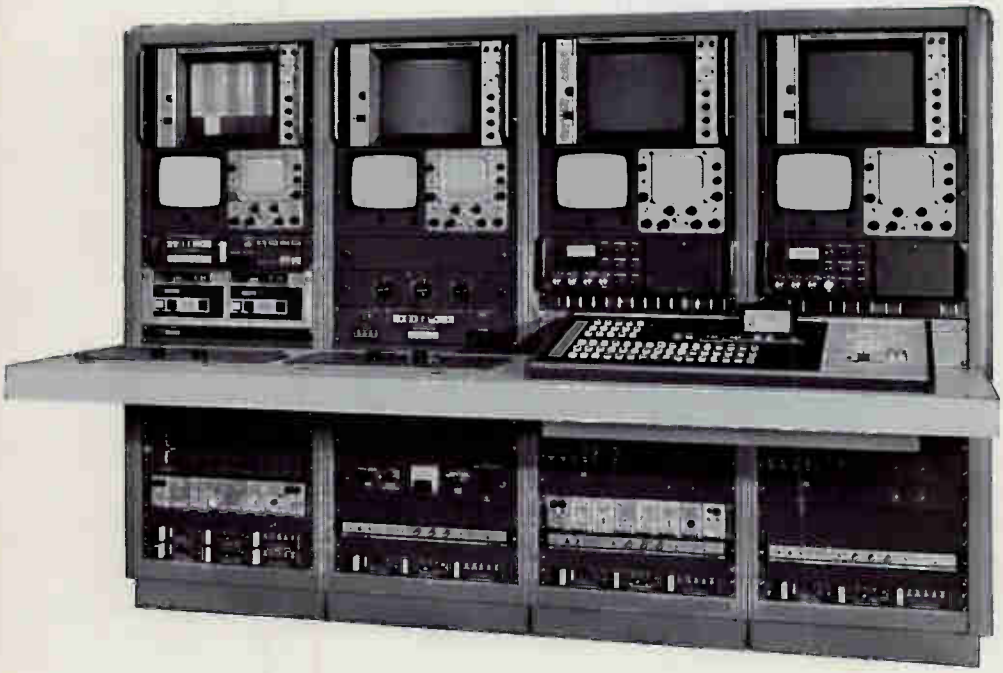
Operating Economy: The TE-201's unusual operating simplicity releases technical manpower for other assignments, and over the camera's life can add up to major savings. Non-technical personnel can easily operate the TE-201. At the camera head are only lens zoom and focus controls (besides viewfinder brightness and contrast). All electrical operating controls, such as iris (servo), master blanking and sensitivity, are at the camera control unit.

The camera's stability is so excellent that normally only the white levels and black levels on each channel need be set daily. This is done using a simple null meter, in six steps, in contrast to the 20 to 30 steps required for cameras without the TE-201's stability.

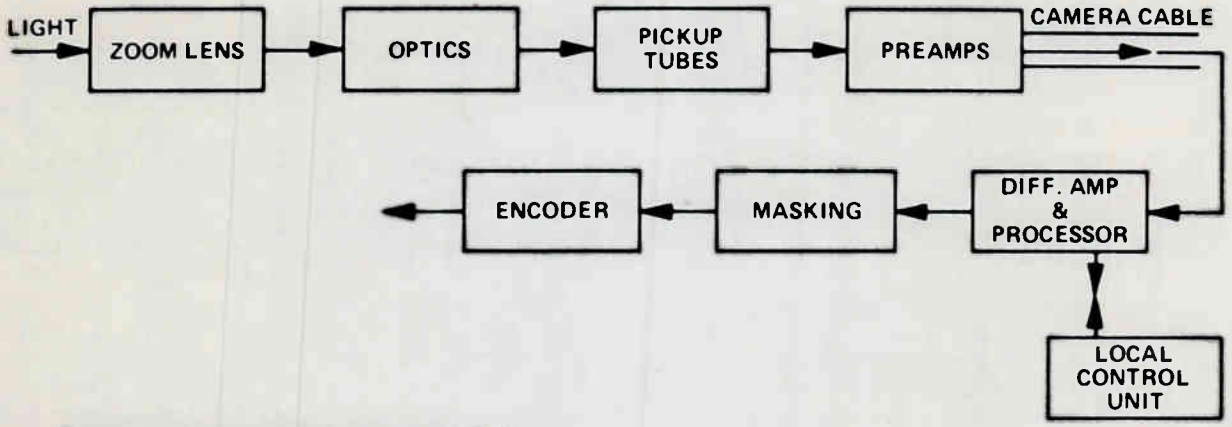
Operating Controls—The local control panel, with master blanking and iris (servo) controls is at top. The camera control unit is below, showing the null meter for simple daily checkout of black and white levels on each channel.



Maximum Access—The camera control unit extends out on its rack slides, and may be swung up on for 90-degree presentation and immediate access to either the top circuit boards (shown), or those on the bottom.



Typical Rack Installation—Rack equipment for two TE-201 cameras in a typical custom installation. The camera control units are mounted in the two right-hand short racks; the local control panels are set into the custom desk mount top.



TE-201 camera system functional flow diagram, including accessory encoder.

As noted under low-light-level performance, color balance is automatically maintained with gain sensitivity setting changes, with no other adjustments required.

Execution of the complete setup procedure is normally required only every several weeks, due to the TE-201's inherent stability.

Maintenance Economy: Contributing further to the lifetime economy of the TE-201 is its ease of servicing and maintenance. The total 40-pound weight of camera head, zoom lens, and viewfinder simplifies handling for maintenance.

The detachable 15-pound viewfinder unlocks and slides off in seconds, for easy portability, or maintenance without disabling the camera. Circuit boards are laid out neatly, with easy accessibility to all components.

All circuit modules, all integrated circuits, and most transistors are plug-in. All three pickup tubes can be changed quickly and easily from the rear in a few minutes without disturbing the yokes or the optics.

The entire camera control unit drawer extends out on its rack slides, and swings to present either the top or the bottom of the unit at 90 degrees, for fast access to all boards.

TE-201 Specifications

System Standards: NTSC. PAL and SECAM standards with appropriate encoder.

Scanning Standards: 525 lines, 60 fields, or 625 lines, 50 fields.

Signal Outputs: Red, blue, green, each 0.7 Volts into 75 ohms.

Signal Inputs: H drive, V drive, blanking, sync and sub-carrier.

Geometric Distortion: No point will depart more than 1% of picture height from its true position on the face of the camera pickup tubes.

Focus Current Regulation: ±0.1%

Signal-to-noise Ratio: 48 dB with 4.2 MHz bandwidth.

Sensitivity: 85 foot-candles (850 lux) for 100% video, at 48 dB signal-to-noise ratio, in 1X gain sensitivity mode with lens at f/2.8 and typical tubes. Less than 10 foot-candles (100 lux) for usable pictures in 4X gain sensitivity mode, with f/2.1 lens. Less than 20 foot-candles (200 lux) for usable picture in 4X gain sensitivity mode, with f/2.8 lens.

Signal-to-lag Ratio: 45 dB, green channel, in 1X gain mode. 32 dB, green channel, in 4X mode, peak to peak signal current to peak to peak decay lag current, measured without gamma correction at 200 milliseconds with typical tube. Image reduction of 4 to 1 is employed on the red and blue tubes for close balance with green.

Horizontal Resolution: 500 lines.

Masker: Included in the video processors, with fixed coefficients.

HARRIS INTERTYPE CORPORATION

GATES RADIO COMPANY

A DIVISION OF HARRIS-INTERTYPE CORPORATION

123 HAMPSHIRE STREET • QUINCY, ILLINOIS 62301 • 217-222-8200

January 25, 1972

Mr. Glenn Petersen
161 East Goebel Drive
Lombard, Illinois 60148

Dear Mr. Petersen:

Thank you for your inquiry requesting information on Gates Executive Console.

You can use regular tape decks with the Executive Console as these inputs can be as low as -20 dB. When you order your transmitter and antenna you should give the frequency because both pieces of equipment are tuned and tested on the customer's frequency. You can pick your equipment up at the factory, if you choose. Enclosed are brochures on the FM-22A and Executive.

For further information, may I suggest you contact our District Manager for your area, Mr. Robert Gorjance, whose card is attached. He will be glad to help you with your planning. If I may be of further service, please feel free to write or call.

Cordially yours,

Rolland O. Looper

Rolland O. Looper
Broadcast Sales Specialist

ROL:cs
Enc

cc: R. Gorjance

HARRIS INTERTYPE CORPORATION

HARRIS-INTERTYPE CORPORATION

GATES DIVISION: 123 HAMPSHIRE STREET • QUINCY, ILLINOIS 62301 • 217-222-8200

October 20, 1972

Mr. Glenn C. Petersen
161 East Goebel Drive
Lombard, Illinois 60148

Dear Mr. Petersen:

Thank you for your request for information and pricing on Gates equipment for an educational radio facility.

Enclosed are brochures on various Gates products and a typical proposal for a 10 watt station. This listing is simply an equipment guide which may be altered according to your requirements.

There would be no additional cost for the installation of the stereo generator - other than the cost of the generator itself, which is priced at $1,890.00.

The Criterion 80 recorded tapes will play on machines of a different make as long as all machines are mono and are built to NAB Standards.

For further information, may I suggest you contact our District Manager for your area, Bob Gorjance, whose card is attached. Bob will be happy to discuss your equipment requirements.

If I can be of further assistance, please feel free to contact me at any time.

Cordially yours,

Rolland O. Looper

Rolland O. Looper
Broadcast Sales Specialist

ROL:mh
encs

cc: Bob Gorjance

HARRIS INTERTYPE CORPORATION

GATES
A DIVISION OF HARRIS-INTERTYPE

Product Information Bulletin

4-CHANNEL TRANSISTOR AUDIO CONSOLE

STUDIOETTE 80

A successor to Gates' famous Studioette, in use in over 1,000 radio stations, the Studioette 80 is a solid-state, four-mixer monophonic console that provides a high degree of flexibility through the use of 13 input selector switches.

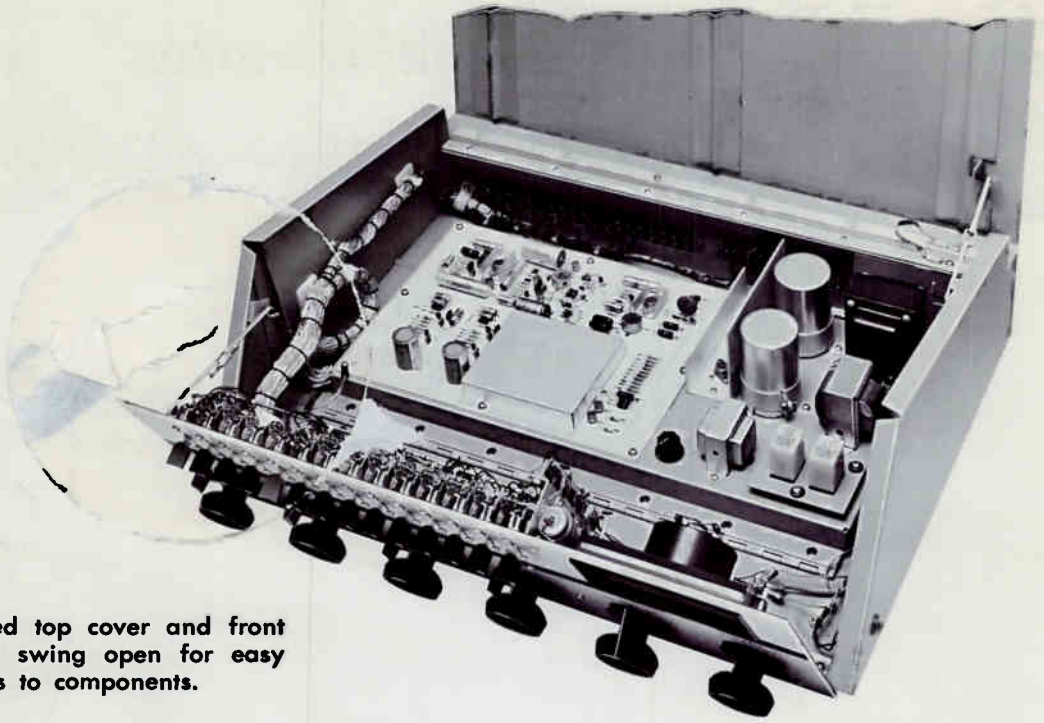
Although compact in size, the Studioette 80 offers a wide range of facilities, and is ideal as a main console in medium and smaller-size stations. In larger stations, the Studioette 80 will find application as a production console, or may be used for independent programming from a second studio. It is also excellent for use in mobile units and at other remote locations.

OPERATION: One of the design objectives in the engineering of the Studioette 80 was to enhance the console's versatility. Although a small console, the Studioette 80 has a great number of input facilities. It provides 4 mixing channels with channel keys and a row of 13 input keys for multiple circuit combinations. Three utility keys are provided for specialized station needs and may be wired into any input. The channel attenuators are high quality step-type controls. Channels 3 and 4 include a cue position attenuator. In addition, the inputs and outputs have isolation transformers which prevent ground loops and subsequent system problems.

Four microphones may be key-selected into two preamplifiers. Three turntables, two reel-to-reel and one cartridge machine, two remote lines and network are also accommodated. A 10-watt monitoring amplifier, the same high-quality product found in larger Gates' consoles, is standard equipment.

ADDITIONAL FACILITIES: A monitor-selector key switches the monitoring amplifier input to: (1) program circuit, (2) terminals for an external source, and (3) audition circuit. A headphone jack is always available across the program line. The 4-inch illuminated VU meter has modern scale and bezel styling. This meter is connected to the program line, indicating +8 VU output at "0" scale reading. A special cueing amplifier/speaker system is available and can be ordered as an accessory item. The Studioette 80 is designed for 117/234 VAC, 50/60 Hz.

MECHANICAL FEATURES: Silicon transistors are used throughout the Studioette 80. Mounted in a smartly-styled, all-metal housing, the console is finished in dark-gray pebble texture. The Studioette 80, which features hinged cover and front panel for ease of maintenance, is equipped with specially designed "feel-of-the-board" VA knobs, similar to those used on Gates' larger consoles.



Hinged top cover and front panel swing open for easy access to components.

Studioette 80 Transistor Console

SPECIFICATIONS

MIXING CHANNELS: Total 4. Key selected to program or audition bus. Channels 1 and 2 for microphones, 3 and 4 for multi-input use such as turntables, tapes, etc: Cue position on faders 3 and 4.

AMPLIFIERS PROVIDED: 1 program, 1 monitor, 2 preamplifiers.

OPERATING MODE: Single channel monaural.

INPUT CIRCUITS: 4 microphones, 3 turntables, 2 reel-to-reel and 1 cartridge machine, 2 remote lines, 1 network line. (1 external input for the monitor amplifier).

OUTPUT LINES: 1 program, 2 muted speakers, 1 non-muted speaker, 1 cue bus for accessory amplifier/speaker.

IMPEDANCES: Microphones —30/50 or 150/250 ohms, balanced; turntable/tape/network/remote—600 ohms balanced. Programming output 600 ohms, balanced. Monitor speakers 8 ohms, balanced. Note: where more than 3 loudspeakers are used, see ordering information for additional transformers.

GAIN: (Maximum) Microphone input to program line output, 100 dB. Turntable/tape/network (medium level) input to program line output 60 dB. All measurements ±2 dB.

RESPONSE: Program and monitor circuits ±1 dB 30 to 15,000 Hz.

DISTORTION: Program circuit 1% or less between 30-15,000 Hz at +8 dBm ouput level. Monitor amplifier 1% or less at 40-15,000 Hz at +40 dBm (10 watts).

NOISE: Program circuits: 70 dB or better below +18 dBm output with −50 dBm input (equivalent input noise is −120 dBm.)

MONITOR CIRCUITS: More than 70 dB below +40 dBm output.

CROSSTALK: Less than 10 dB above noise level with normal control gain settings for proper programming.

POWER: 117 volts (as shipped)/234 volts, 50/60 Hz. Power consumption: 25 watts maximum.

CABINET DATA: Size: 24" wide, 8" high, 18" deep. Finish: Front panel—satin natural anodized aluminum with black markings. Cabinet—beige-gray with pebble texture. Weight: 46 pounds, unpacked.

SHIPPING DATA: Packed weight: (domestic) 75 lbs.; (export) 120 lbs. Cubage: 5 cubic feet.

ORDERING INFORMATION

Studioette 80 transistor audio console	994-6769-001
Recommended spare parts kit (100% semi-conductors, fuses, pilot lights)	994-6905-001
Isolation transformer	478-0009-000
Monitor speaker tranformers:	
For one speaker	478-0291-000
For three speakers	478-0290-000
Cueing amplifier with built-in speaker	994-5377-001

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123 HAMPSHIRE ST. · QUINCY, ILLINOIS · 62301 · U.S.A.

CP 1M-1071

ADV. 307

COMPLETE TUNE UP PROCEDURE

The M6095 Exciter Unit may be completely tuned to operating frequency by using a 20,000 ohms/volt voltmeter similar to a Simpson Model 260. The Exciter should tune to any frequency from 88 to 108 Mc without changing any tuned circuit component. This may be accomplished from the front of the panel by using the test points provided. These test points are labeled TP101 through TP123. Test points TP122 and TP123 are black and are connected to chassis ground. All voltage readings are with reference to these two black test points and test points TP101 through TP121 which are white. Black test point TP122 is located on the upper left hand side of the Exciter and TP123 is located on the lower right hand portion of the Exciter.

Tune-up of the Exciter is expedited by referring to overall schematic 852 5774 001, functional block diagram 837 9534 001 and typical test point voltages included at the end of the Instruction Book.

STEP #1

Assuming the Exciter is properly wired and all tubes are in place, 117 V. a.c. should be connected to TB101-7 and 8. S101, main power switch for the Exciter, should be in the "OFF" position. A jumper should be connected from TB101-7 to TB101-9 and another jumper from TB101-8 and TB101-10. These jumpers provide 117V. a.c. for the crystal oven. An alternate method is to connect a separate line cord to TB101-9 and 10. A jumper should be connected between TB101-5 and 6. This provides positive voltage for power amplifier stage V115. An ammeter may be connected here later to measure plate current of V115. Until the final stage V113 has been properly tuned up, R161 should be turned completely counterclockwise. This reduces screen voltage so that V115 will not over dissipate.

STEP #2

Place the negative probe of a voltmeter in TP122 or TP123 and the positive probe in TP121. Turn S101 "ON" and after the tubes have warmed up for about 30 seconds, set voltage adjust control R182 so that the voltmeter reads +320 volts.

If tubes fail to light, check main power fuse F101. Its value is 1.5 amperes, "slo-blo" variety.

Crystal oven light A101 should be lit. If not, check F102, the oven fuse. Its value should be .125 amperes. The crystal oven circuit works independently of S101. After 117V. a.c. has been applied to the crystal oven circuit for about 30 minutes, the oven light A101 should start cycling which indicates that the oven thermostat is operating properly.

In all of the following steps, it is assumed that one of the voltmeter leads is inserted in either TP122 or TP123. These are chassis ground.

STEP #3

Place voltmeter probe into TP101. If the crystal and associated circuitry of V101 are operating properly, a negative voltage of about -27 volts will be observed. If the crystal oscillator stage is not operating properly, the voltage at TP101 will be zero. Should the first section of V102 be dead, zero will be observed at TP101, also.

STEP #4

Place voltmeter probe into TP102. Proper operating voltage at this point is about +12 volts. This voltage will be about +29 volts, if stages ahead of TP102 are not operating properly.

STEP #5

Place voltmeter probe into TP103. Proper operating voltage at this point is around +1 volt. Should a previous stage fail, voltage at TP103 will rise to about 1.5 volts. If the first section of V104 is dead, voltage at TP103 will rise to about 1.5 volts.

STEP #6

Place voltmeter probe into TP104. Proper operating voltage at this point is about a negative 4 volts. A failure of V101 through V104 will cause this voltage to drop to zero. If the first section of V105 goes dead, this voltage will rise to about +3 volts.

STEP #7

Place voltmeter probe into TP105. Proper operating voltage at this point is about +9 volts. If the stage prior to TP105 fails this voltage will rise to about +15 volts. This voltage will also rise to about +15 volts if the first section of V106 is dead.

STEP #8

Place the voltmeter probe into TP106. Proper operating voltage at this point is a negative 36 volts. This voltage measurement is due to drive developing bias at the grid of V107, the first multiplier stage. A failure of V101 through V106 will cause this voltage to drop to zero. It will also drop to zero if V107 goes dead.

STEP #9

Place voltmeter probe into TP107. This test point is located in the plate circuit of V107. V107 triples crystal frequency to a range of .3 to .375 Mc. Now tune L101 for a rise in voltage reading. A 5 to 10 volt variation should be noted. Now tune L102 for a dip in meter reading. This will be very slight. Retune L101 for a rise in the meter reading. When operating properly, the voltage at TP107 will be about 70 volts. If drive to V107 fails, voltage

at TP107 will drop to about 30 volts. If V107 is dead, full plate supply voltage of 320 volts will be observed at TP107.

STEP #10

Place the negative probe of the voltmeter into TP108. Tune L103 for a peak reading. Now, momentarily, place the positive probe of the voltmeter into TP109 and tune L104 for a peak reading.

Return the negative probe of the voltmeter to TP108 with the positive probe connected to a black test point. Now tune L101, L102 and L103 for a peak in meter reading in the order mentioned. Repeat this adjustment again. Voltage at TP108 should be about -2 volts. Failure of any stage V101 through V108 will cause this reading to drop to zero.

When tuning of L101, L102 and L103 has been completed, the slugs of these 3 coils should all be about the same distance out. Maximum inductance of these coils occurs while the slug is still 1/4 to 3/8 of an inch out. If the adjustment screws of these coils are screwed down tight, maximum inductance will have been passed.

STEP #11

Place the positive probe of the voltmeter into TP109. This test point is located in the plate circuit of V108 which is a frequency doubler stage. Frequency range of this stage is .61 to .75 Mc or 6 times crystal frequency. Tune L104 for a peak reading. Now tune L105 for a dip in the voltmeter reading.

Temporarily place the voltmeter probe in TP110 and tune L106 for a peak meter reading.

Return the voltmeter probe to TP109 and tune L105 for a dip in meter reading. Retune L104 for a peak in the meter reading.

When the L104 and L105 are properly tuned, voltage at TP109 will be about 55 volts. If drive should fail, voltage will drop to about 35 volts. If V108 goes dead, 320 volts will be noted at TP109.

STEP #12

Place the positive probe of the voltmeter into TP110. This test point is located in the plate circuit of V109 a frequency tripler stage. Frequency range of this stage is from 1.83 to 2.25 Mc or 18 times crystal frequency. Tune L106 for a peak in the voltmeter reading. Tune L107 for a dip in the voltmeter reading. Momentarily move the voltmeter probe to TP111 and tune L108 for a peak in voltmeter reading.

Return the voltmeter probe to TP110 and retune L107 for a dip in the voltmeter reading.

Now retune L106 for a peak in the voltmeter reading.

When properly tuned, voltage at TP110 will be about 75 volts.

Failure of drive to V109 will cause this voltage to drop to about 30 volts. If V109 fails, full plate voltage of 320 volts will be observed at TP110.

STEP #13

Place the positive probe of the voltmeter into TP111. This test point is located in the plate circuit of V110, a frequency doubler stage. Frequency range of this stage is 3.66 to 4.5 Mc or 36 times crystal frequency. Tune L108 for a peak meter reading. Tune L109 for a dip in the meter reading. Momentarily move the voltmeter probe to TP112 and tune L110 for a peak in the reading. This variation will just barely be noticeable.

Return the voltmeter probe to TP111 and tune L109 for a dip in the meter reading. Retune L108 for a peak in the meter reading. Proper voltage at TP111 is about 70 volts. Failure of drive will cause this voltage to drop to about 40 volts. If V110 goes dead, 320 V. will be observed at TP111.

STEP #14

Place the positive probe of the voltmeter into TP112. This test point is located in the plate circuit of V111. V111 is a frequency tripler stage. Frequency range of this stage is 11 to 13.5 Mc or 108 times crystal frequency. Tune L110 for a peak in the voltmeter reading. This peak will be very sharp and very slight.

Momentarily move the voltmeter probe to TP115 and tune L111 for a dip in the meter reading. Now tune L112 for a peak meter reading. Retune L111 for a dip in the meter reading.

Return the voltmeter probe to TP112 and return L110 for a peak meter reading.

Proper voltage at this point is about 130 volts. Failure of drive will cause this voltage to rise to about 200 volts.

If V111 fails, 320 volts will appear at TP112.

STEP #15

Move the positive probe of the voltmeter to TP115. This test point is located in the plate circuit of V112 a frequency doubler stage. Frequency range of this stage is 22 to 28 Mc or 216 times crystal frequency. Tune L113 for a dip in the meter reading.* Momentarily move the voltmeter probe to TP116 and tune L114 for a dip in the meter reading.

Replace the probe in TP115 and tune L113 for a dip on the voltmeter. Now retune L112 for a peak in the meter reading.

If in the previous instructions for tuning this stage it was impossible to obtain a dip in the meter reading while tuning L113 with

the voltmeter probe connected to TP115, the following procedure may be followed. Place the positive voltmeter probe in TP116 and tune L113 for a dip in the meter reading. Then tune L114 for a dip. Retune L113 for a dip. Then return the voltmeter probe to TP115 and retune L112 for a peak in meter reading. The tune-up method first mentioned for L112 and L113 is preferred.

When L112 and L113 are properly tuned up, the voltage at TP115 will be about 115 volts. Failure of drive will cause this voltage to rise to about 175 volts. If V112 is dead and fails to draw plate current, 320 volts will be observed at TP115.

*An alternate method, tuning this stage is given in a following paragraph.

STEP #16

Move the positive probe of the voltmeter to TP116 and tune L115 for a peak in the meter reading.* This test point is located in the plate circuit of V113 a frequency doubler stage. Frequency range of this stage is 44 to 54 Mc or 432 times crystal frequency.

Now momentarily move the voltmeter probe to TP117 and tune C162 for a dip in the meter reading.

Return the voltmeter probe to TP116 and retune L115 for a peak in the meter reading. Retune L114 for a dip in the meter reading.

Proper voltage at TP116 is about 130 volts. Failure of drive to this stage will cause the voltage to rise to around 225 volts. If V113 is dead, voltage at TP116 will rise to 320 volts.

In the preceeding instructions for tuning L114 and L115 with the voltmeter probe connected to TP116, the rise in meter reading when tuning L115 may be so slight as to be unnoticed. In that case, place the voltmeter probe in TP117 and tune L115 for a dip in the meter reading. Then dip the meter reading by tuning C162. Then return the meter probe to TP116 and tune L114 for a dip in meter reading. First instructions given for tuning L114 and L115 are preferred.

*An alternate method, tuning L115 is given in a following paragraph.

STEP #17

Move the positive voltmeter probe to TP117. This test point is located in the plate circuit of V114 a frequency doubler stage. Frequency range of this stage is 88 to 108 Mc or 864 times crystal frequency.

Tune C164 for a dip on the voltmeter.

STEP #18

If a dummy load of 51 ohms has not previously been connected to J103, it should now be done. If the Exciter Unit is being used as

a driver for a larger transmitter, the following stage may be used as the Exciter load.

Circuits of V115, the final amplifier stage should not be tuned with nothing connected to J103, the RF output receptacle.

STEP #19

Place the negative probe of the voltmeter into TP118. This test point is located in the grid circuit of V115, the final amplifier stage. A reading of approximately -12 volts will be observed here with R167, the output control in a counterclockwise position.

The voltage obtained at TP118 is due entirely to grid drive and is a good check on proper tune-up of previous stages.

STEP #20

Place the positive probe of the voltmeter in TP119 and turn R167, the RF output control, to a full clockwise position. A reading of from 175 to 200 volts will be obtained. Now tune C164 (grid tuning condenser of V115) for a dip on the voltmeter. Now immediately tune C167 (V115 plate tune condenser) for a dip on the meter.

IMPORTANT: C167 (V115 plate tune) should be tuned for a dip on the voltmeter as soon as possible after bringing up the output control R167 to prevent serious over dissipation.

ALSO IMPORTANT: Do not operate the Exciter with the black heat dissipating shield removed from V115.

STEP #21

If the Exciter output is connected to a dummy load and wattmeter, RF output should now be observed. If the Exciter is connected to another amplifier stage, the grid circuit of that stage should be tuned for maximum grid current.

At this point the following controls should be tuned for maximum power output at J103, C162, C164, C167 and C169.

This will place these circuits at about the proper resonance point.

STEP #22

The Exciter should now be putting out a reasonable amount of power of 7 watts or more.

To obtain maximum efficiency and power output from the Exciter, special effort and attention must be given to the plate circuit of V114 (tuned by C162), the grid circuit of V115 (tuned by C164), the plate circuit of V115 (tuned by C167) and the output coupling circuit (tuned by C169).

Be very careful tuning and adjusting of these circuits, up to 12 watts output have been obtained with efficiency ranging on the order of 60 to 65% of the final amplifier stage.

With a reasonable amount of effort, 10 watts output should be obtained with about 55% efficiency of the final stage V115.

STEP #23

With the Exciter putting a few watts into a load, the voltage at TP118 should be measured. This should be at least -4 volts and preferably a little higher.

Now turn the Exciter off and remove the shield that covers the plate circuit of V114 and the grid circuit of V115. C162 and C164 are under this shield.

Observe the setting of C162 and C164. If the frequency of the Exciter is near the low end of the band, say 88 to 92 Mc and either condenser is fully meshed,* it indicates that the turns of the coil associated with that circuit need to be squeezed together slightly. If the Exciter is near the high end of the band, say 104 to 108 Mc and either C162 or C164 is at minimum capacity, the turns of the coil associated with that circuit, either L116 or L117 will have to be spread slightly.

When changing the inductance of either L116 or L117, great care should be taken so as not to spring or damage the tuning condensers.

*The same condition results from overcoupling of L116 and L117. See paragraph 7, Step #24.

STEP #24

If in Step #23 it was found that the plate circuit of V114 and the grid circuit of V115 are hitting resonance properly the coupling between L116 and L117 may be varied to obtain maximum grid drive into V115.

Temporarily replace the shield box over C162 and C164. Turn the Exciter on and place the negative probe of the voltmeter in TP118.

Tune L115, C162 and C164 for maximum negative voltage. Note the voltage and turn the Exciter off.

Remove the shield box over C162 and C164 and vary coupling slightly between L116 and L117. This may be done by moving L117 up or down slightly.

Replace the shield box over C162 and C164 and turn transmitter on. Retune C162 and C164 for maximum negative voltage at TP118.

In general, the best coupling between L116 and L117 appears to be with L116 about half way into the center of L117.

If L116 and L117 are overcoupled badly, it will cause C162 or C164 to go to full capacity to obtain maximum voltage at TP118.

Each time the coupling between L116 and L117 is changed, the cover over these circuits should be replaced and C162 and C164 retuned for maximum negative voltage at TP118.

After several trys, a point should be reached where either increasing or decreasing the coupling between L116 and L117 decreases negative voltage obtained at TP118. This is the optimum coupling point.

When this point is reached, the cover over L116 and L117 should be replaced and permanently fastened in place.

Retune L115, C162 and C164 for maximum negative voltage at TP118.

As much as -15 volts is safe at TP118. Generally, at least -8 volts is needed to obtain a full 10 watts output from the Exciter.

STEP #25

Turn the Exciter off and remove one or both sides from the shield box that covers the output circuitry of V115. This circuitry consists of C167 and C169, L118 and L119.

Observe the setting of C167 the plate tune condenser. If the exciter is tuned up at the low end of the FM band, say 88 to 94 Mc, and C167 is fully meshed, it indicates that the turns of L118 need to be squeezed together. If the Exciter is tuned up at the high end of the FM band, say 104 to 108 Mc and C167 is at minimum capacity, it indicates that the turns of L118 need to be spread apart.

If C169 is fully meshed it indicates that L118 and L119 are under coupled. If C169 is near minimum capacity for best power output it indicates L118 and L119 are over coupled.

In general, C169 should tune at about half mesh to be able to match a wide variation in loads as may happen when coupled to a following amplifier stage.

Coupling between L118 and L119 may be varied by moving L119 up or down. In general, it appears that optimum coupling occurs with L119 three-quarters of the way into the center of L118.

When the best point of coupling between L118 and L119 has been reached, the sides should be permanently refastened to the shield box over L118 and L119.

Turn the Exciter on and retune C167 and C169 for maximum power output.

STEP #26

Final tune-up of the last three stages of the Exciter may now be done as stated below. Final touch-up tuning must be done with the Exciter warmed up for about 5 or 10 minutes. If final tuning is done just after the Exciter is turned on, power output will fall off a watt or two, due to capacity changes after the final tune-up.

Final touch-up tuning should be done as follows: Place the positive voltmeter probe in TP116 and tune L114 for a dip. Tune L115 for a peak in the voltmeter reading.

Place the positive voltmeter probe in TP117 and tune C162 for a dip.

Place the negative probe of the voltmeter in TP118 and tune C164 for a peak reading.

Now tune C167 and C169 for maximum power output into a dummy load or for maximum drive to the following amplifier stage.

STEP #27

This step will give the procedure to be followed when adjusting the cascade modulators.

An audio signal generator with a balanced output impedance of 600 ohms should be connected to TB101-1-2-3. The shield should connect to TB101-3 which is ground.

The output of the Exciter should be sampled and the sample fed to the FM monitor.

The output of the FM monitor should be connected to a distortion analyzer.

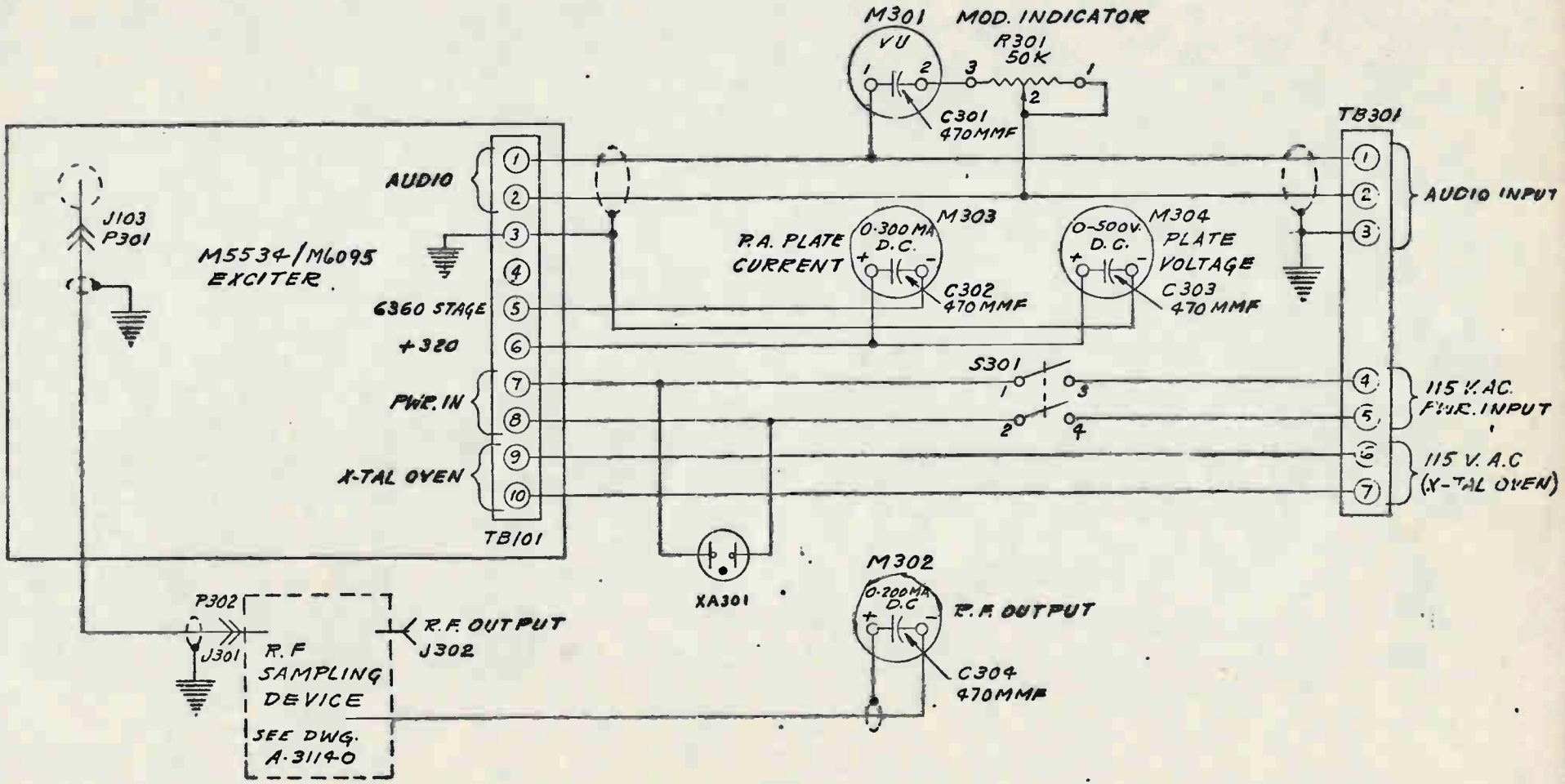
Set switch (S2) in the modulator #2 position. Set the audio oscillator frequency to 30 cycles and modulate the Exciter with +13 DBM. Next, adjust C119 so that the FM monitor reads 50% modulation. Distortion adjustment control (R126) is then adjusted for best distortion. If R126 is considerably away from the proper adjustment point, it may be impossible to obtain the desired level of modulation or the waveform obtained may be completely torn up. If such is the case, adjust R126 for minimum distortion while modulating somewhat less than 50%, say about 30%. Then, reset the level on the audio oscillator to +13 DBM and adjust C119 and R126 as described above. Then place the modulator selector switch in the modulator #1 position, and follow the procedure just described to adjust modulator #1. In this case, however, the capacitor adjustment is C111 and the distortion adjustment control is R115.

If it is impossible to reduce distortion at 30 cycles, it is advisable to check just the audio portion of the Exciter unit and/or the audio oscillator itself. The audio portion of the Exciter consisting of tubes V116 and V117 may be checked by running test leads from TP120 and TP122 or TP123 to the input of the distortion analyzer. Distortion as measured at TP120 should be well below .5% at any audio frequency. If distortion from the audio section is O.K. but overall distortion as measured from the monitor is not, then the waveforms of the pulse circuitry should be checked. Typical waveforms of V101 through V106 are given on drawing 826 7991 001.

100% modulation should occur at an input level of approximately +10 DBM from 30 to 1,000 cycles. This input level will cause an RMS audio voltage at TP120 of about 15 volts. If an input level of +10 DBM does not generate an RMS voltage of about 15 volts at TP120, then a defect in the audio section may be suspected. If sufficient RMS voltage exists at TP120 and the Exciter

will not modulate 100%, then a defect in the modulator or previous stage should be suspected.

In any FM system, worse distortion occurs at the lowest modulating frequency. In other words, if distortion is 1% at 30 cycles then the distortion can be expected to be better at all higher modulating frequencies. Higher distortion figures may result between 10,000 and 15,000 cycles. The fault will not generally lie in the modulator stage, however, it could lie in the audio section.



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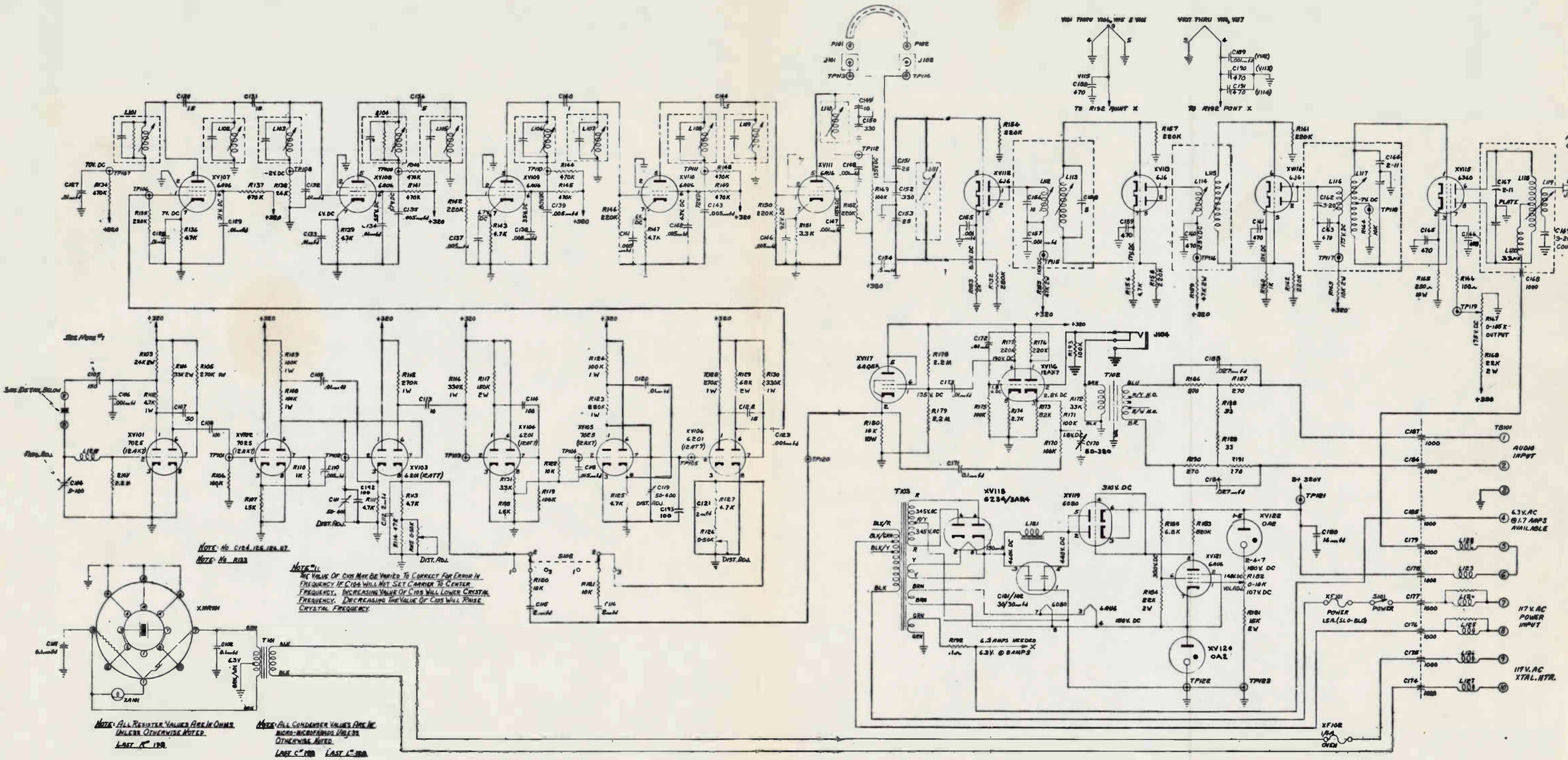

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