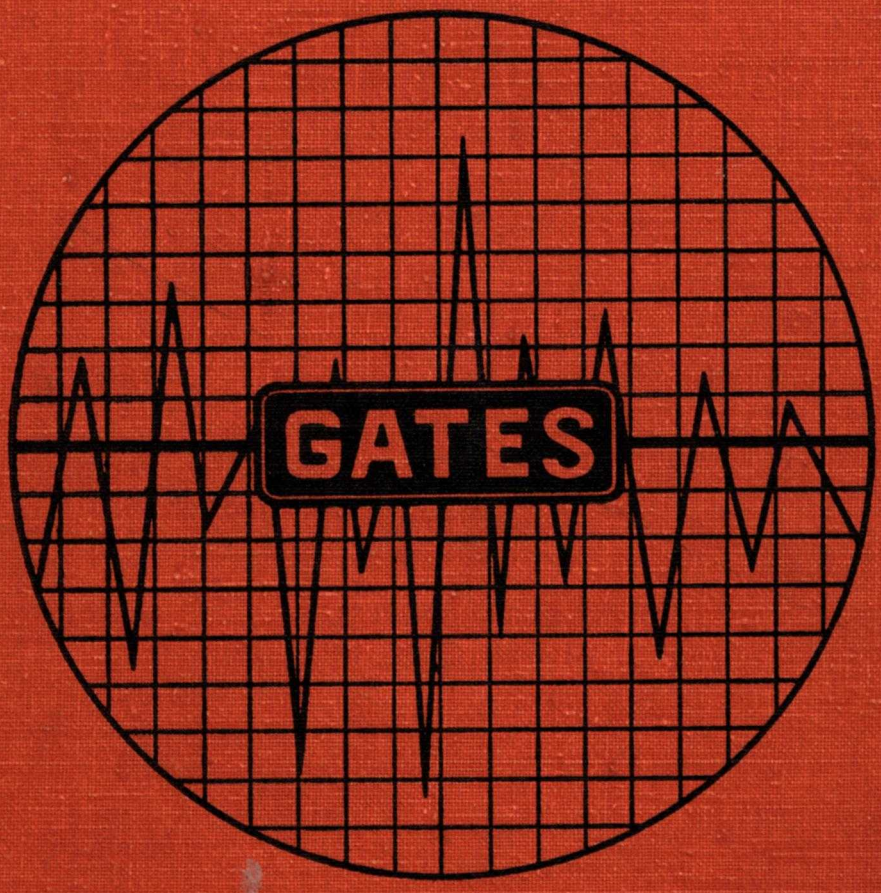


GENERAL CATALOG

BROADCAST, COMMUNICATIONS AND ELECTRONIC EQUIPMENT

Introduction

The equipment listed in this catalog is among the most comprehensive ever offered to the broadcast, communications and associated industries. Gates has prepared this catalog both as an informative book and a buying guide. Though provided to list all major items of manufacture by Gates, this catalog also lists parts and complete equipments manufactured by other reputable companies that have entered into distributing arrangements with Gates. Almost without exception, every item listed is carried in stock at either the main Gates factory and warehouses at Quincy, Illinois, or the factory warehouse branch.

Our field sales, service and engineering are international in scope. Field sales engineers travel all areas of the United States. In addition to our main sales and engineering offices in Quincy, Illinois, branch offices are in Washington, D. C. and Houston. The Houston branch carries a generous inventory of capital equipment as well as service parts. Sales in Canada are handled exclusively by the Canadian Marconi Company with its branches in every major city in Canada. International sales are handled by the international department of the Gates Radio Company, located at 13 E. 40th Street in New York City.

Established in 1922 and nearing forty years of service, Gates is the senior member in the broadcasting fraternity of many fine manufacturing concerns. Gates has consistently led in new and progressive designs. Recognizing quality as of first importance, progressive engineering is backed by a strict manufacturing quality control in one of the world's most modern electronics factories.

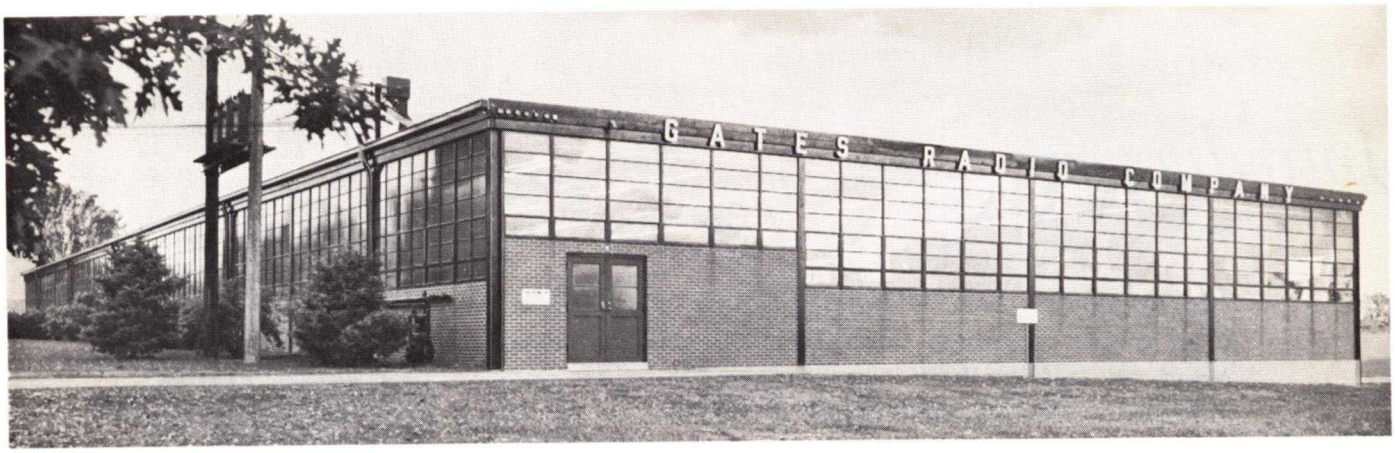
Gates is a member of the Harris-Intertype Corporation family, world leader in the Graphic Arts field. In addition to the two large Gates factories in Quincy, Illinois, this family includes manufacturing plants in Brooklyn; Cleveland; Dayton; Los Angeles; Westerly, R.I.; Slough, England and West Berlin, Germany.

If your need is in radio broadcasting, television broadcasting, communications or industrial electronics, we wholeheartedly invite your patronage. Everyone in the Gates organization will do his very best to justify the confidence placed in us.

GATES RADIO COMPANY

SUBSIDIARY OF HARRIS-INTERTYPE CORPORATION

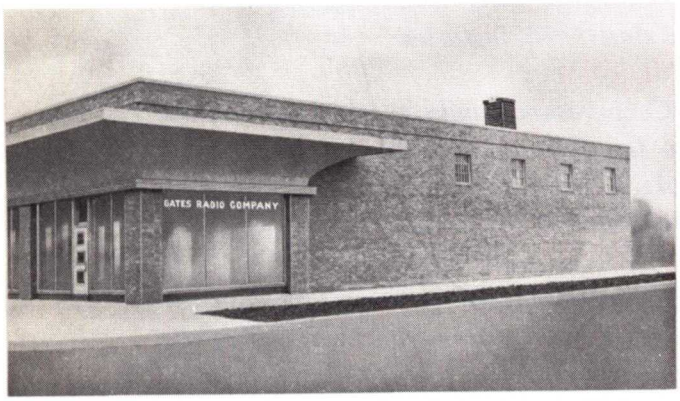
GATES OFFICES and FACTORIES



Above is the Gates Broadway factory, built in 1953 and considered one of the electronic industry's most modern manufacturing plants. The heavy transmitters and other large electronic systems are manufactured here.

Gates Second and Hampshire street facility. Here are the administration offices, development laboratories, engineering, special equipment, cabling and audio construction departments.

Gates warehouse and regular shipping point. It is one of the most strategically located buildings in Quincy in relation to air, rail and truck shipping.



Houston, Texas, stock carrying branch located at 2700 Polk Avenue, telephone Capitol 8-8536.

WASHINGTON OFFICE

Complete sales engineering, across from FCC offices, Warner Building, 13th & E Streets, N.W., telephone Metropolitan 8-0522.

THROUGHOUT CANADA

The Canadian Marconi Company, with main office in Montreal and branches in all principal Canadian cities. Telephone Atlantic 9441 in Montreal.

INTERNATIONAL

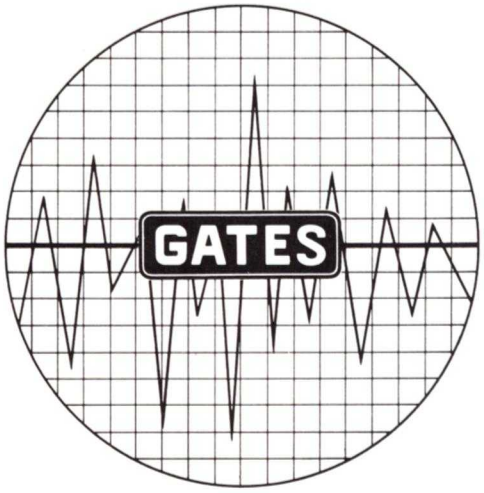
World-wide sales are conducted by the Gates International Division, 13 East 40th Street, New York City. Cable address ARLAB.

GATES RADIO COMPANY

Subsidiary of Harris-Intertype Corporation

QUINCY, ILLINOIS

Telephone BAldwin 2-8202



CONTENTS

PAGE SECTION

5 .... BROADCAST TRANSMITTERS (AM-FM-TV) AND ACCESSORIES

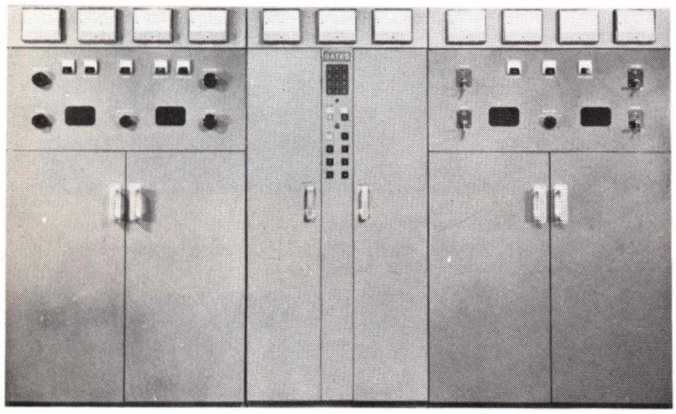
109 .. AUDIO EQUIPMENT AND ACCESSORIES

189 .. HIGH FREQUENCY AND COMMUNICATIONS TRANSMITTERS, ACCESSORIES

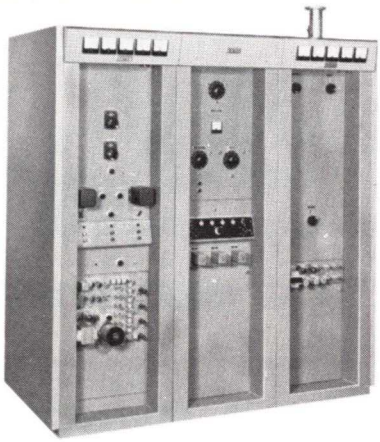
233 .. COMPLETE INDEX

NEW PRODUCTS

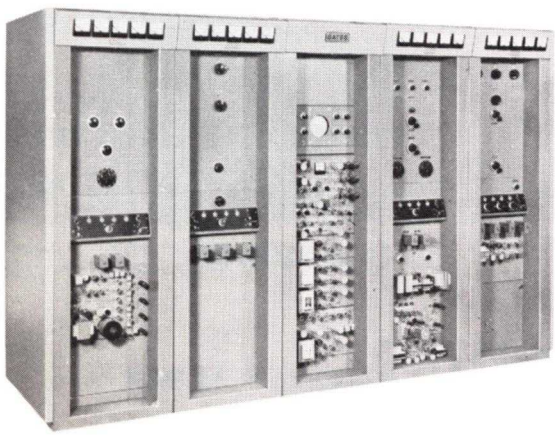
As the reader leafs through the pages of this new catalog, he will find improved versions of existing products and completely new types of equipment, which are continually being developed for the broadcast, communications, and industrial electronic industries. A complete index showing the extensive range of Gates products is found on Page 233. However, for quick reference on new broadcast equipment, a *partial* listing is shown below.



NEW. Gates BC-50C 50,000 watt AM Broadcast Transmitter. Small and compact with many outstanding features. Fully described, page 6 thru 11.



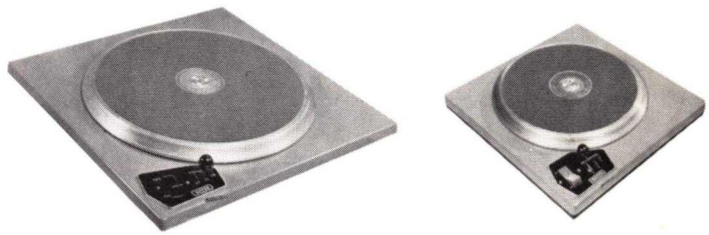
NEW. Gates FM-10A, 10,000 watt FM Broadcast Transmitter, featuring *Varia-Line* Tuning. Fully described, page 44 thru 47.



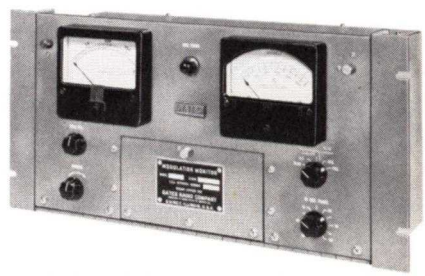
NEW. Gates BT-5C, 5,000 watt TV Transmitter for both color and monochrome transmission. Fully described, page 61 thru 65.

NEW. Gates *Cartritape*, the tape transport and playback unit of an entirely new system. Fully described, page 144 thru 148.

NEW. Gates Spot Tape Recorder, accommodating 101 announcements on one tape, 13″ wide. Fully described, page 140 thru 143.

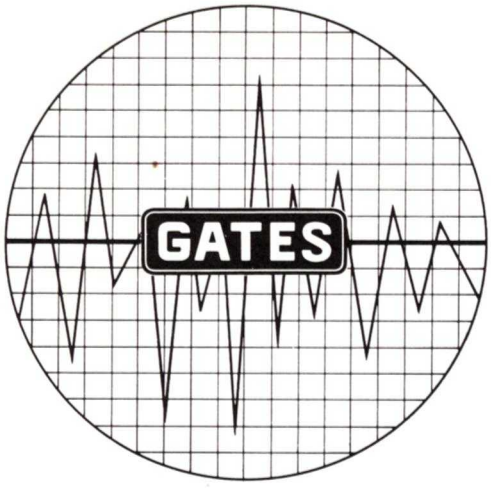


NEW. Gates CB-500 Turntable (16 inch) and CB-77 Turntable (12 inch), both designed with emphasis on true low rumble. Fully described on page 130 thru 133, 136, 137.



NEW. Gates M-5693 Modulation Monitor, operating on an entirely new principle. Fully described, pages 90 and 91.

Terms and condition of sale for Gates products are stated on Gates published price list, or will be supplied on request. All products listed in this catalog subject to standard improvement.



BROADCAST TRANSMITTERS AND ACCESSORIES

PAGES	
6- 43	AM BROADCAST TRANSMITTERS
44- 60	FM BROADCAST TRANSMITTERS
61- 77	TV BROADCAST TRANSMITTERS AND TV SYSTEMS
78-108	ACCESSORY EQUIPMENT

50,000 WATT AM BROADCAST TRANSMITTER

Model BC-50C

The New Gates BC-50C is an accumulation of nearly 40 years of engineering and manufacturing experience. Following the design considerations of several 50KW transmitters produced for the United States Information Agency, the new BC-50C offers many important new features, including the use of dry rectifiers throughout, compact size, external or internal air cooling, and the use of only 15 tubes of 6 types.

BC-50C 50,000 WATT AM BROADCAST TRANSMITTER

POWER AMPLIFIER CUBICLE: PA cubicle houses two Westinghouse 5891 final amplifier tubes as well as all of the associated circuitry for the power amplifier itself. Access to the PA tubes is gained through the front doors of the transmitter and a convenient floor dolly is provided for changing tubes without any lifting. These tubes operate in parallel and are output coupled by a method to assure minimum harmonic and spurious radiation. A single 5891 is capable of producing 50 KW output. Tubes are operated at about 50% of manufacturer's rating.

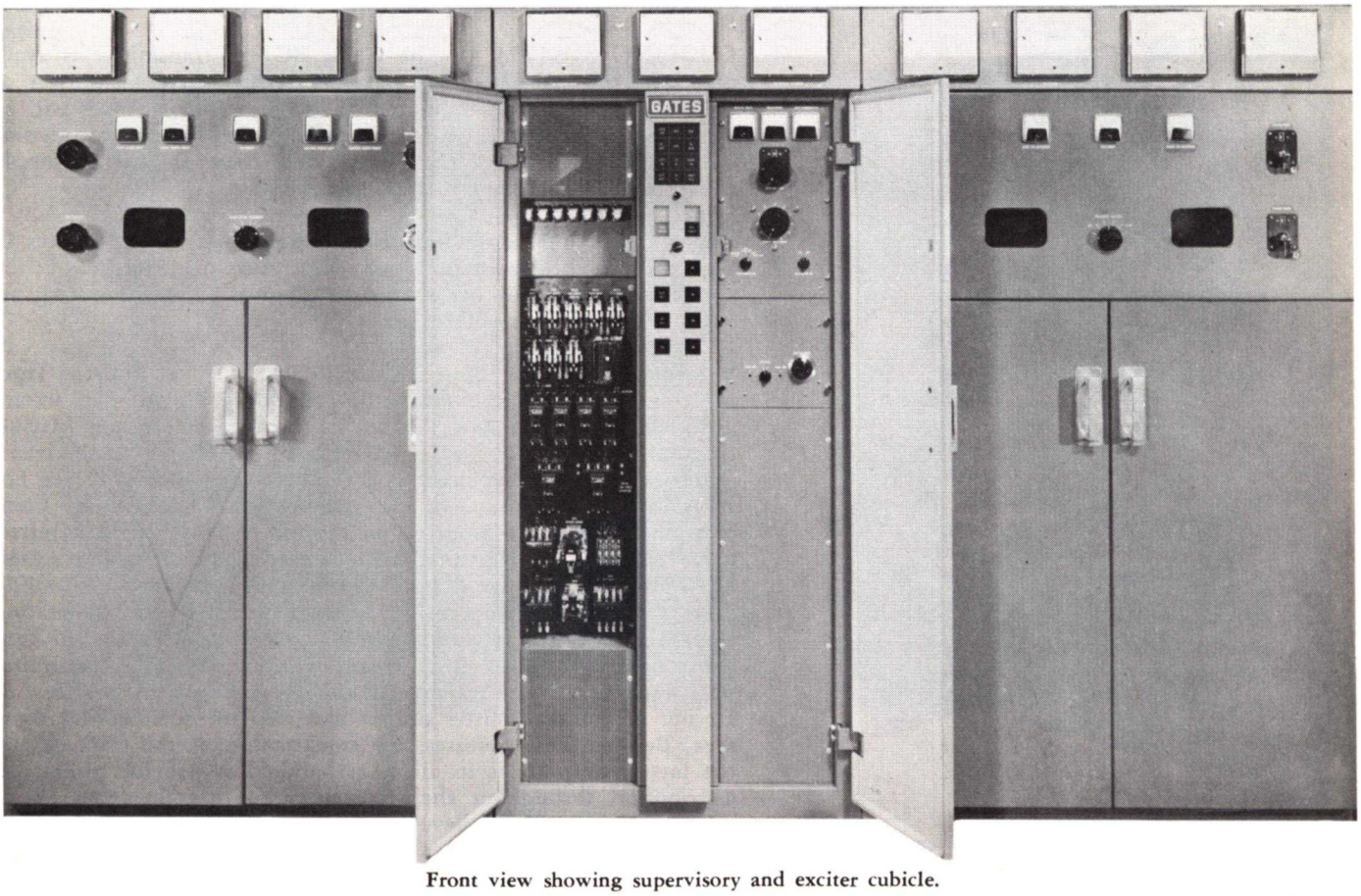
EXCITER DRIVER CUBICLE: This is the center cubicle and measures 32" wide by 60" deep. The driver for the final amplifier consists of a single Amperex type 6076 tube, which provides more than sufficient power for driving the final amplifier to the transmitter's rated output power. This unit is cooled through the main circulating system by picking up air from the intake duct and through a separate blower, the driver-amplifier stage itself is cooled. Cooling more than sufficient to accommodate maximum plate dissipation in the 6076 tube is provided. This tube operates at approximately 60% of its capability.

MODULATOR CUBICLE: This cubicle houses two type 5891 modulator tubes. As in the case of the final amplifier, these tubes are accessible through the front doors of the transmitter. Modulator and final amplifier tubes are of the same type for standardization and spare tube stock.

The front section of the modulator cubicle is devoted to the Class B modulator stage itself. Cubicle is divided approximately 1/3 of distance from front to back and in back of this divider are all of the lower level audio stages. Audio input stage consisting of two type 6146 tubes is mounted near the base of the cubicle. The second audio stage consisting of two type 813 tubes is mounted immediately above and the audio driver stage consisting of two 833A tubes in a cathode follower driver circuit is mounted toward the top of the modulator cubicle.

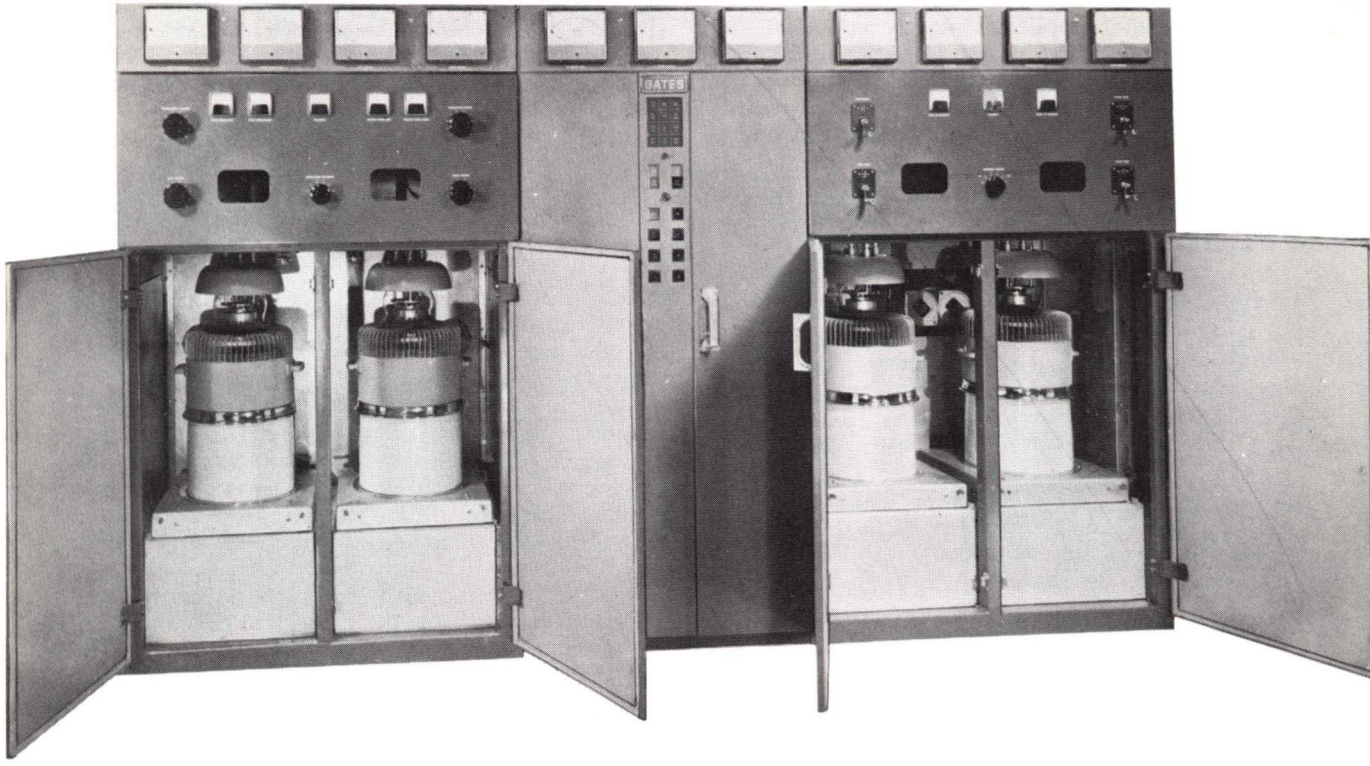
CONTROL CIRCUIT — The design of the control system of the BC-50C transmitter is in keeping with the highest present day standards. The protection of valuable equipment, reliability and safety of personnel and simplicity of design were constantly kept in mind during the design stages of the BC-50C trasmitter. All cubicle doors are interlocked, of course, and in addition are provided with automatic mechanical grounding switches for safety. The service lights inside the cubicles are also controlled by separate switches on the cubicle doors.

Desirable features such as reliable air pressure switches, an adequate number of status lights and the positive mechanical grounding switches mentioned above all contribute to protecting the transmitter and its operating personnel. The arrangement of the control circuit has been designed so that modifications and special applications often desired with a particular installation may readily be applied.

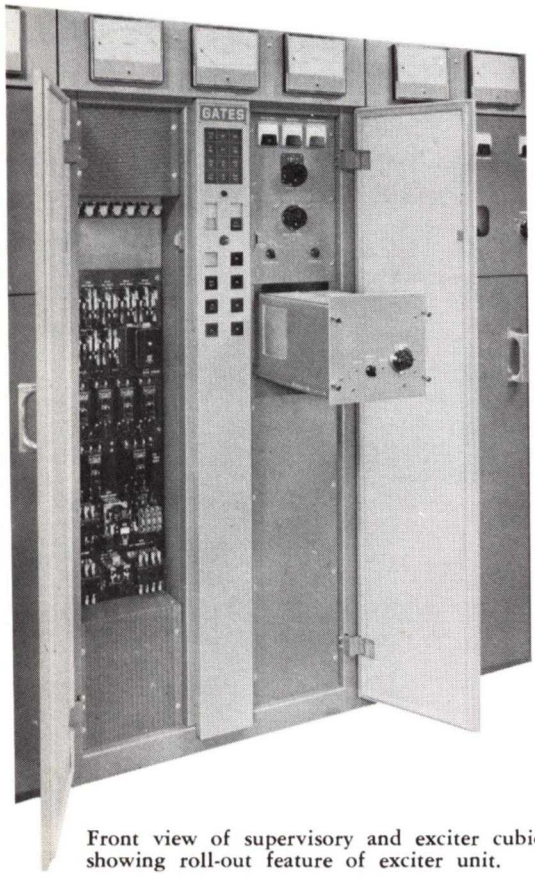


Front view showing supervisory and exciter cubicle.

BC-50C 50,000 WATT AM BROADCAST TRANSMITTER



Front view showing tubes — compact design.



Front view of supervisory and exciter cubicle showing roll-out feature of exciter unit.

COOLING SYSTEM — The Gates BC-50C transmitter is available with internal air blowers, or with central external blower, as ordered. Neither the modulator nor final amplifier tubes will be operating at near their maximum dissipation ratings at anytime during the operation of the BC-50C and, therefore, the air supply is far more than required with either system.

The output temperature limit of the transmitter is 57 degrees C. Operating at the maximum input temperature of 45 degrees C, the temperature rise will not exceed 12 degrees C in the output air stream from the transmitter.

It is estimated that approximately 17,000 BTU is radiated from the transmitter into the surrounding building. In order to accomplish this extremely low amount of heating effect, the BC-50C transmitter incorporates infrared reflector shields within the transmitter walls at points near power tubes which normally are hot spots in the transmitter. In the past few years Gates Radio Company has done much research on the use of these infrared reflectors and we have found that the temperature of a transmitter cabinet wall can be reduced by a phenomenal amount by installing these reflectors on the inside surface, near the heat generating sources mentioned. In addition to the infrared reflectors, to keep the cabinet surface temperatures down, the BC-50C transmitter uses refrigerator type seals on all the doors to prevent the flow of air out of the transmitter proper and into the surrounding room area. Besides these features, the construction of the cabinets and the layout of parts is in all cases handled to provide proper air distribution throughout the transmitter so that there are no so called "hot spots" that develop within the transmitter itself. This,

BC-50C 50,000 WATT AM BROADCAST TRANSMITTER

therefore, allows us to quote the figure of approximately 17,000 BTU into the building.

It must be pointed out, however, that this figure is based on having exhaust ducts from the transmitter which are either of double wall construction, or which are well insulated so that the exhaust itself does not contribute to the temperature rise within the building.

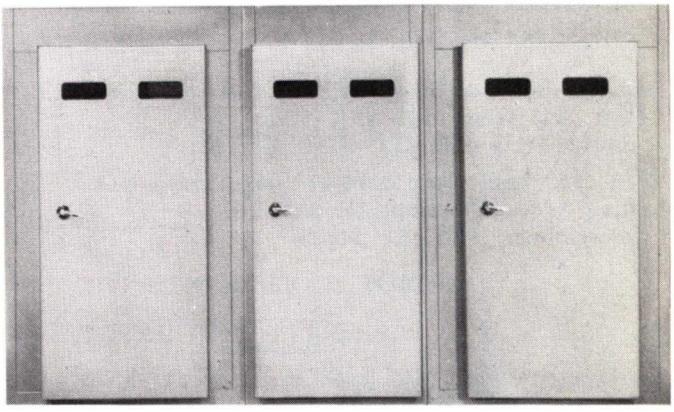
The use of louvers in the exhaust duct above the transmitter can be employed in order to provide building heat during cold weather. These louvers must, of course, be tight fitting, in order to prevent air leakage during periods of air conditioning.

The new BC-50C transmitter unit occupies only 55 square feet of floor space, 11′ wide by 5′ deep. Heavy components, and the control and rectifier cubicle are located external to the transmitter unit. The control and rectifier cabinet occupies 9 square feet of floor space and can be located at any convenient place inside the building.

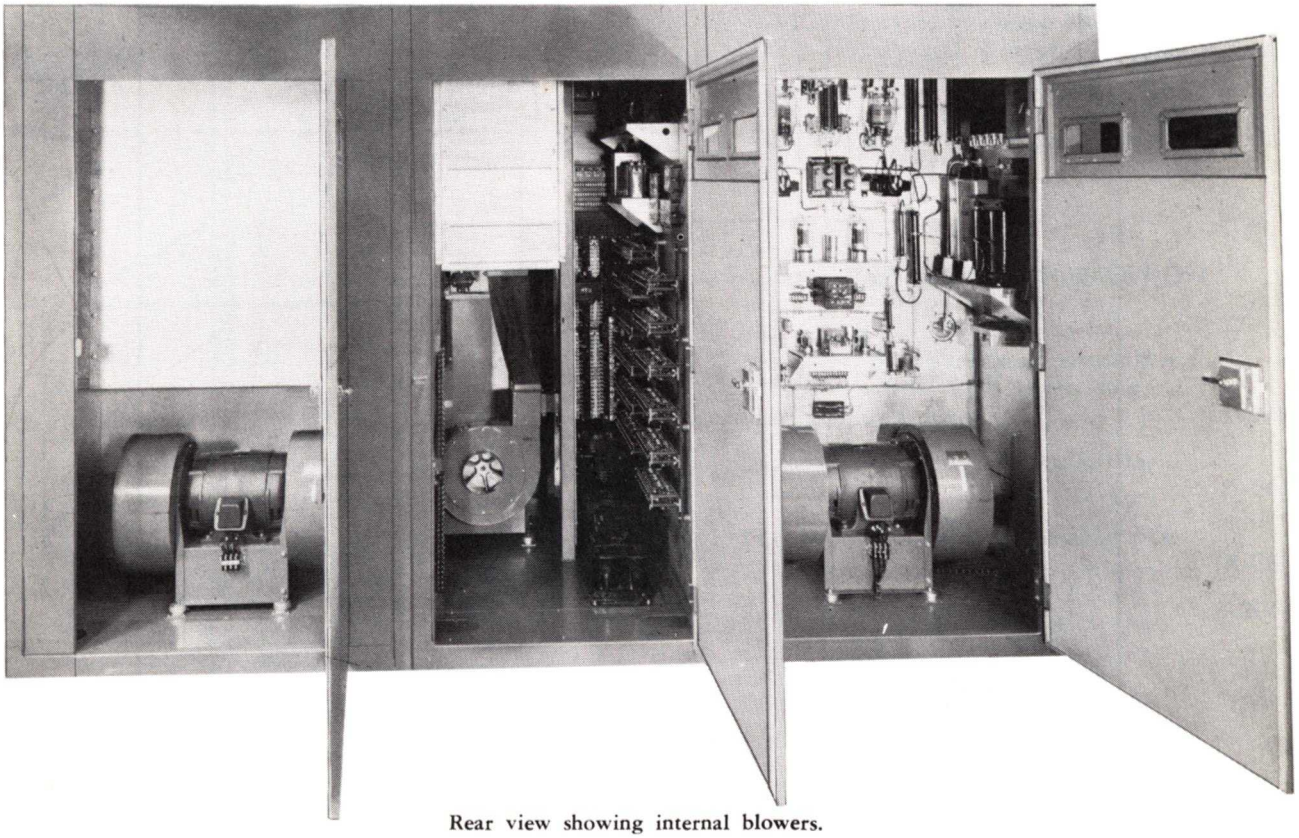
In addition to the compact design being offered in the Gates BC-50C, Gates' Engineers have painstakingly developed a completely dry rectifier system to provide all DC voltages needed in the transmitter. Careful and conservative design of the new rectifier system for the BC-50C indicates a long and trouble free life expectancy. Once again the power handling capability of this part of the transmitter is operating at less than 50% of manufacturers rating.

The following are technical specifications on the rectifiers employed:

10.5 SUPPLY employs 264 audio devices Type 50M7N rectifiers capable of 35 amperes output.
4.5 KV SUPPLY employs 132 audio devices Type 50 K7N rectifiers, capable of 25 amperes output.
3 KV SUPPLY employs 78 audio devices Types 50 K7N rectifiers, capable of 25 amperes output.
800 VOLT screen supply uses 24 IRC Type SD-94A rectifiers.
500 VOLT bias supply uses 40 IRC Type SD-94A rectifiers.
300 VOLT bias supply uses 12 IRC Type SD-94A rectifiers.

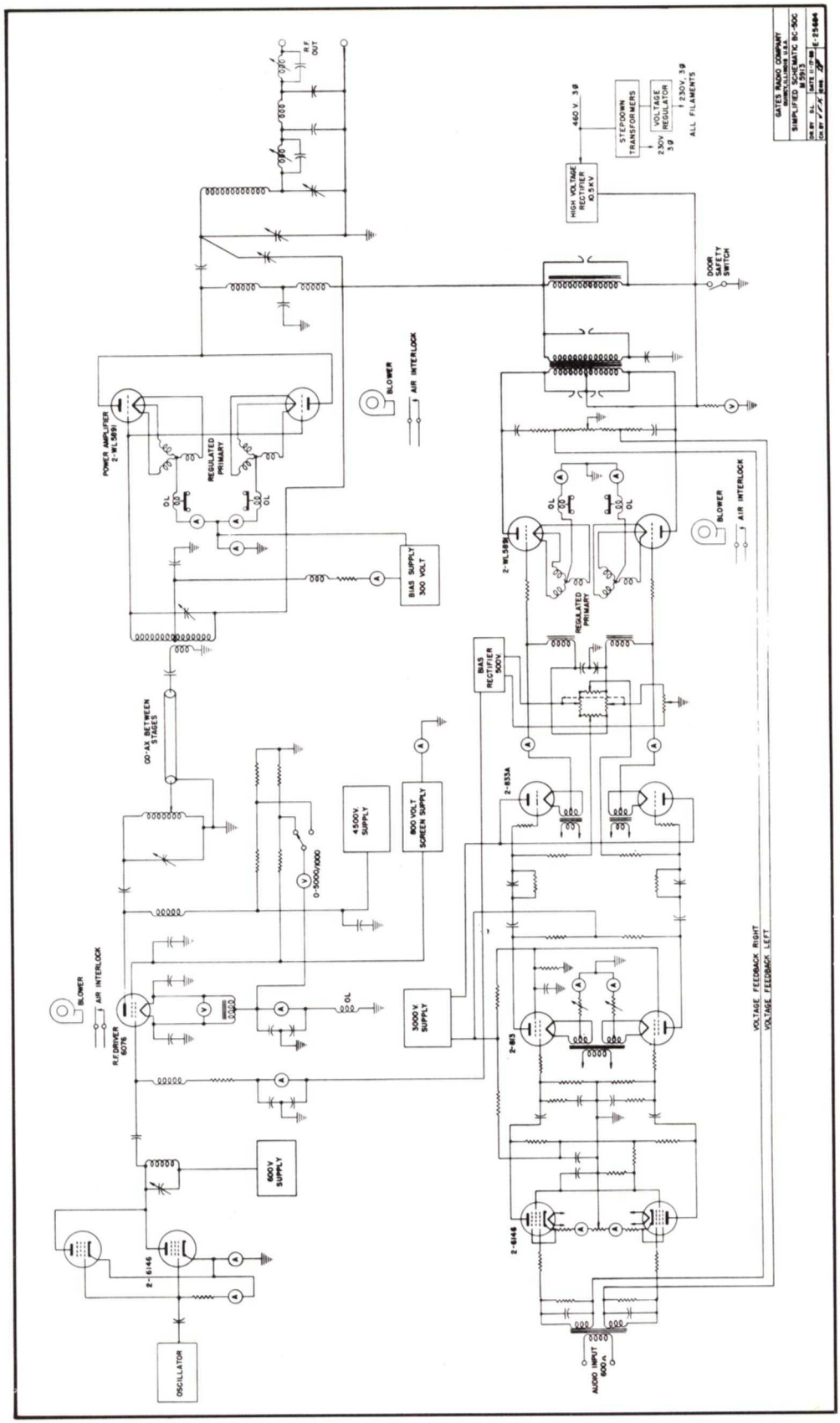


Rear view.



Rear view showing internal blowers.

BC-50C 50,000 WATT AM BROADCAST TRANSMITTER



BC-50C Simplified Schematic.

BC-50C 50,000 WATT AM BROADCAST TRANSMITTER

SPECIFICATIONS

POWER OUTPUT: 55 KW maximum.

RF OUTPUT IMPEDANCE: 230 ohms unbalanced. (other impedances available on special order).

RF RANGE: 540 KC to 1600 KC (as ordered).

FREQUENCY STABILITY: ±5 cycles.

RF HARMONICS: Suppression of harmonics meets or exceeds FCC requirement.

AUDIO FREQUENCY RESPONSE: ±1.5 db 30-10,000 cycles.

AUDIO HARMONIC DISTORTION: 3% or less 50-7500 cycles at 95% modulation.

AUDIO INPUT LEVEL: ±10 dbm ±2 db for 100% modulation.

AUDIO INPUT IMPEDANCE: 600 ohms balanced.

PRIMARY VOLTAGE: 460 volts, 3 wire, 60 cycles, 3 phase.

POWER FACTOR: 90% or better.

POWER CONSUMPTION:
89 KW at zero modulation
99 KW at average modulation
134 KW at 100% modulation

CARRIER SHIFT: 5% or less at 100% modulation.

TUBES: RF section — (2) 12BY7 oscillator and 1st amplifier (2) 6146 buffer (1) 6076 RF driver (2) 5891 final output.

Audio section — (2) 6146 audio input, (2) 813 second audio, (2) 833A audio driver, (2) 5891 modulators.

TOTAL NUMBER OF TUBES: 15.

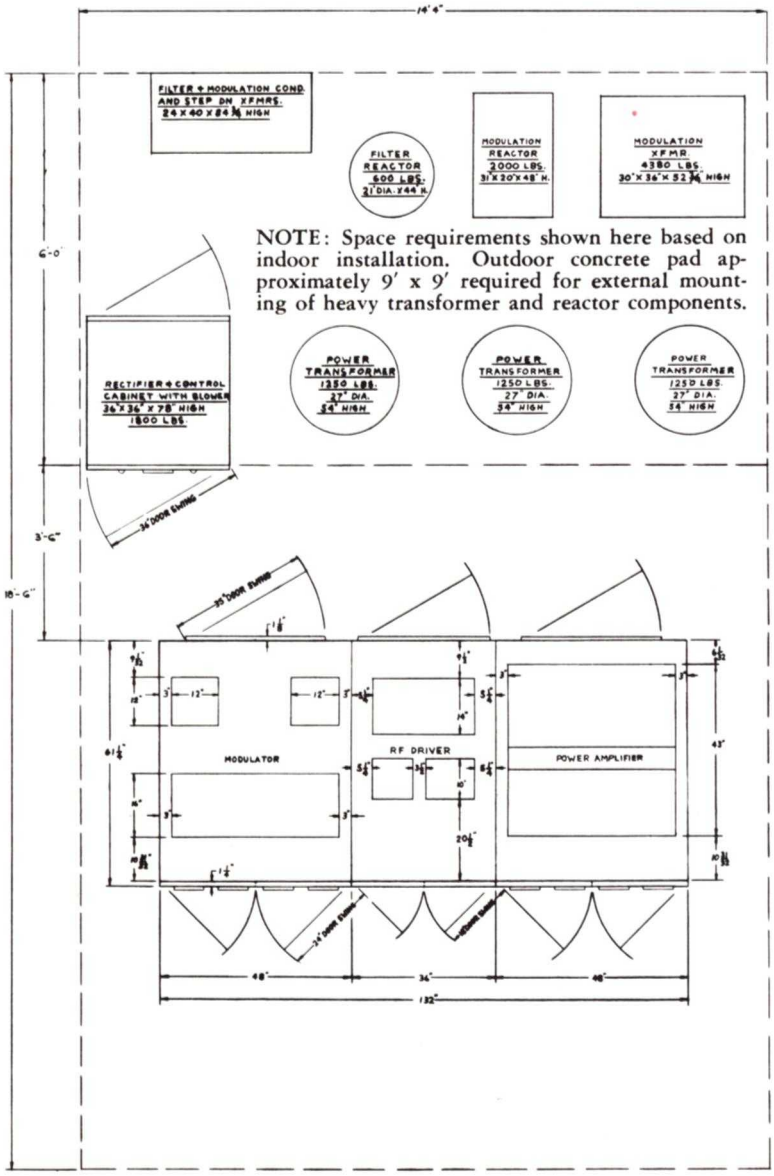
TOTAL TUBE TYPES: 6.

SIZE: 11′ wide, 5′ deep, 6½′ high (transmitter cabinets). See diagram for weights and dimension of external components.

WEIGHT: Approximately 18,000 lbs. net.
Packed Weight — 22,900 lbs.

CUBAGE: 1555 with internal blowers.

FINISH: Medium gloss gray, two-tone.

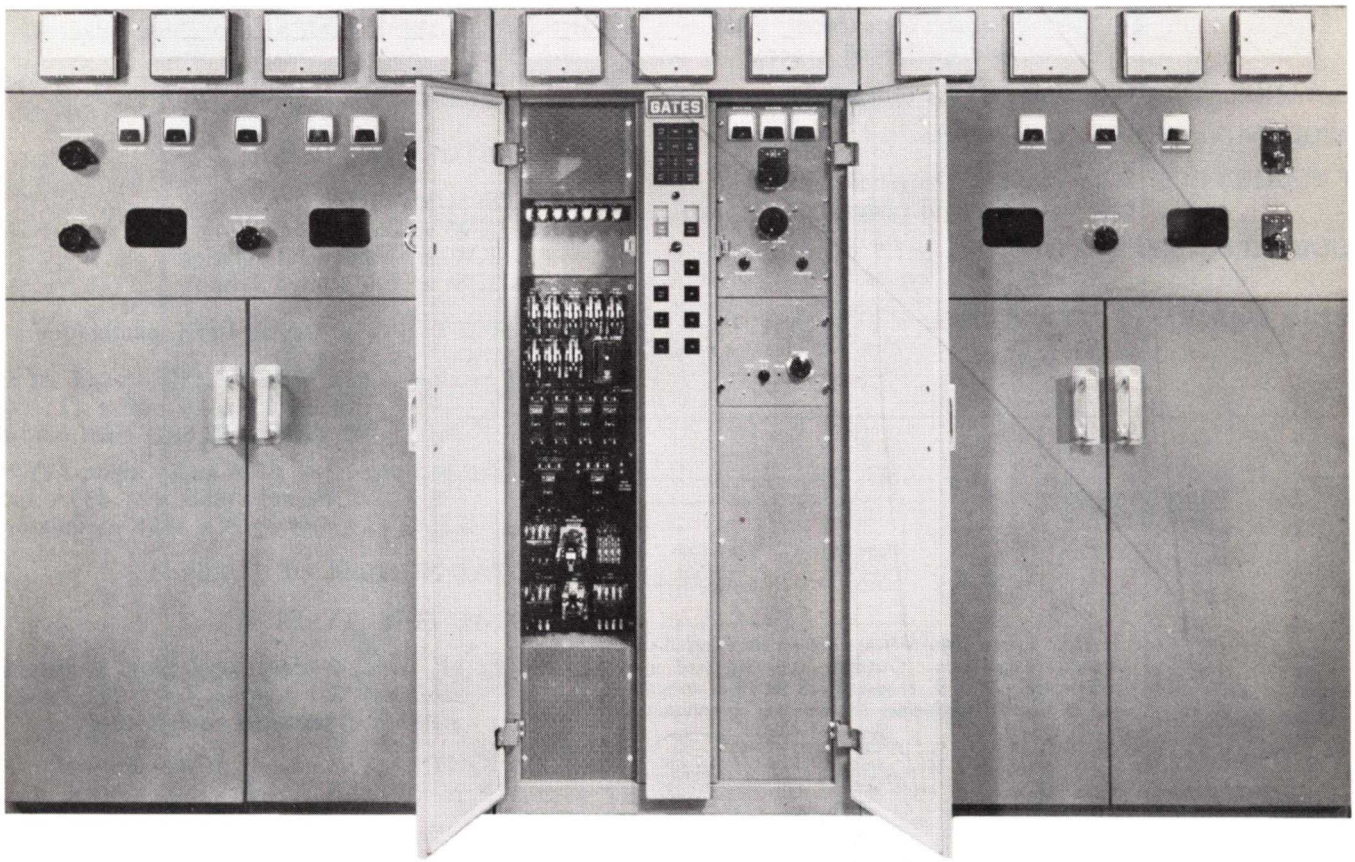


ORDERING INFORMATION

Model BC-50C broadcast transmitter, 50,000 watts, with tubes, one crystal and oven	**M-5913**
Spare 100% tube complement for above	**TK-367**
FCC Tube complement (required FCC spares)	**TK-368**
Spare crystal and holder	**A-30866**

100,000 WATT AM BROADCAST TRANSMITTER

Model BC-100C



Front view showing supervisory and exciter cubicle.

The new Gates BC-100C 100 KW transmitter incorporating many new outstanding features such as compact size, silicon rectifiers, and only 15 tubes of 6 different types is the logical outgrowth of Gates' unparalleled experience in the manufacturing of broadcast transmitters.

POWER AMPLIFIER CUBICLE: The driver for the final amplifier consists of an Amperex type 6076 tube. Unit is cooled through the main circulating system by picking up air from the intake duct immediately below the transmitter. Driver amplifier stage itself is cooled through a separate blower.

MODULATOR CUBICLE: This cubicle houses two 5891 tubes which are accessable through the front doors. Cubicle is divided approximately 1/3 of distance from front to back with all lower level audio stages in back of divider. Audio input stage consisting of two 6146 tubes are mounted near the base of the cubicle. The second stage consisting of two type 813 tubes is mounted immediately above and the audio driver stage consisting of two WL5736's in cathode follower driver circuit are mounted toward the top of the cubicle.

CONTROL CIRCUIT: The control system of the BC-100C transmitter is the most advanced type. All cubicle doors are interlocked and have automatic mechanical grounding switches. Cubicle service lights are controlled by separate switches on the door. The control switch circuit is arranged so that modifications and special applications may be made.

COOLING SYSTEM: The BC-100C is available with external blower unit only, providing more than the required amount of air. Refrigerator type seals are used on all doors to prevent the flow of air out of the transmitters. Proper air distribution is assured because of the BC-100C's unique layout — "hot spots" are eliminated.

BC-100C AM BROADCAST TRANSMITTER

Heavy components and the control and rectifier cubicles are located external to the transmitter unit, and can be located at any convenient place inside the building. Each control and rectifier cubicle occupies only 9 square feet of space. Heavy components are weatherproof.

A completely dry silicon rectifier system has been developed by Gates' Engineers to provide all DC voltages needed in the transmitters. Careful and conservative design of this new system for the BC-100C indicates long and trouble free life expectancy.

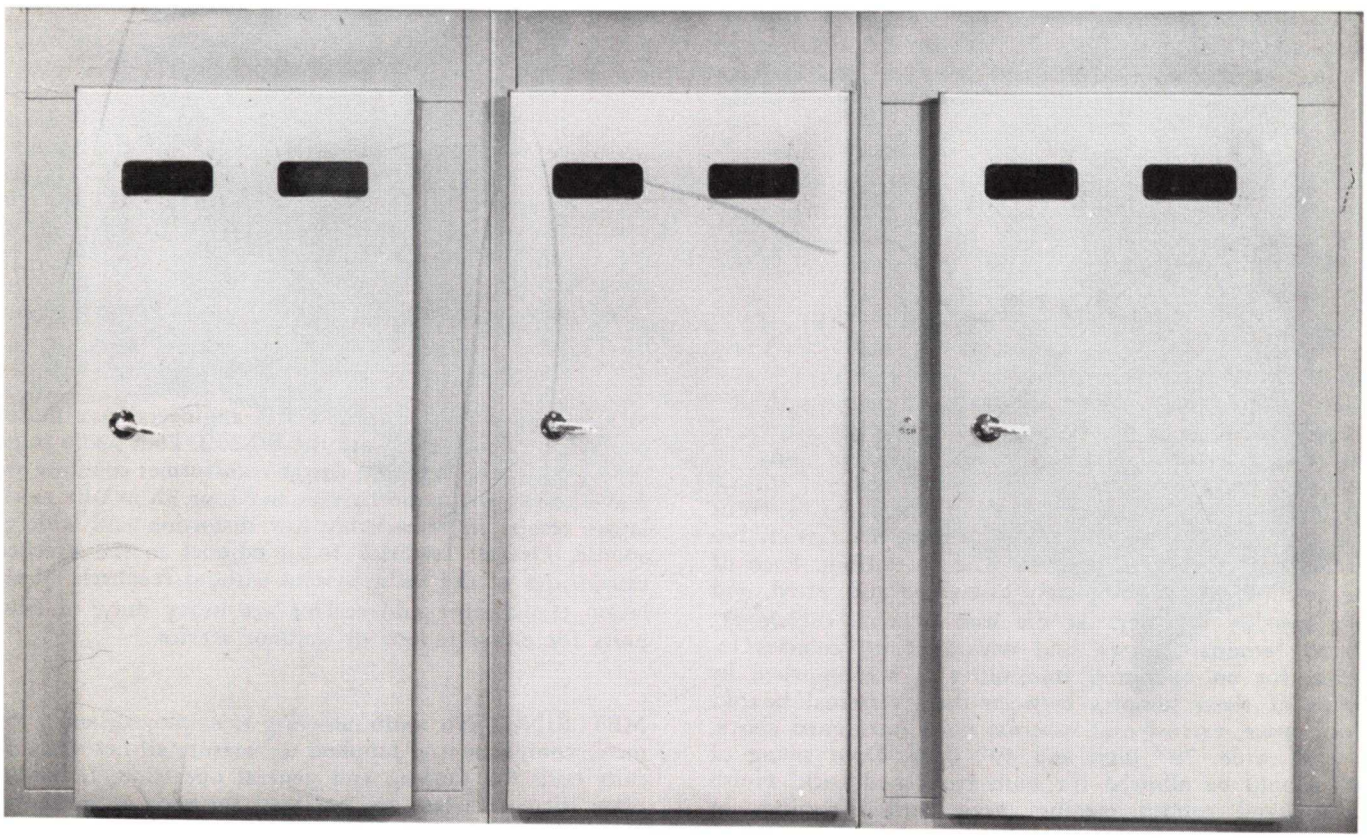
SPECIFICATIONS

POWER OUTPUT: 100,000 watts.
RF OUTPUT IMPEDANCE: 230 ohms unbalanced.
RF RANGE: 540 KC to 1600 KC.
FREQUENCY STABILITY: ±5 cycles.
RF HARMONICS: Suppression of harmonics meets or exceeds FCC requirements.
AUDIO FREQUENCY RESPONSE: ±1.5 db 30-10,000 cycles.
AUDIO HARMONIC DISTORTION: 3% or less 50-7500 cycles at 95% modulation.
AUDIO INPUT IMPEDANCE: 600 ohms balanced.
PRIMARY VOLTAGE: 460 volts, 3 wire, 60 cycles, 3 phase.
POWER FACTOR: 90% or better.

POWER CONSUMPTION:
150 KW at zero modulation
168 KW at 30% average modulation
249 KW at 100% modulation
CARRIER SHIFT: 5% or less at 100% modulation.
TUBES: RF Section — (2) 12BY7 oscillator and 1st amplifier (2) 6146 buffers (1) 6076 RF driver (2) 5891 final output.
Audio Section — (2) 6146 audio input, (2) 813 second audio, (2) 5736 audio driver, (2) 5891 modulators.
TOTAL NUMBER OF TUBES: 15.
TOTAL TUBE TYPES: —6.
SIZE: 14 ft. wide, 6 ft. deep, 6 ft. 5/8" high.
WEIGHT: Approx. 22,914 lbs.
CUBAGE: 1444.
FINISH: Medium gloss gray.

ORDERING INFORMATION

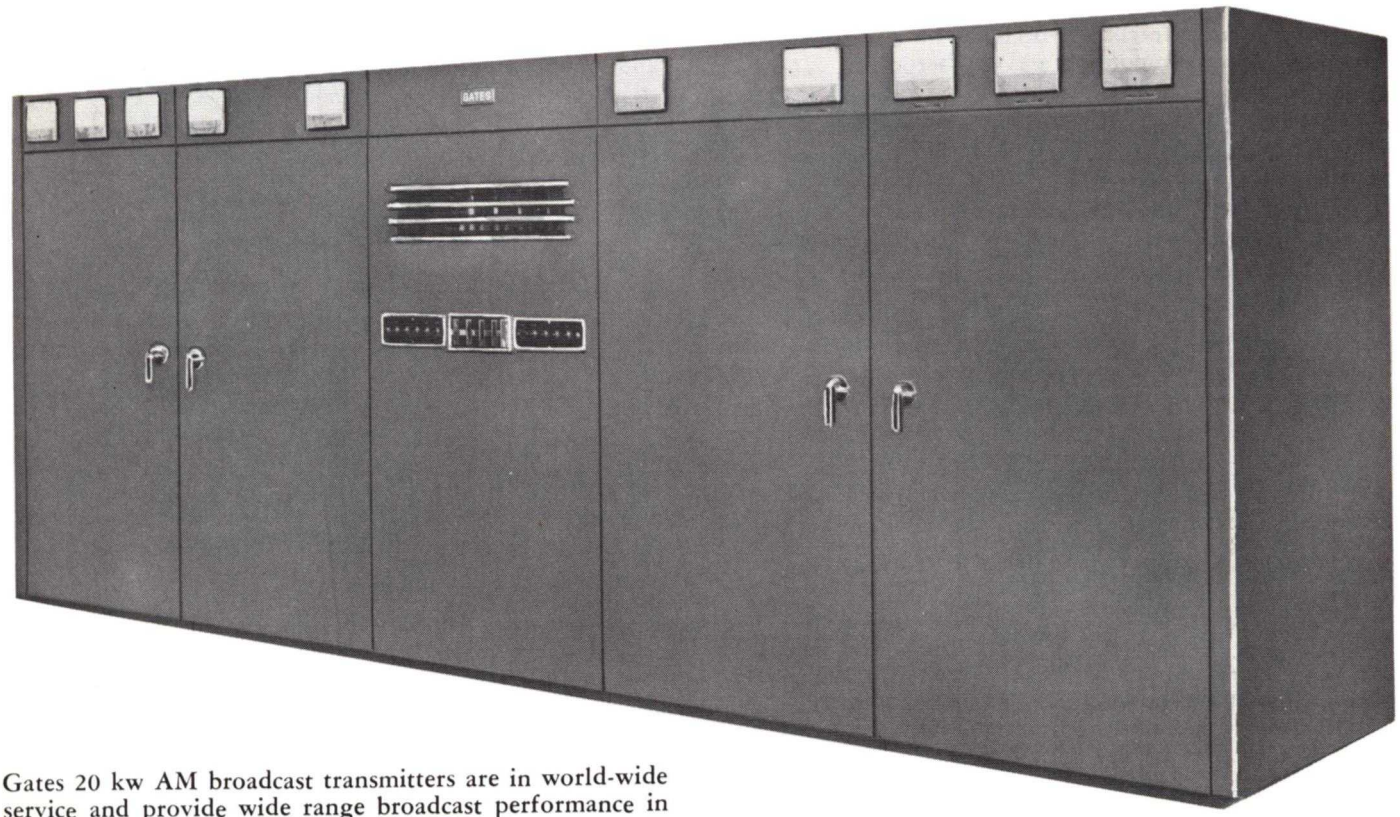
Model BC-100C broadcast transmitter, 100,000 watts, with tubes and two crystals M-5967
Spare 100% tube complement for above TK-376
FCC Tube complement (required spares) TK-377
Spare crystal and holder A-30866



Rear View

20,000 WATT AM BROADCAST TRANSMITTER

Model BC-20B



Gates 20 kw AM broadcast transmitters are in world-wide service and provide wide range broadcast performance in the standard broadcast band of 540-1600 Kc. Heavy commercial construction is combined with walk-in-to-service and modern up to date circuitry. Dual full wave, 3 phase, high voltage power supplies — one for the RF power amplifiers and the second for the modulators — exemplifies the conservative approach to BC-20B design. Tube complement utilizes thoriated single phase filament design in all power stages and tube cost is lower by a generous margin than any other transmitter in this power area.

CONSTRUCTION. Five cubices join together to house the 20 kw radio frequency, audio frequency, protective and power supply units. The only external components are the two main power transformers, modulation transformer and reactor. These units are oil-filled and may be installed either in the building or on a protected platform outside the building. The transmitter is dead front, and all front doors may be opened without disrupting the carrier. No intercubicle cabling is required when installing. Each of the five cubicles is completely assembled and wired, and bolt speedily together. At the base of each cubicle are barrier terminal boards, and wiring of all cubicles together for an operating transmitter is accomplished by means of short jumpers between these terminal boards. Floor space, exclusive of external units mentioned above, is 210″ wide, 78″ high and 49″ deep. Door swing of 40″ should be allowed for both front and back. Finish is in hand rubbed medium gray with trimmings in chrome, brushed aluminum and anodized black.

RADIO FREQUENCY SECTION. Including oscillator, there are five radio frequency stages. All but the final amplifiers are self-neutralized. Dual crystals with closely held temperature controlled ovens excite a 6V6 oscillator with very low voltage applied for stability. IPA stages are 807, 6146 and dual 4-250A drivers. Four 3X2500F3 triodes comprise the pushpull power amplifier. Output coupling provides an impedance match from 40-270 ohms as ordered.

MODULATOR SECTION. Gates engineers have built a truly fine audio system into the BC-20B. Four audio stages are all pushpull. A special design transformer coupling system between the audio drivers and four 3X3000F1 modulators results in remarkably low distortion and wide response. Overall feedback is an adjunct to the excellent capabilities of the audio system without feedback. Modulation transformer and reactor are heavy duty, oil-filled units for either indoor or outdoor service.

METERING. No multi-metering is employed, and a full meter complement is supplied to measure all necessary circuits both for tune-up and general operation. Individual plate current meters are provided for each of the power amplifier and modulator tubes.

MODEL BC-20B 20 KW BROADCAST TRANSMITTER

RELAYS AND PROTECTION. Gates engineers have provided protection to the point that no power consuming circuit of importance has been overlooked. Primary magnetic circuit breakers are nserted in all main primary lines. Individual supervisory overload relays are incorporated, not only for the transmitter main overload, but also for separate protection: exciter failure, air failure, RF driver, power amplifier, audio driver and modulators. Included are secondary relays for door interlock and air cooling interlock. Automatic condenser discharge relay switch immediately discharges the main filter capacitors when the door interlocks are disengaged.

RECYCLING. Automatic recycling relay controls automatically where the carrier is disrupted, and attempts to reset the carrier four times before remaining off. Many times the carrier interruption is caused by static discharges across the transmssion line or tower base and this recycling feature is indispendable.

POWER SUPPLIES. Five major power supplies deliver plate and bias voltage to the BC-20B transmitter. Featured are the two complete high voltage supplies. One is used for the radio frequency power amplifier and the other for the modulators. The resulting almost perfect regulation is quickly recognized by the engineer. Likewise, in case of failure of one power supply, the remaining one can be fused in, operating the transmitter on reduced power until repairs are made. Each of these power supplies is full wave, three phase, six tube. Other individual supplies provide modulator bias voltage, power amplifier bias voltage and intermediate voltage for driver stages. All power supplies are generously protected by circuit breakers, overload relays, etc.

PERFORMANCE. Recognizing this transmitter will be used in every climate of the world, engineering attention was given to reliability under unusual conditions. Extra blower capacity in case of extreme heat is an example. The BC-20B will produce a carrier with a rich transmission quality, the result of low distortion, wide response, low noise and excellent stability.

MODEL BC-20B SPECIFICATIONS

POWER OUTPUT: Rated 20,000 watts. Capable 21,250 watts.

RF OUTPUT IMPEDANCE: 40-270 ohms.

OUTPUT CONNECTOR: Type Feedthru.

RF RANGE: 540 to 1600 Kc as ordered.

FREQUENCY STABILITY: 0.005% or better.

FREQUENCY MONITOR COUPLING IMPEDANCE: 50/70 ohms.

MODULATION MONITOR COUPLING IMPEDANCE: 50/70 ohms.

RF HARMONICS: Suppression of harmonics meets or exceeds FCC requirements.

POWER REDUCTION: Low power tune-up switch standard equipment.

AUDIO FREQUENCY RESPONSE: $\pm 1\frac{1}{2}$ db, 50-10,000 cycles.

AUDIO HARMONIC DISTORTION: 3% or less, 50-7500 cycles at 95% modulation.

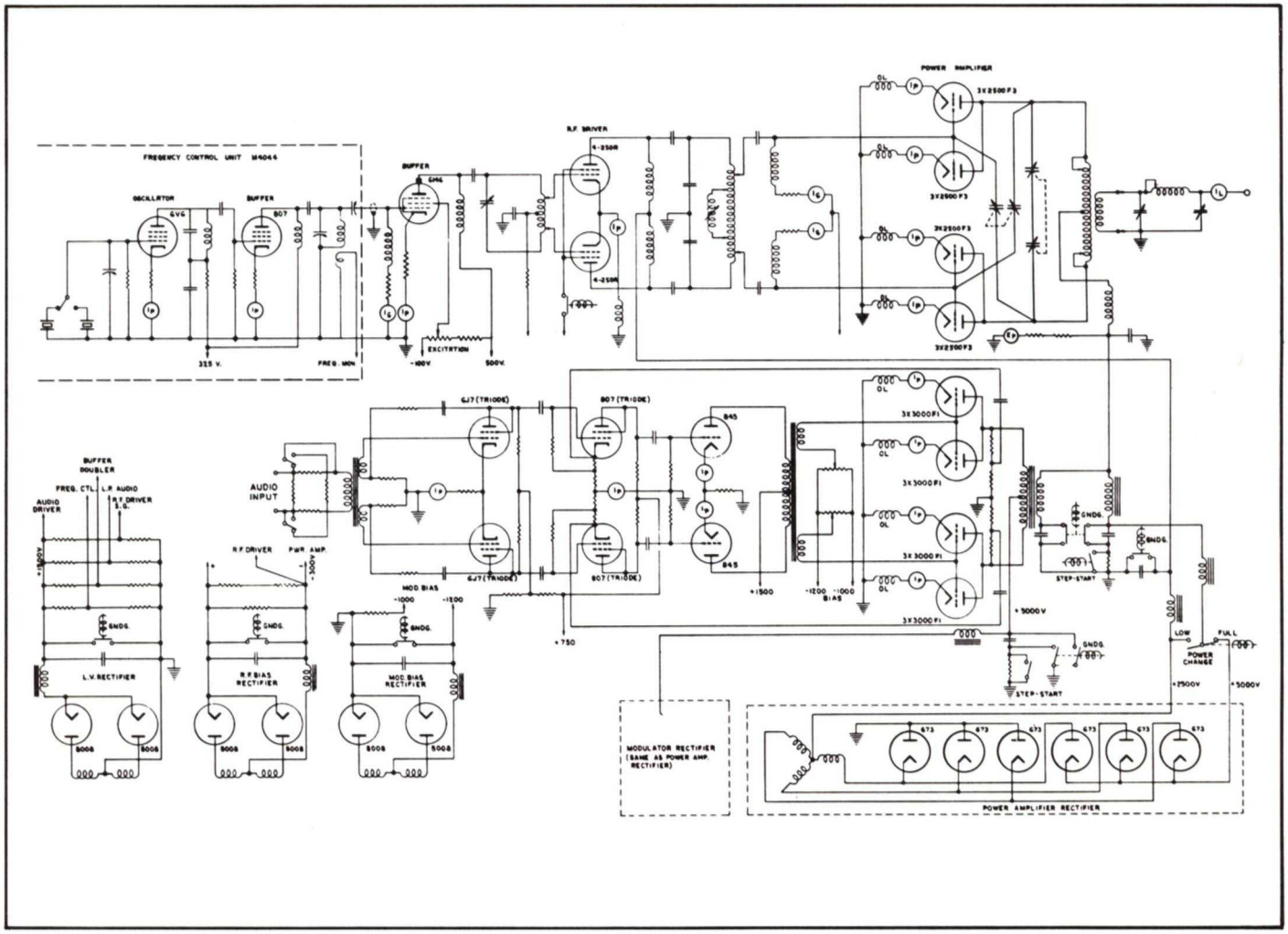
AUDIO INPUT LEVEL: +8 db $\pm$2 db for 100% modulation.

AUDIO INPUT IMPEDANCE: 600 ohms.

PRIMARY VOLTAGE: 230 volts, 3 wire, 50/60 cycles.

POWER CONSUMPTION: 37 Kw at zero modulation, 43 Kw at average modulation, 55 Kw at 100% modulation.

CARRIER SHIFT: 5% or less at 100% modulation.



MODEL BC-20B SPECIFICATIONS

TUBES: (Radio Frequency) 6V6 osc., 807 IPA, 6146 IPA, (2) 4-250A IPA, (4) 3X2500F3 power amplifiers.

(Audio Section) (2) 6J7 1st audio, (2) 807 2nd audio, (2) 845 3rd audio, (4) 3X3000F1 modulators.

(Power Supplies) (12) 673, (6) 8008.

TOTAL NUMBER OF TUBES: 37

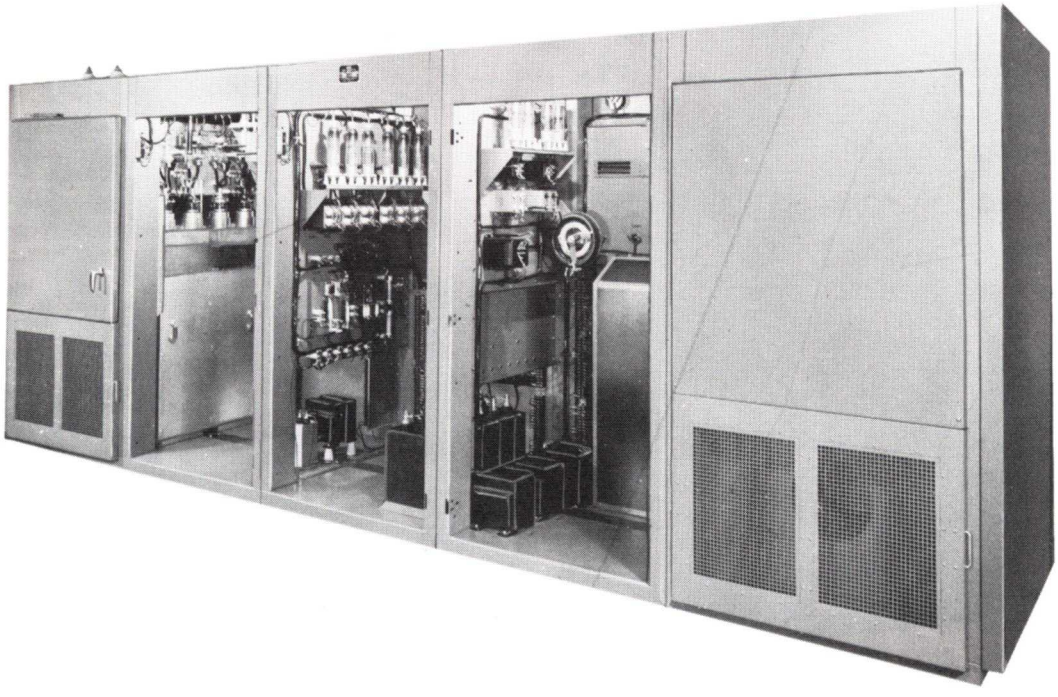
TOTAL TUBE TYPES: 10

SIZE: 78″ high, 210″ wide, 49″ deep. Front door swing, 40″. Floor space external transformers, 10′ x 2½′.

WEIGHT: 19,500 lbs. net, 23,000 lbs. packed.

CUBAGE: 720 cubic feet.

FINISH: Finish is in hand rubbed medium gray with trimmings in chrome, brushed aluminum and anodized black.



ORDERING INFORMATION

AM broadcast transmitter, 20,000 watts, with tubes, one crystal and oven	**BC-20P**
Spare 100% tube complement for above	**TK-229**
FCC tube complement (required FCC spares)	**TK-361**
Spare crystal and oven	**JK-57M**

10,000 WATT AM BROADCAST TRANSMITTER

Model BC-10P

The Gates BC-10P 10 KW broadcast transmitter has been designed with emphasis on wide frequency response to satisfy the discriminating listener, less floor space to permit a power jump in the same building facilities and low operating cost via reliability for lesser maintenance and lowest tube replacement cost.

CONSTRUCTION: BC-10P is completely self-contained in three cubicles each 24″ wide, 36″ deep and 78″ high. The three units, when joined as a single assembly, make a unit 73½″ long, 39½″ deep and 78″ high. These three cubicles contain as separate units, a power supply, modulator and radio frequency unit. As there are no mechanical interconnections such as tuning drives, bus-work, supporting frames, etc., the cubicles may be arranged in respect with each other in any sequence as best suits the installation. With additional end bells, the cubicles may be installed as separate units. Those increasing power or replacing existing equipment will note the small floor space area. Back doors are of the latch-on type and no door swing allowance is necessary. Even older model 1 KW transmitters often consumed this area. Installation of BC-10P may be made in nearly all buildings housing lower powered equipment at the present time.

HARMONIC RADIATION: Harmonic radiation is realistically reduced by constructing the entire radio frequency section within a heavy aluminum enclosure. This is known as elimination of cabinet radiation, otherwise serious in higher powered transmitters. The tank circuit includes a full Pi network, coil tuned and void of variable capacitors. It is believed no other 10 KW transmitter will equal the low potential harmonic radiation of the BC-10P transmitting plant.

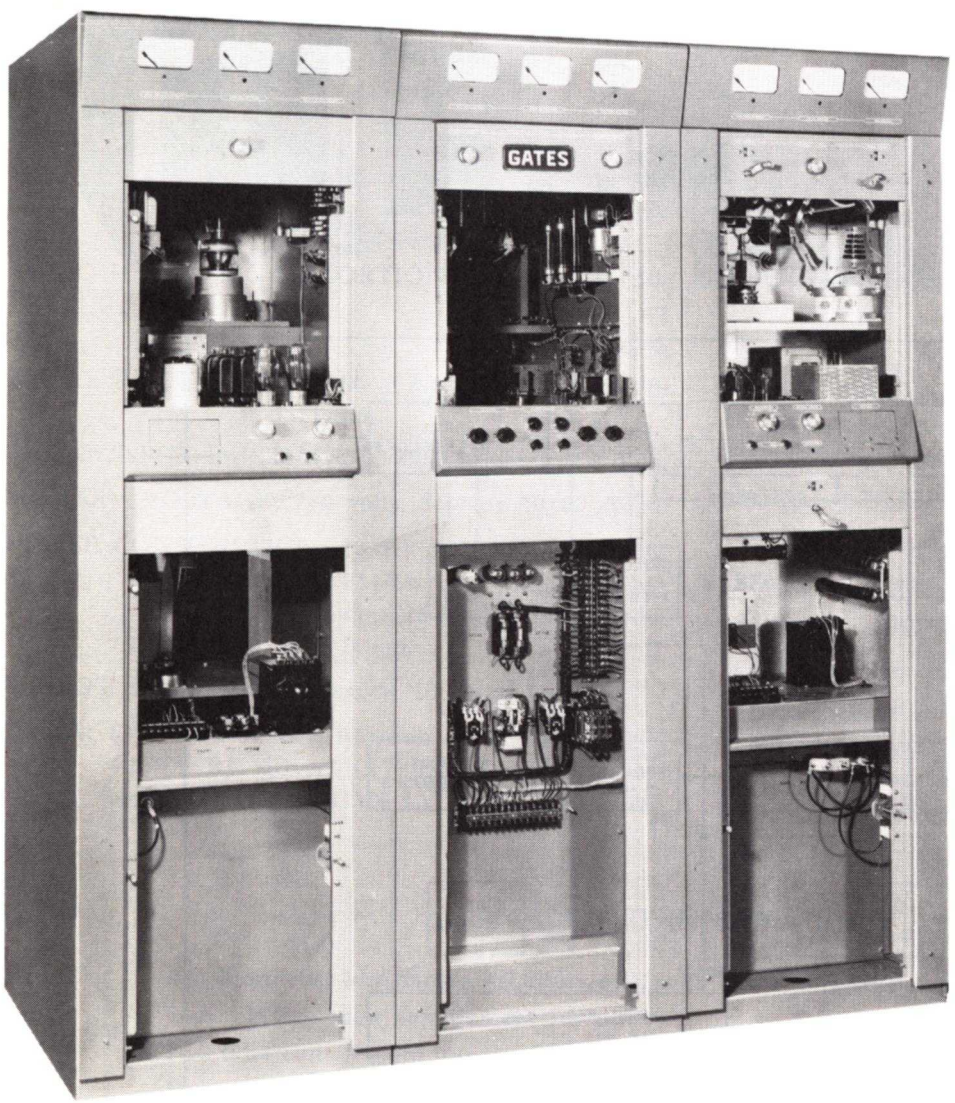
FIDELITY: Fidelity of the BC-10P transmitter extends to 15,000 cycles. Where adjacent channel conditions will not permit 15,000 cycle response, this may be reduced to

MODEL BC-10P 10 KW AM BROADCAST TRANSMITTER

meet FCC requirements. Low distortion is even more important to high fidelity than wide frequency response. The use of cathode follower audio drive, over-all audio feedback and over-powered RF grid drive assures day to day low distortion without exhaustive alignment and balancing. Not to be overlooked is the use of low impedance modulator tubes where transformer ratio between modulator plates and Class C amplifier impedance is near unity and conducive to best audio transfer at high efficiency and lower distortion.

COOLING: Many factors are associated with reliability. Cooling is the most important. The BC-10P transmitter incorporates individual cooling for each of the three cubicles comprising the entire equipment. Instead of one master blower, as in older models, where hot air could be spilled into another part of the transmitter, BC-10P has three sealed separate air chambers, each cooled separately. In this way, all air from the filtered intake at the base of each cubicle is sent through to the top exhaust point quite like the updraft of a flue. Components in the RF section are cooled with the tubes, remembering the RF section is an aluminum chamber. There is no cooler operating 10 kilowatter than the Gates BC-10P.

TUBES AND LIFE. Though the BC-10P has the lowest cost tube complement of any 10 KW broadcast transmitter, of much greater value is the long tube life and tube interchangeability. Major recognition must be given to interchangeability of RF power amplifier and modulator tubes in both maintaining highest performance standards and ability to obtain the last ounce of tube life through interchangeability. But again, the masterful cooling system plays a major part in tube life. The torrent of BC-10P air develops the longer tube life from the lowest cost tube complement.



REMOTE CONTROL: Whether remote control is attended or unattended, the engineer should note the 100% relay complement and absence of circuit breakers in control circuits. To adapt to remote control is as simple as making the connections. No major mechanical alterations or addition of control relays is necessary if remote control is in your operating picture.

OSCILLATOR. New vacuum mount ovenless crystals are used with pin-point accuracy. There is provision for two.

RF POWER PLANT. Single ended dual 3X2500F3 air cooled power stage feeds full-fledged Pi network. Tank and load tuning by variable coils. Optional RF ammeter in direct electrical circuit visable through port. Dual vacuum mount crystals excite untuned Colpitts oscillator. 6146 IPA and 4-250A tetrode drives 3X2500F3 power amplifiers. Maximum output power of 10,600 watts accommodates most complicated multi-tower phasor. Complete RF section is in right cubicle.

AUDIO: Four push-pull stages with overall feedback. Dual 3X2500F3 modulators interchangeable with RF power amplifier. Audio driver is cathode follower design. Modulator/audio section in left cubicle.

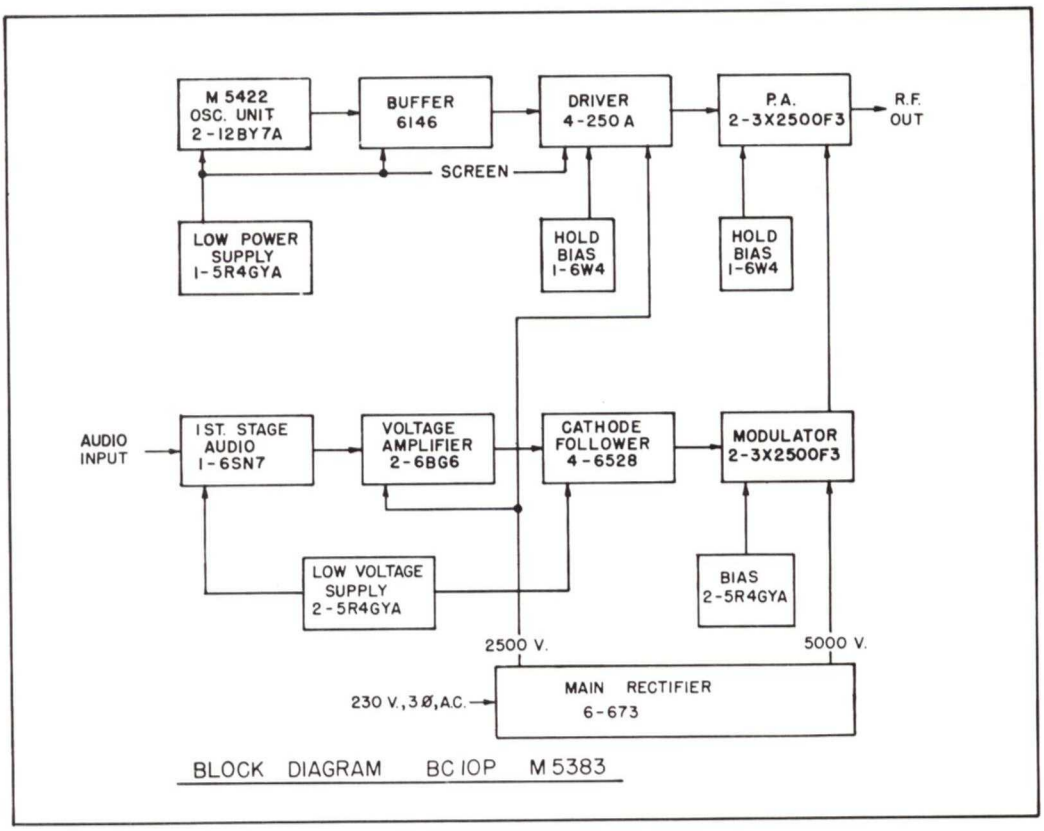
MODEL BC-10P BROADCAST TRANSMITTER

POWER SUPPLIES. Four in all, 3 low voltage supplies plus 3 phase full wave (six 673 tubes) main power supply.

RECYCLING. In case of overload, transmitter automatically recycles and places itself back on air. A rapid succession of overloads removes the high voltage. For remote control, this feature is indispensable.

PROTECTIVE DEVICES. Full overload, start, stop and interlock protection of relay type. No electrical or mechanical alterations necessary for adapting to remote control.

CONELRAD. As each radio frequency cubicle is independent to the over-all transmitter, a second RF cubicle for Conelrad may be purchased at less cost than a separate Conelrad transmitter. Simple instantaneous relay switching to Conelrad.



BLOCK DIAGRAM BC IOP M 5383

MODEL BC-10P SPECIFICATIONS

POWER OUTPUT: Rated 10,000 watts.
Capable 10,600 watts.

RF OUTPUT IMPEDANCE: 40-270 ohms, as ordered.

OUTPUT CONNECTOR: Type Feed thru.

RF RANGE: 535 Kc to 2000 Kc as ordered.

FREQUENCY STABILITY: ±10 cycles.

FREQUENCY MONITOR COUPLING IMPEDANCE: 50/70 ohms.

MODULATION MONITOR COUPLING IMPEDANCE: 50/70 ohms.

RF HARMONICS: Suppression of harmonics meets or exceeds FCC requirements.

POWER REDUCTION: Reduces to 2500 watts by switch control.

AUDIO FREQUENCY RESPONSE: ±1½ db, 30-10,000 cycles at 95% modulation. ±1½ db, 30-15,000 cycles under typical programming conditions.

AUDIO HARMONIC DISTORTION: 3% or less 50-7500 cycles at 95% modulation.

AUDIO INPUT LEVEL: 0 db ±2 db for 100% modulation.

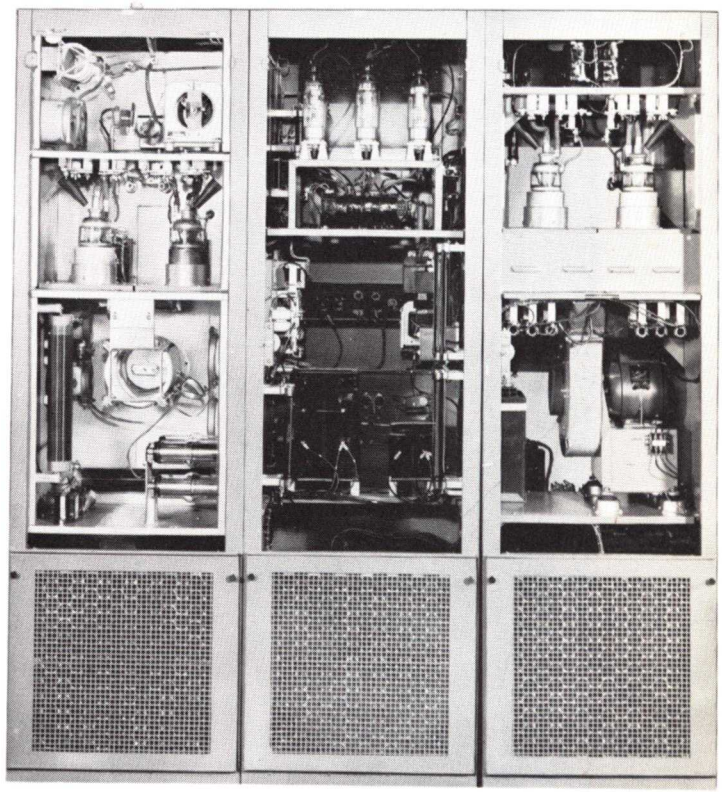
AUDIO INPUT IMPEDANCE: 600/150 ohms at 0 dbm.

PRIMARY VOLTAGE: 230 volts, 3 phase 50/60 cycles.

POWER CONSUMPTION: 18 Kw at zero modulation, 21 Kw at average modulation, 26 Kw at 100% modulation.

CARRIER SHIFT: 3% or less at 100% modulation.

TUBES: (2) 12BY7A osc./isolation buffer, 6146 IPA, 4-250A RF driver, (2) 3X2500F3 RF power amplifiers, (5) 5R4GYA LV power supply rectifiers, (6) 673 HV power supply rectifiers, (2) 6W4 hold bias rectifiers, 6SN7 first audio, (2) 6BG6 second audio, (4) 6528 cathode follower driver amplifiers, (2) 3X2500F3 modulators.



TOTAL NUMBER OF TUBES: 28.

TOTAL TUBE TYPES: 11.

SIZE: 78" high, 73½" wide, 39½" deep.

WEIGHT: 2650 lbs. net. 3400 lbs. packed.

CUBAGE: 198 cubic feet.

FINISH: Base color: dark industrial gray, with second color in semi-gloss medium gray. Control knobs in anodized aluminum and kurled for firm gripping.

ORDERING INFORMATION

AM Broadcast transmitter, 10,000 watts, with tubes, one crystal and oven	**BC-10P**
Spare 100% tube complement for above	**TK-314**
FCC tube complement (required FCC spares)	**TK-315**
Spare crystal and holder	**A30866**

NOTE: BC-10P also available with Silicon Rectifiers.

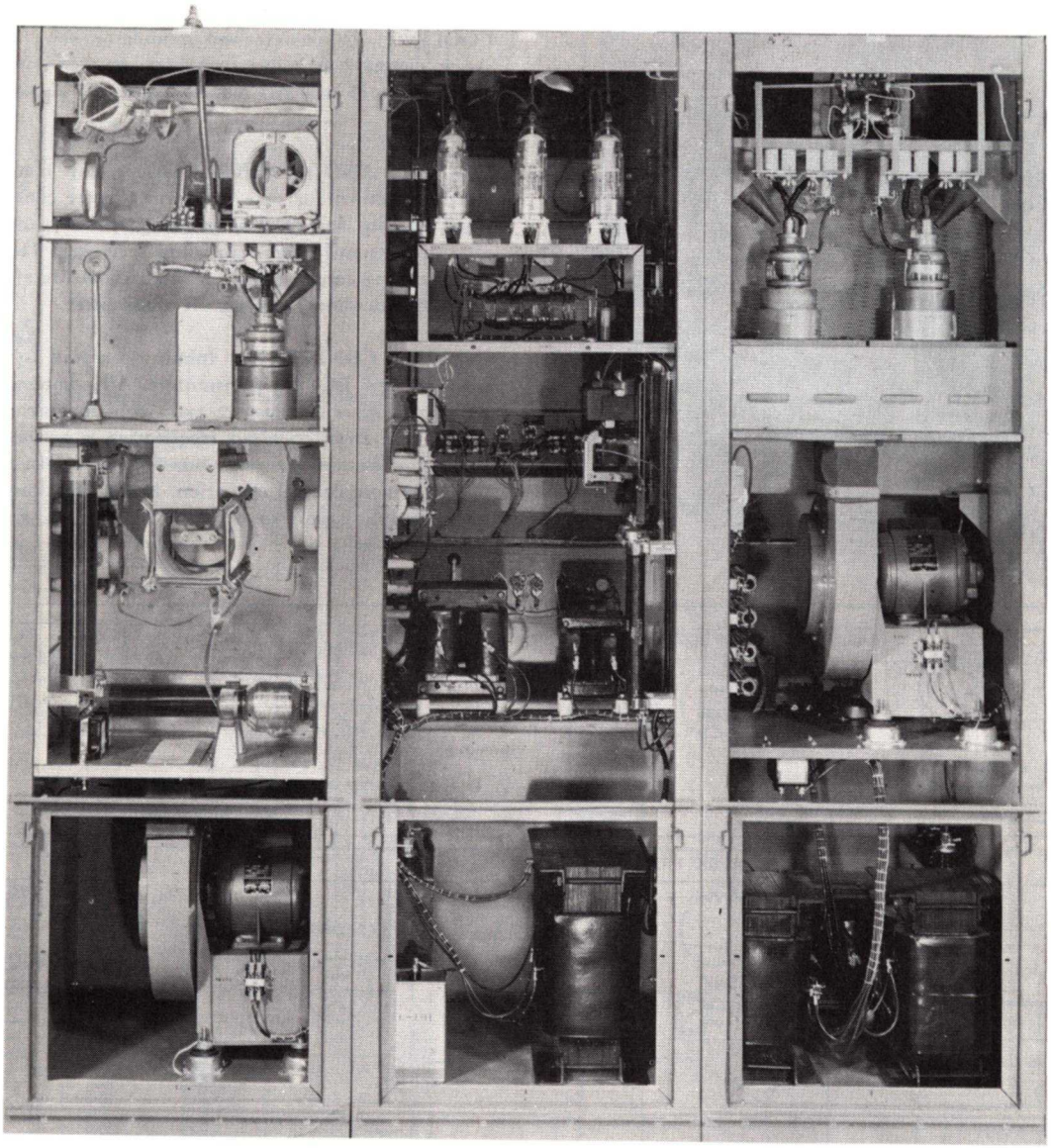
5000 WATT AM BROADCAST TRANSMITTER

Model BC-5P-2

The Gates BC-5P-2 transmitter offers a more reliable service and increased frequency stability through the use of the Gates M-5422 oscillator (with vacuum crystal holders that do not require crystal heaters). Larger filament rheostats have been added to give greater range of filament voltage control. This Gates 5 kilowatt transmitter also has new and improved wiring techniques which give the added advantage of extra voltage and current rating, neatness, and numbering for assistance in tracing out cables and circuits. Everyday reliability is the result of conservative component specifications and a 3-cabinet cooling system replacing the single blower. Gates BC-5P-2 has the advantage of exclusive styling, which includes new and improved door design, air filter, mounting and improved accessibility for servicing. A 100% air cooled RF power plant sets the pace by cooling all the important radio frequency components instead of only the power tubes. Lower tube cost is twofold in both the lowest dollar cost for a complete tube complement and longer tube life through the advanced cooling system and high efficiency.

RADIO FREQUENCY SECTION: As shown in the rear view, the RF section is the left cubicle. As each cubicle is mechanically independent of the other, the RF cubicle could also be to the right or completely separate. In this way, the RF section may be placed exactly convenient to the desired phasor location or transmission line exit from the building. Headed by dual vacuum type crystals requiring neither oven, thermometer nor thermostat, the

BC-5P-2 5000 WATT AM BROADCAST TRANSMITTER



four RF stages are self-neutralized except the triode 3X2500F3 power amplifier. The final tank plus the complete 2-coil Tee output coupling network is variable coil tuned, eliminating chance for arc over. The squirrel cage blower at the bottom cools this cubicle only and places every major component under forced air.

AUDIO SECTION: This cubicle can be moved from left to right, too. A second independent cubicle is forced air cooled by another blower identical to that in the RF cubicle. Four stages, all push-pull, feature an ultra linear driver amplifier, known world-wide as the ultimate in low distortion audio. Modulators are Class B 3X2500F3 tubes and are interchangeable with the RF power amplifier. Over-all feedback from the modulator plates to the input stage grids, adds to the excellent performance possible even without feedback.

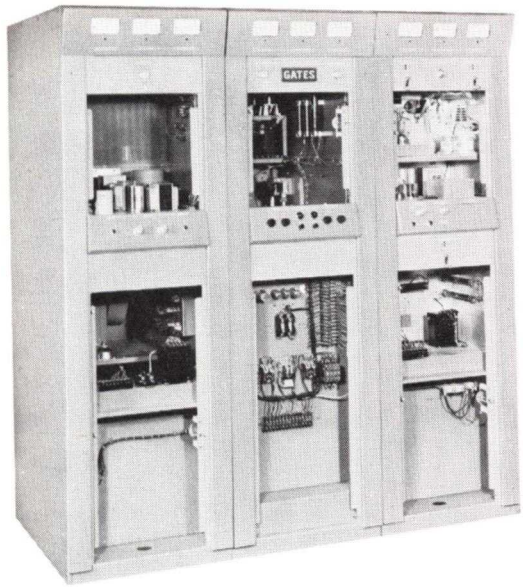
POWER SUPPLIES: Five power supplies include (a) the six tube, three phase, full wave, 5000 volt, high voltage supply, (b) audio driver supply, (c) RF driver supply, (d) modulator bias supply, and (e) RF bias supply. All are well regulated and excellently filtered power supplies of the highest order. 100% silicon rectifiers optional.

PROTECTIVE: A complete relay complement for overload, start-stop, interlock and condenser discharge. Air pressure switches replace the older damper type interlock to supply 100% protection in case of failure.

REMOTE CONTROL: The use of relays in the protective system is a natural adjunct for easy attachment of remote control. As circuit breakers are not used in major control circuits, alterations, either mechanical or electrical, are negligible. Remote control may be installed without involved wiring changes. Circuits to be affected are provided with extra terminals.

RECYCLING: In case of overload the transmitter automatically places itself back on the air until overload has been determined permanent, an indispensable feature for both attended and unattended operation.

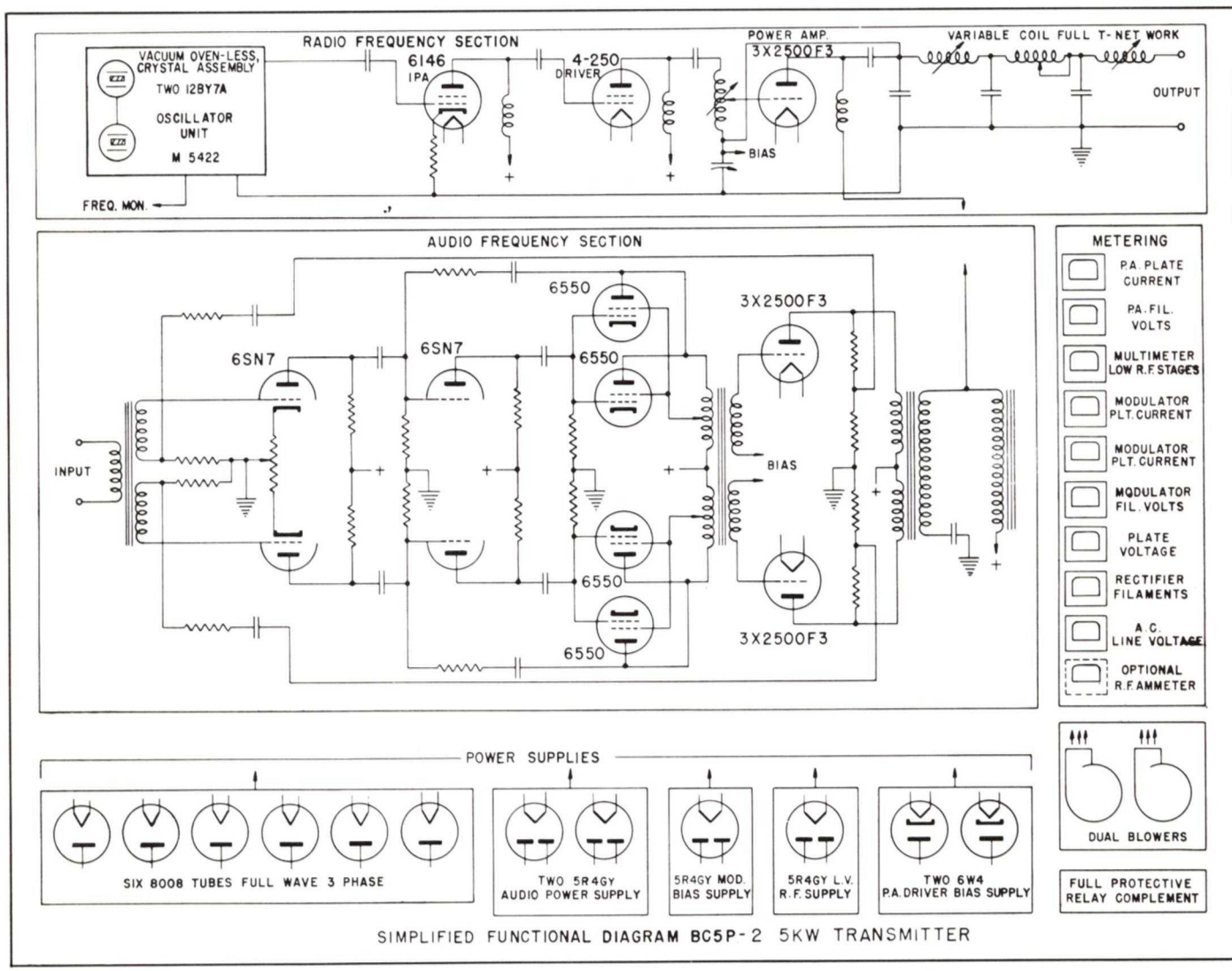
BC-5P-2 5000 WATT AM BROADCAST TRANSMITTER



COOLING: RF cubicle and modulator cubicles have individual shock mounted impeller type blowers. Power supply cubicle has exhaust fan in top. All motors are single phase for easy maintenance.

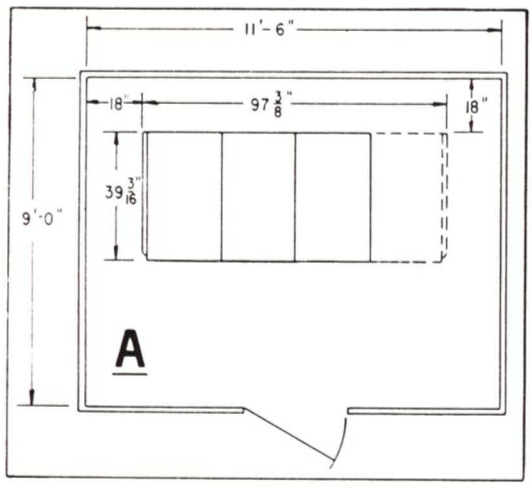
STYLING AND CONSTRUCTION: Top meter panels tilt forward and down for ease in vision. Center control panels tilt forward and up for ease in handling. Front panels of semi-hinged type are instantly removable for servicing. Three back doors of latch-on type conserve space. Three cleanable air intake filters are removable without turning off transmitter.

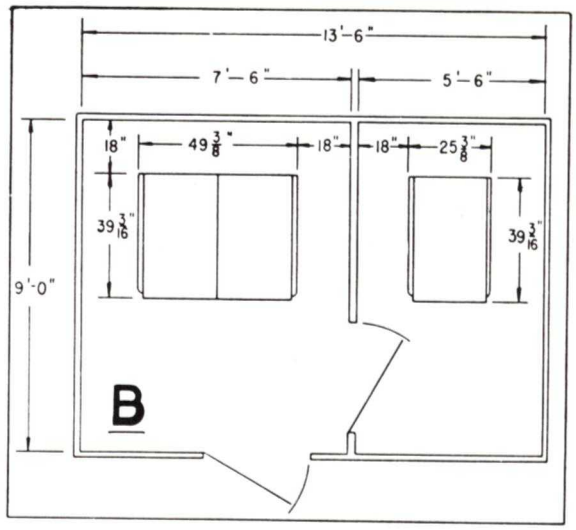
INBUILT CONELRAD: Inbuilt conelrad system is available with all new BC-5P-2 transmitters. All components are housed in RF cubicle thus eliminating extra cubicle previously used. Switching to and from conelrad frequencies is accomplished by merely pushing a button for each function. Is easily adaptable to unattended remote control operation, as the broadcaster simply changes tower coupling unit to conelrad frequencies. Output on conelrad frequencies will be the same as on regular frequency.

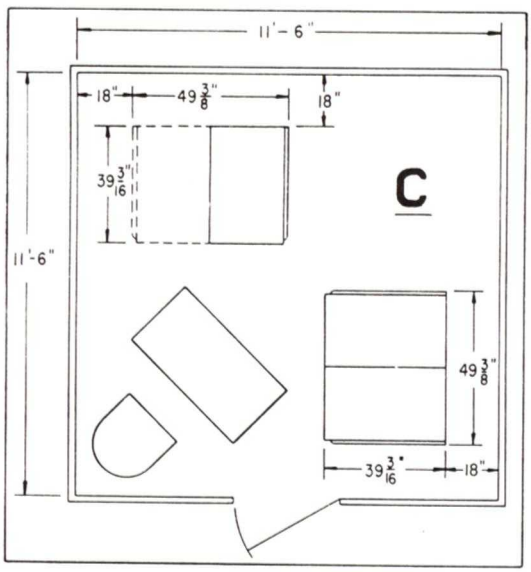


SIMPLIFIED FUNCTIONAL DIAGRAM BC5P-2 5KW TRANSMITTER

BC-5P-2 VERSATILE FLOOR PLANS







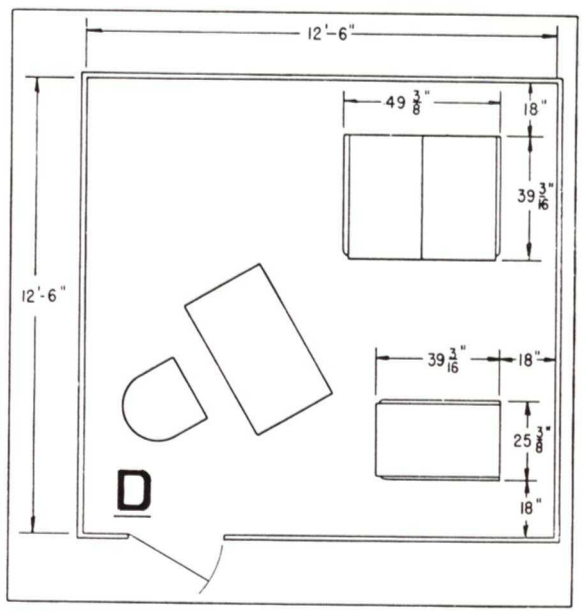


FIG. A: Three cubicles comprise the transmitter. The fourth (dotted line) may be either a phasor or extra RF cubicle for Conelrad or standby. The RF cubicle and phasor may be to the left or right side, as preferred. Note very small floor area even with extra cubicle added.

FIG. B: Often when increasing power to 5 KW the transmitter building is too small. As each cubicle in BC-5P-2 is independent, they may be moved around as desired. Here, one of the BC-5P-2 cubicles has been placed in the tool or bunk room. This may also be a simple lean-to added to the present building.

FIG. C: In this arrangement a square building accommodates 2 cubicles on one side of the room and 2 cubicles at 90° angle. In this way, a complete transmitter plus phasor will install in the most cramped quarters, leaving ample room for a rack or audio, monitor and remote control equipment. As both front and back doors are of latch-on type, provision for door swing is unnecessary.

FIG. D: Another method of BC-5P-2 installation. Floor space, in this arrangement, is kept to an absolute minimum. Actually most 250 watt buildings will accommodate this arrangement.

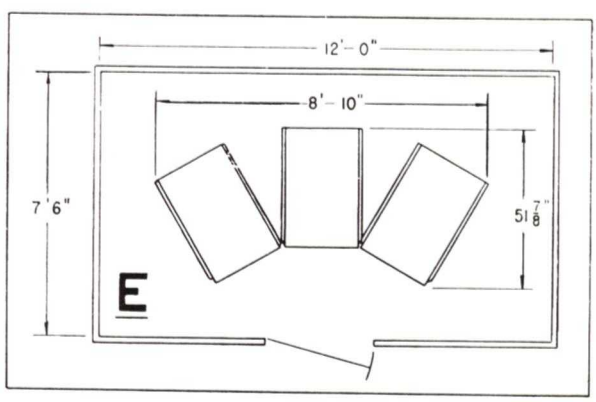


FIG. E: Here is something different in 5 KW floor arrangements. Only Gates design permits a semi-horseshoe floor plan. Only Gates has independent cubicle design where cooling and electrical construction is complete in each cabinet or cubicle and wire jumpers between cubicles is the only necessity for complete operation.

BC-5P-2 5000 WATT AM BROADCAST TRANSMITTER

SPECIFICATIONS

POWER OUTPUT: Rated 5000 watts.
Capable 5600 watts.

RF OUTPUT IMPEDANCE: 40-370 ohms.

OUTPUT CONNECTOR: Feed thru insulator.

RF RANGE: 535-2000 Kc, as ordered.

FREQUENCY STABILITY: ±5 cycles.

FREQUENCY MONITOR COUPLING IMPEDANCE: 50/70 ohms.

MODULATION MONITOR COUPLING IMPEDANCE: 50/70 ohms.

RF HARMONICS: Suppression of harmonics meets or exceeds FCC requirements.

POWER REDUCTION: Carrier reduction to approximate 1 kw.

AUDIO FREQUENCY RESPONSE: ±1½ db, 30-12,000 cycles. Where ordered, transmitter will be supplied to maximum high frequency response of 7500 cycles to meet new FCC regulations for lower sideband radiation.

AUDIO HARMONIC DISTORTION: 3% or less, 50-7500 cycles at 95% modulation.

AUDIO INPUT LEVEL: —5 db ±2 db for 100% modulation.

AUDIO INPUT IMPEDANCE: 600/150 ohms at —5 dbm.

PRIMARY VOLTAGE: 230 volts, 3 phase, 50/60 cycles.

POWER CONSUMPTION: 10.2 KW at zero modulation, 11.5 KW at average modulation, 15 KW at 100% modulation.

CARRIER SHIFT: 3% or less at 100% modulation.

TUBES: 12BY7 osc., 12BY7 1st amp., 6146 buffer, 4-250A RF driver, 3X2500F3 power amplifier, 6SN7 1st audio, 6SN7 2nd audio, (4) 6550 audio driver, (2) 3X2500F3 modulator, 6W4 driver hold bias rectifier, 6W4 PA hold bias rectifier, (2) 5U4G audio plate rectifier, 5U4G modulator bias rectifier, (6) 8008 main rectifier.

TOTAL NUMBER OF TUBES: 24.

TOTAL TUBE TYPES: 9.

SIZE: 78" high, 73½" wide, 39½" deep.

WEIGHT: 2186 lbs. net. 2970 lbs. packed.

CUBAGE: 198 cubic feet.

FINISH: Base color medium dark glossgray, hand rubbed with second tone in medium light gray. Control knobs in anodized aluminum and knurled for firm gripping.

ORDERING INFORMATION

Model BC-5P-2 broadcast transmitter, 5000 watts, with tubes, and one crystal	**M-5565**
Spare 100% tube complement for above	**TK-321**
FCC tube complement (required FCC spares)	**TK-322**
Conelrad adaptor kit installed in transmitter	**M-5969**
Spare crystal and vacuum holder	**A-30866**

BC-5P-2 5,000 WATT AM TRANSMITTER WITH SILICON DRY RECTIFIERS

BC-5P-2 5 KW TRANSMITTER: Silicon rectifiers are offered as an option with the BC-5P-2 transmitter. Exhaustive tests performed by Gates and data available from all dry rectifier manufacturers indicates that silicon rectifiers are the most reliable for the exacting requirements of broadcast service. They are used in all D.C. power supplies, both high and low voltage. Conservatively rated 25 ampere units are used in the 5000 V supply, and plug-in type silicon rectifiers are used in the low voltage and bias supplies.

The Gates BC-10P transmitter, 10,000 watt companion model to the BC-5P-2 transmitter, is also available with silicon rectifiers.

BC-50C 50 KW BROADCAST TRANSMITTER: Silicon rectifiers are used in all D.C. power supplies in the new Gates BC-50C 50,000 watt transmitter. Every precaution has been taken for protection of silicon rectifiers in this transmitter, including ultra conservative power rating and instantaneous trip circuit breakers, which have faster acton than the silicon rectifier specifications require. Forced air cooling is used to insure operating temperatures well below the ambient temperature specifications.

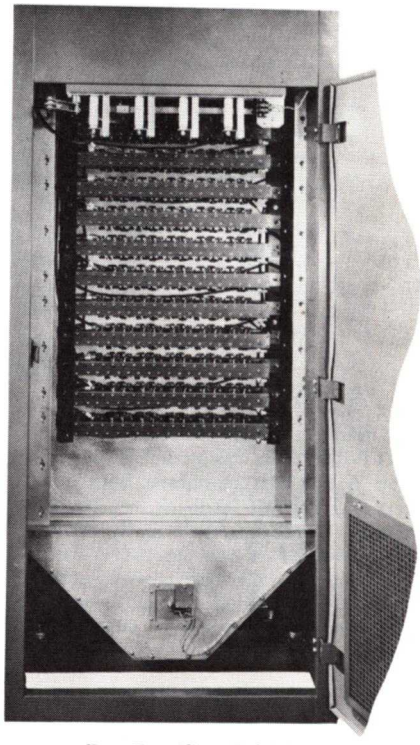
BC-1T 1 KW TRANSMITTER: Silicon rectifiers are offered as an option in this transmitter, and are used in all D.C. power supplies, both high and low voltage. The BC-500T 500 watt transmitter and the BC-250T 250 watt model are also available with silicon rectifiers.

ADVANTAGES OF SILICON RECTIFIERS:

- Compact size
- Long life
- Allows remote control operation of transmitter in unheated building
- Eliminates need for rectifier filament power and reduces power consumption of transmitter
- Allows plate voltage to be applied to transmitter immediately without waiting for rectifier tube to warm up
- Simplifies transmitter maintenance

Pricing information on all Gates transmitters equipped with silicon rectifiers available on request.

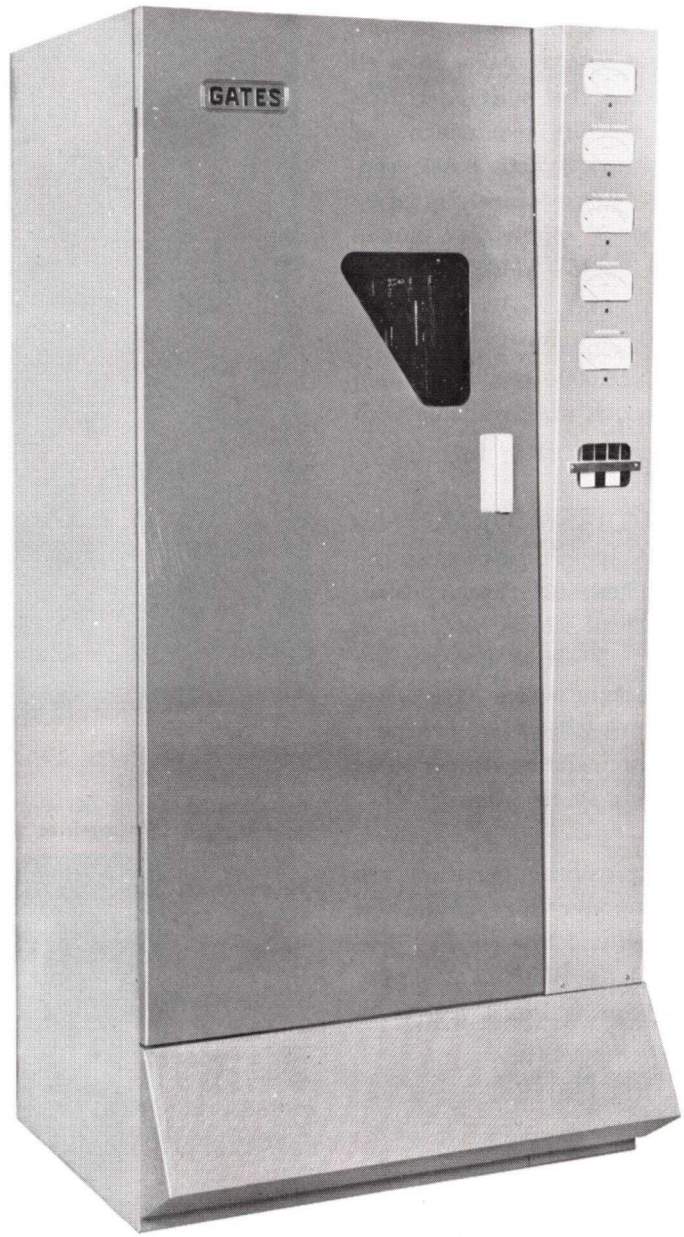
BC-5P-2 5000 Watt AM
Transmitter with Silicon Rectifiers



Dry Rectifier Cubicle,
BC-50C 50 KW Transmitter

1000 WATT AM BROADCAST TRANSMITTER

Model BC-1T



Listenability is defined as that unusual rich quality that holds listeners to BC-1T dial spots. The combination of cathode follower, a modulation system that modulates both the Class C and RF driver amplifiers and over-all feedback, results in a new distortion low. Prototype BC-1T transmitters actually produces 50 cycle distortion as low as one-half of one percent. As a result, production models are easily held in the one percent range. The frequency response has been gently tilted up to 50 and 10,000 cycles to balance response losses often found in other parts of the over-all broadcasting system.

CONSTRUCTION. Transmitter is in a heavy 16 gg. steel cabinet. rigidly reinforced and attractively styled. Meter panel slopes forward for ease in observation and gives the added touch for today's modern radio age. A full length front door is held closed by magnetic door catches. Behind the front door is a full length perforated girll, interlocked for personnel protection but affording full view of components from top to bottom, with the transmitter in operation. This perforated grill may be removed in seconds by means of snap locks. All operating controls are instantly accessible by opening the door. At the bottom front is a full width filtered air intake grill. Exhausted air is brought out of the top by dual exhaust fans. Though the back of the transmitter is quickly removable, there is no need to do so as servicing is accomplished from the front. With this exclusive design, the transmitter may be located near or against the wall with great savings in floor space and the convenience of more usable room in the transmitter building. The cabinet side is also removable. Though the need is unlikely, every part may be reached down to the smallest resistor, in seconds.

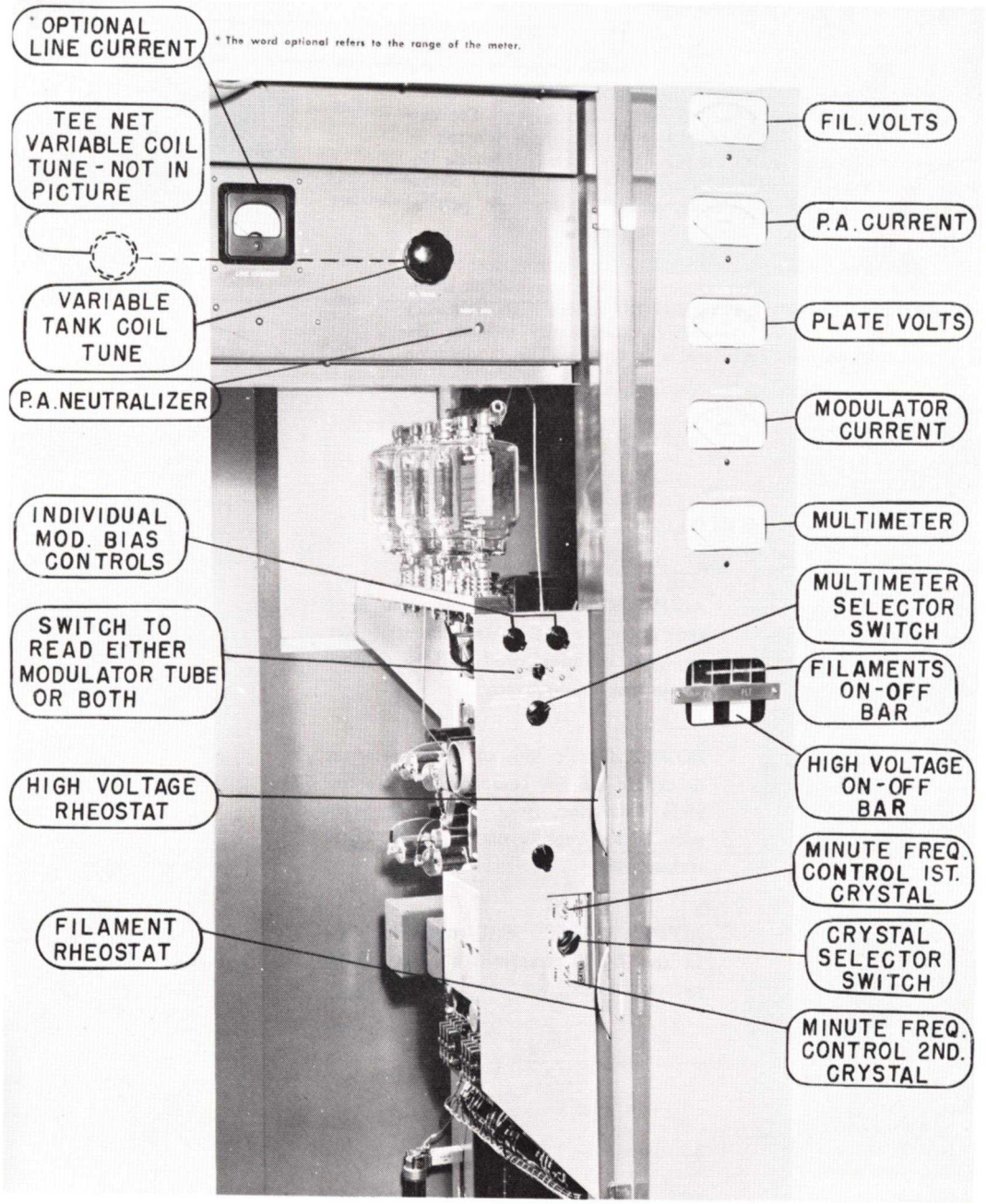
MODEL BC-1T 1000 WATT AM BROADCAST TRANSMITTER

INBUILT DUMMY ANTENNA. For off air testing, the BC-1T includes an inbuilt dummy antenna that will handle the full 1000 watts power 100% modulated. For the new station yet to go on the air, complete tests may be made even before the tower is up, often saving days of time. The station already on the air will find this feature indispensable. Regular maintenance becomes a pleasure. Testing may be done any time instead of waiting until wee hours after midnight. A light indicates when the dummy antenna is in use to omit possibility of leaving dummy antenna in the circuit for regular broadcasting.

PRINTED WIRING. Printed wiring is uniformity. Wiring is always errorless. More important is reliability. No wires to chafe or deteriorate in the more critical circuits of the transmitter. Do not confuse printed wiring with printed circuit. In BC-1T there are no printed components—only printed wiring. The oscillator-IPA unit, RF driver section, audio amplifier section and feedback ladder are all printed wiring. In maintenance and point to point checking, the engineer will not overlook the tremendous advantage of printed wiring with no wires or parts stacked on top of each other.

LOCAL REMOTE CONTROL. Handled entirely by relays. No hard to adapt circuit breakers are employed. Terminals are incorporated for attachment of filament on-off and high voltage on-off for remote control. Overload relays and time delay relays are all of the type and circuit which assures positive protection and easy adaptation to remote control.

COOLING. Across the bottom front is a full width grill behind which is a replaceable air filter. In the top of the cabinet are two,



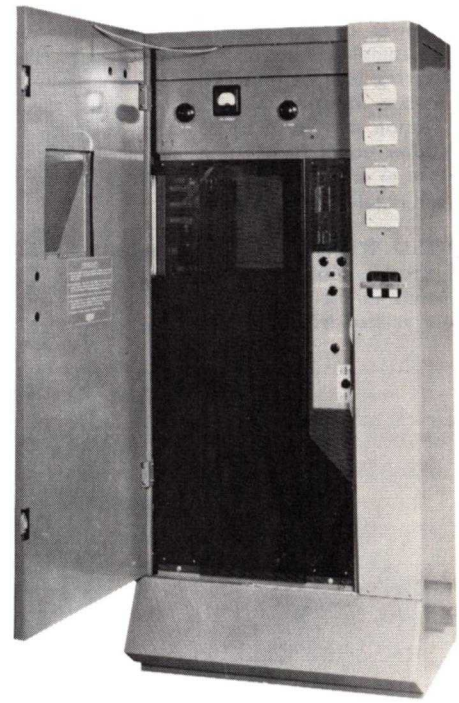
MODEL BC-1T 1000 WATT AM BROADCAST TRANSMITTER

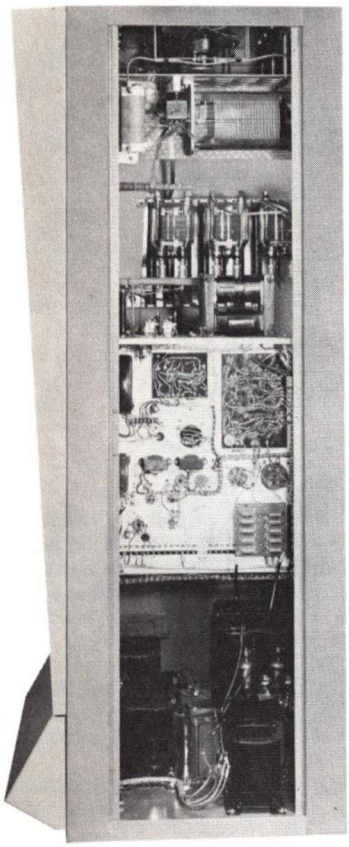
quiet operating suction fans. One of these is directly over the power tube section. By observing the inner BC-1T construction, the engineer will note all components, large and small, are in the exact circulating air stream. BC-1T cooling has been as much of the engineering consideration as the outstanding electrical design.

METERING. The five wide-face 4" meters read every necessary measurable circuit. Individual meters continuously read plate volts, PA plate current, filament volts and modulator current. The fifth meter, a multimeter, is switch selectable to necessary grid and cathode circuits over the entire transmitter. Individual modulator plates may be observed by a key that switches the modulator current meter to either tube. When this key is in the center position, both tubes are metered. A 0-8 line meter is mounted at the top center. The question may be asked as to reaching meters for servicing. The front shield does not hold the meters. This shield is quickly removable and all meters are 100% accessible.

RF SECTION. Dual vacuum type crystal units require no temperature oven for pin-point stability. Frequency adjustment and crystal changeover are from the front. There are four RF stages, with all stages self-neutralized except the last. Dual long-life 833A tubes feed 1000 watts into a complete Tee network for exact loading and harmonic attenuation. The final amplifier and Tee network are tuned by variable coils of the large edgewise type, manufactured by Gates. A portion of the audio is applied to the RF driver plate to provide linear RF drive under modulation for improved performance and ease of modulating. The oscillator-IPA unit and RF driver section incorporate printed wiring throughout.

AUDIO SECTION. Three stages, all push-pull. The cathode follower driver stage has dual 6BG6G tubes, a tube similar to the 807. The modulation transformer has been designed for extremely low leakage for superb high frequency performance. Typical production BC-1T transmitters continually indicate distortion under 2% at the critical 7000 cycle audio frequency. The modulation

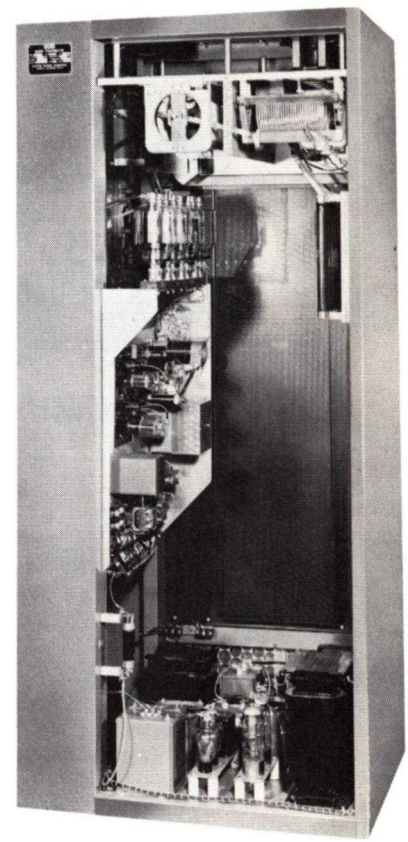




ABOVE RIGHT: Open the front door and every tuning control is at finger tip, plus an interlocked grill to observe transmitter components.

LOWER LEFT: Side of BC-1T removes to expose the few components not accessible from the front. Reaching every part is an engineering must in Gates transmitters.

LOWER RIGHT: Full length rear view of the BC-1T transmitter. The design radiates confidence.



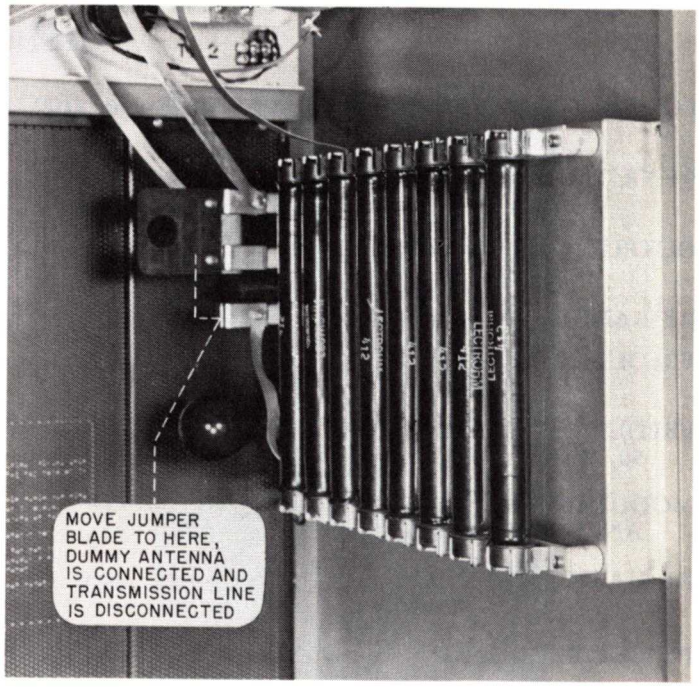
MODEL BC-1T 1000 WATT AM BROADCAST TRANSMITTER

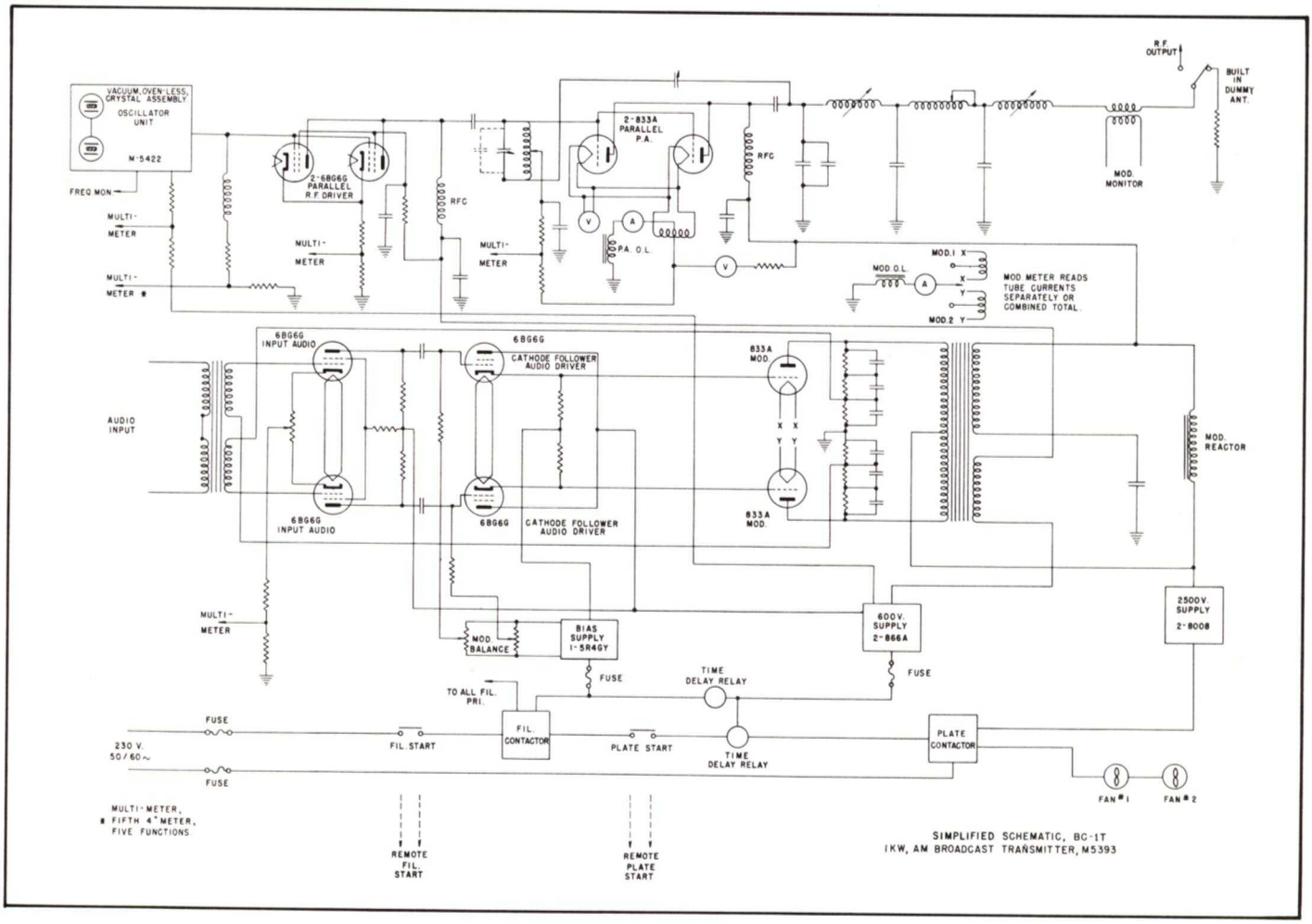
transformer has two secondary windings, one for high level modulating the Class C amplifier, the other for partially modulating the RF driver. A full sized modulation reactor is also employed. Cathode follower audio drivers, feedback, all push-pull audio and new transformer design produces true high fidelity. Wide frequency response combined with lower than ever distortion provides real listenability.

POWER SUPPLIES. One husky, low voltage supply with dual 866A rectifiers delivers well filtered direct current to all stages except the RF power amplifier and modulators. The power tubes are devoted exclusively to the high voltage supply with full wave 8008 rectifiers. A third bias supply for the Class B modulators with individual bias rheostats completes a dependable, easy-working type of power section.

MONITORS. This transmitter will operate with all current makes of frequency and modulation monitors. A scramble wound pickup coil inductively couples the modulation monitor. The frequency monitor connects to the 1st IPA in the crystal oscillator section. A modern transmitter accessory cabinet including monitors and limiting amplifier also available.

CONELRAD. The BC-1T is designed for instantaneous Conelrad switching by remote control or from front panel controls. The addition of the Conelrad feature is optional.





MODEL BC-1T 1000 WATT AM BROADCAST TRANSMITTER

SPECIFICATIONS

POWER OUTPUT: Rated 1000 watts. Capable 1100 watts.

RF OUTPUT IMPEDANCE: 50 ohms, or other as ordered.

OUTPUT CONNECTOR: Type ceramic feed-thru bowl, 1/4-20 hardware.

RF RANGE: 540 kc to 1600 kc, as ordered.

FREQUENCY STABILITY: ±10 cycles (Typical: ±2 cycles.)

FREQUENCY MONITOR COUPLING IMPEDANCE: 50/70 ohms.

MODULATION MONITOR COUPLING IMPEDANCE: 50/70 ohms.

RF HARMONICS: Suppression of harmonics meets or exceeds FCC requirements.

POWER REDUCTION: To 500 W or 250 W.

AUDIO FREQUENCY RESPONSE: ±1½ db 30-12,000 cycles. (Typical: ±1½ db 30-16,000 cycles under practical programming conditions.)

AUDIO HARMONIC DISTORTION: 3% or less 50-10,000 cycles at 95% modulation. (Typical: 2% or less 50-16,000 cycles under practical programming conditions.)

AUDIO INPUT LEVEL: +12 db for 100% modulation.

AUDIO INPUT IMPEDANCE: 150/600 ohms.

PRIMARY VOLTAGE: 230 volts, 2 wire, 50/60 cycles.

POWER CONSUMPTION: 2740 watts at zero modulation, 4000 watts at 100% modulation.

CARRIER SHIFT: 3% or less at 100% modulation.

DUMMY ANTENNA: 51½ ohms. Capability 1000 watts carrier 100% modulated, inbuilt.

TUBES: 12BY7A oscillator, 12BY7A 1st IPA, (2) 6BG6G 2nd IPA, (2) 833A power amplifiers, (2) 6BG6G 1st audio, (2) 6BG6G 2nd audio, (2) 833A modulators, 5R4GY rectifier, (2) 866A LV rectifiers, (2) 8008 HV rectifiers.

TOTAL NUMBER OF TUBES: 17

TOTAL TUBE TYPES: 6

SIZE: 78" high, 36" wide, 32" deep. Front door swing 28".

WEIGHT: 800 lbs. net. 1090 lbs. packed.

CUBAGE: 110.0

FINISH: Finish is in hand rubbed medium gray with trimmings in chrome, brushed aluminum and anodized black.

Open and closed views of the new ovenless, low drift crystal oscillator — first IPA unit.

ORDERING INFORMATION

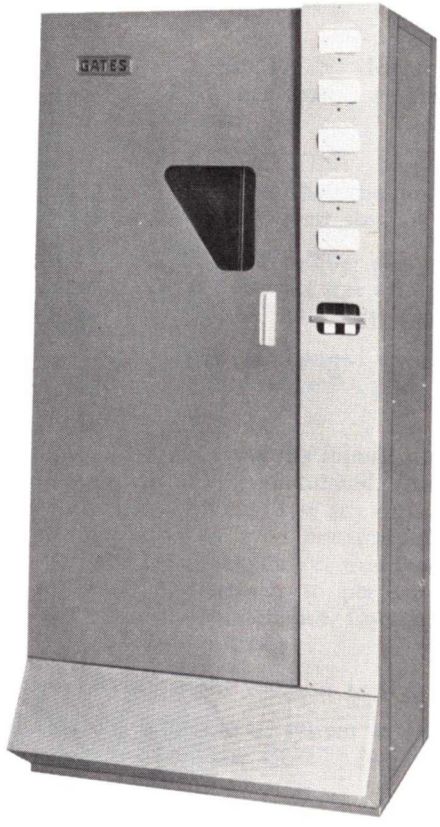
AM broadcast transmitter, 1000 watts, with tubes, one crystal, dummy antenna	**BC-1T**
Spare 100% tube complement for above	**TK-287**
FCC tube complement (required FCC spares)	**TK-288**
Spare crystal and holder	**A-30866**

NOTE: See page 41 for additional conelrad information.

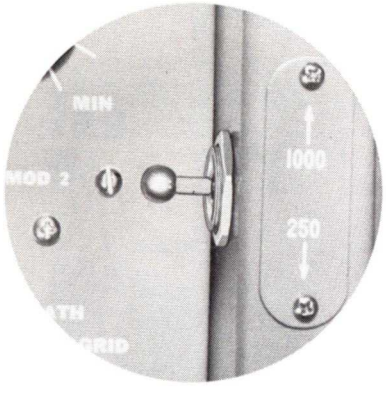
1000/250 WATT AM BROADCAST TRANSMITTER

Model BC-1T

With the Gates BC-1T 1000/250 watt transmitter, you efficiently reduce power to 250 watts nighttime operation by changing the primary voltage of the plate transformer. In this manner, when operating at reduced power of 250 watts, the primary power consumption is at a minimum, and the use of plate voltage dropping resistors, which are power consuming, is eliminated.



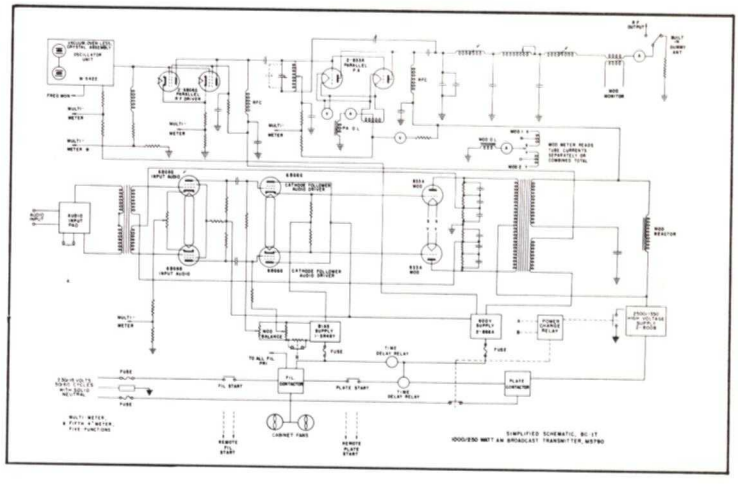
This reduced plate voltage at 250 watts power to both the modulator and power amplifier tubes results in hundreds of added tube hours and a great savings in power cost.



The *exclusive* Gates feature of the inbuilt dummy antenna will also be appreciated by the engineer. With two-power operation at 1000 and 250 watts, initial alignment and periodic proof of performance required at two power levels is accomplished with utmost simplicity.

In summary, the BC-1T 1000/250 watt transmitter offers you the convenience of already having a one kilowatt transmitter installed — needing only to throw the switch for a change in power. Power change may also be remote controlled.

For complete technical information on the BC-1T transmitter, see data on preceding pages.



ORDERING INFORMATION

BC-1T transmitter for 1000/250 watts complete with tubes, one crystal, dummy antenna and ready to operate M-5790

NOTE: FCC type approval on 1000/250 transmitter is Model BC-1T. Catalog No. M-5790 is for ordering purposes only.

Spare 100% tube complement for above TK-287

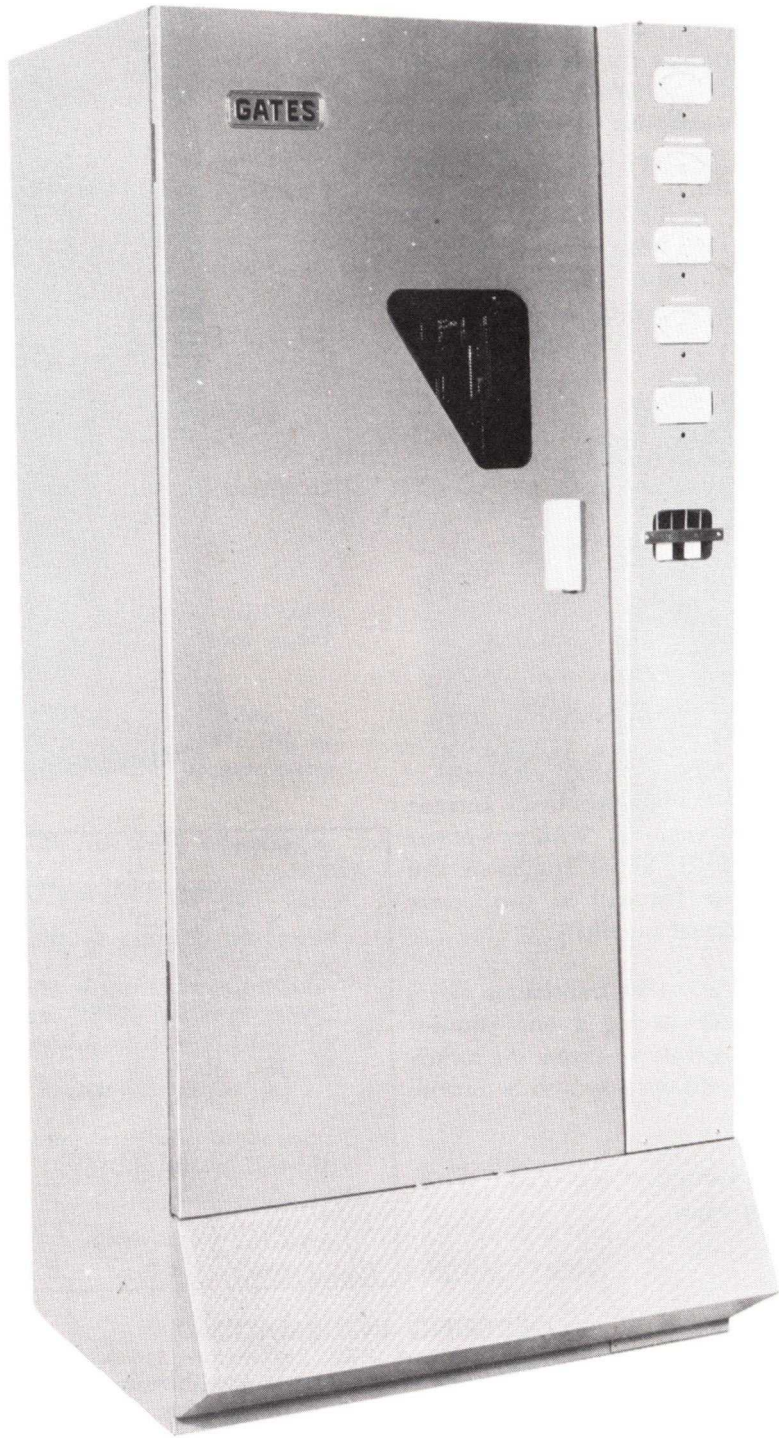
FCC tube complement (required FCC spares) TK-288

Conelrad adaptor kit installed in transmitter .....

Spare crystal and holder A-30866

500 WATT AM BROADCAST TRANSMITTER

Model BC-500T



Except where modified for 500 watt service, the BC-500T is essentially the same as the BC-1T, 1000 watt model. Step up to 1000 watts, at any later date, may be done quickly and effectively with the BC-500T.

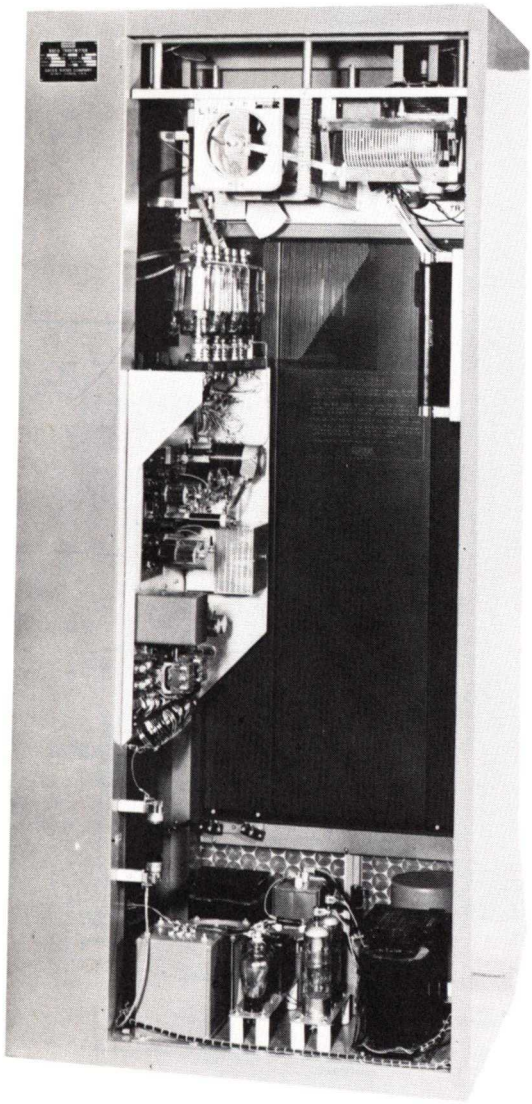
As the basic description of the BC-500T transmitter is the same as Model BC-1T, the following pages cover information pertinent to the BC-500T and for all other descriptive data the reader is asked to refer to Model BC-1T.

MODEL BC-500T 500 WATT AM BROADCAST TRANSMITTER

GENERAL DESCRIPTION
(Model BC-500T)

In standardization of manufacturing processes, the BC-500T transmitter is produced on the same line and with most of the same components as the BC-1T, 1000 watt model. Modification of the BC-1T to become the BC-500T consists of only the necessary basic changes to meet FCC requirements along with proper power, modulation and reactor transformer sizes.

For metering, local-remote control, cooling, general construction, audio section and other data common with BC-500T to the BC-1T, reference to the BC-1T will not only provide the desired information but emphasize the 1000 watt basic design of this modern 500 watt model.



This is BC-500T from the rear. Modern design and husky construction spells confidence for the heaviest broadcasting schedule.

RADIO FREQUENCY SECTION: Identical in all respects to Model BC-1T other than a single 833A power amplifier tube is employed.

AUDIO FREQUENCY SECTION: Identical in every way to that in the BC-1T other than the modulation transformer and reactor are of 500 watt size.

POWER SUPPLY SECTION: The power transformer and filter reactors are of 500 watt size in the high voltage supply. The balance is BC-1T 1000 watt design.

METERING for BC-500T is changed to accommodate a 0-5 RF ammeter and a lower range PA plate current meter to meet FCC requirements.

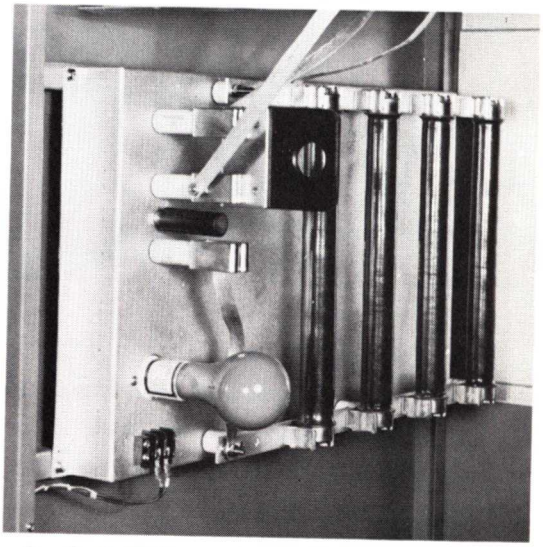
OFF AIR TESTING provides the inbuilt dummy antenna for 500 watts carrier 100% modulated. Move the switch bar to "Dummy" and you may test any time. New stations may finish tests prior to even erection of the antenna tower. — For regular maintenance, this feature will save hours of time and add greatly to performance through convenience of routine maintenance. Construction is identical to the BC-1T transmitter.

PRINTED WIRING is the same as in the BC-1T.

LOCAL-REMOTE CONTROL system in BC-500T is the same relay system as in the BC-1T. No circuit breakers are employed.

COOLING FEATURES include full width filtered air intake at the bottom and dual exhaust fans at the top. Same as Model BC-1T.

PERFORMANCE: The owner of BC-500T has without question an ultraconservative transmitter when basic 1KW design is followed. Tube life, especially that of the larger tubes, should be extremely gratifying.



Standard equipment in BC-500T is the inbuilt dummy antenna. Routine maintenance now becomes a pleasure.

BC-500T SPECIFICATIONS

POWER OUTPUT: Rated 500 watts. Capability 550 watts.

RF OUTPUT IMPEDANCE: 50/70 ohms.

OUTPUT CONNECTOR: Type RF feed-thru bushing.

RF RANGE: 540 Kc to 1600 Kc (as ordered).

FREQUENCY STABILITY: ±10 cycles.

FREQUENCY MONITOR COUPLING IMPEDANCE: 50/70 ohms.

MODULATION MONITOR COUPLING IMPEDANCE: 50/70 ohms.

RF HARMONICS: Suppression of harmonics meets or exceeds FCC requirements.

POWER REDUCTION: Reduces to 250 or 100 watts as ordered.

AUDIO FREQUENCY RESPONSE: ±1½ db 30-12,000 cycles. (Typical: ±1½ db 30-16,000 cycles under practical programming conditions.)

AUDIO HARMONIC DISTORTION: 3% or less 50-10,000 cycles at 95% modulation.

AUDIO INPUT LEVEL: +9 db ±2 db for 100% modulation at impedance choice.

AUDIO INPUT IMPEDANCE: 150, 250, or 600 ohms.

PRIMARY VOLTAGE: 230 volts, 3 wire, 50/60 cycles single phase.

POWER CONSUMPTION: 2400 watts at zero modulation, 3000 watts at average modulation, 3150 watts at 100% modulation.

CARRIER SHIFT: 3% or less at 100% modulation.

TUBES: 12BY7A oscillator, 12BY7A 1st IPA, (2) 6BG6G 2nd IPA, (1) 833A power amplifier, (2) 6BG6G 1st audio, (2) 6BG6G 2nd audio, (2) 833A modulators, 5R4GY rectifier, (2) 866A LV rectifiers, (2) 8008 HV rectifiers.

TOTAL NUMBER OF TUBES: 16

TOTAL TUBE TYPES: 6

SIZE: 78" high, 36" wide, 32" deep. Front door swing 28".

WEIGHT: Domestic — 700 lbs. net, 990 lbs. packed.

CUBAGE: Domestic — 61.

FINISH: Medium hand rubbed gloss gray, two tone.

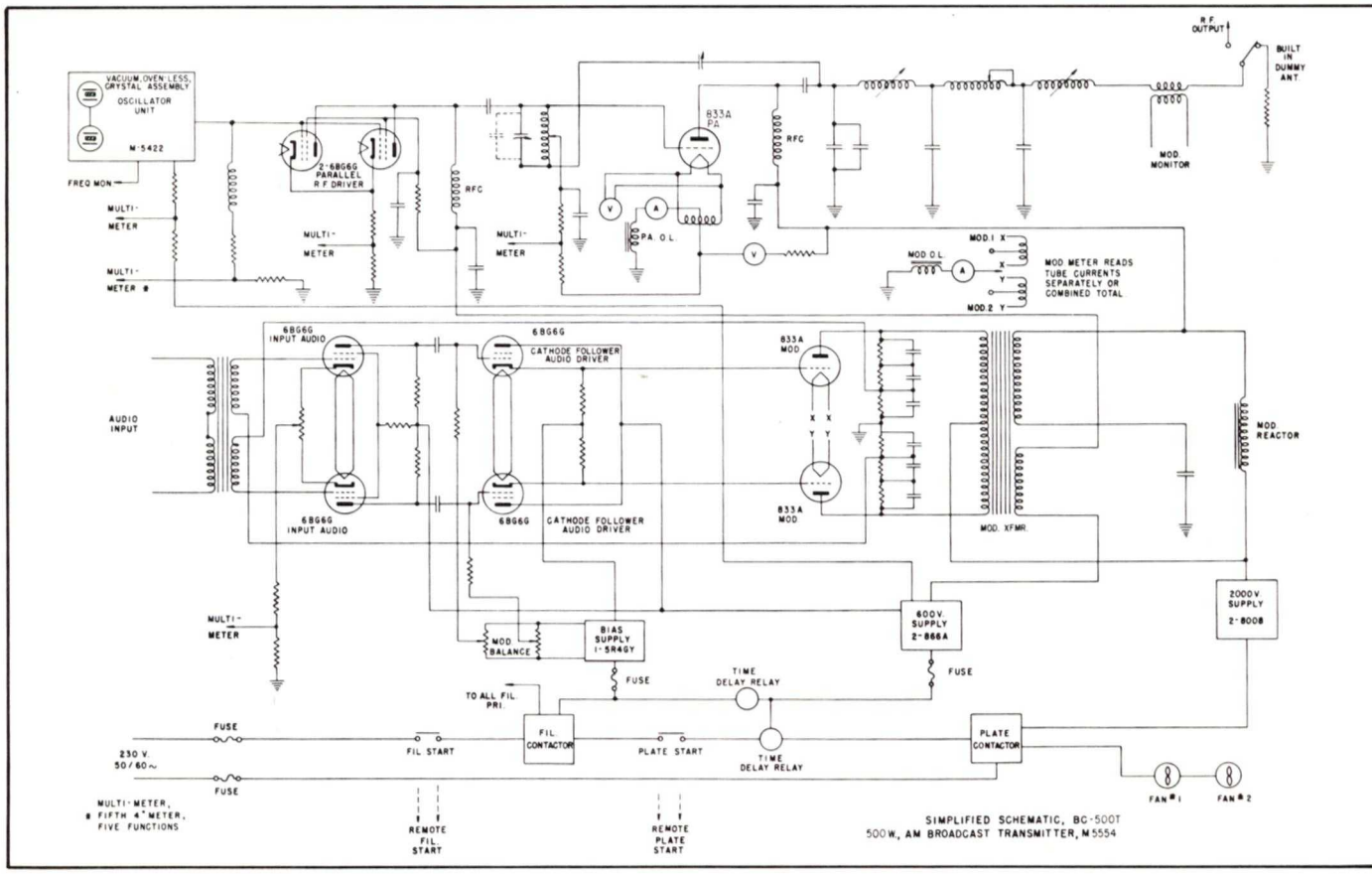
ORDERING INFORMATION

Model BC-500T AM broadcast, 500 watts, with tubes, one crystal BC-500T

Spare 100% tube complement for above TK-300

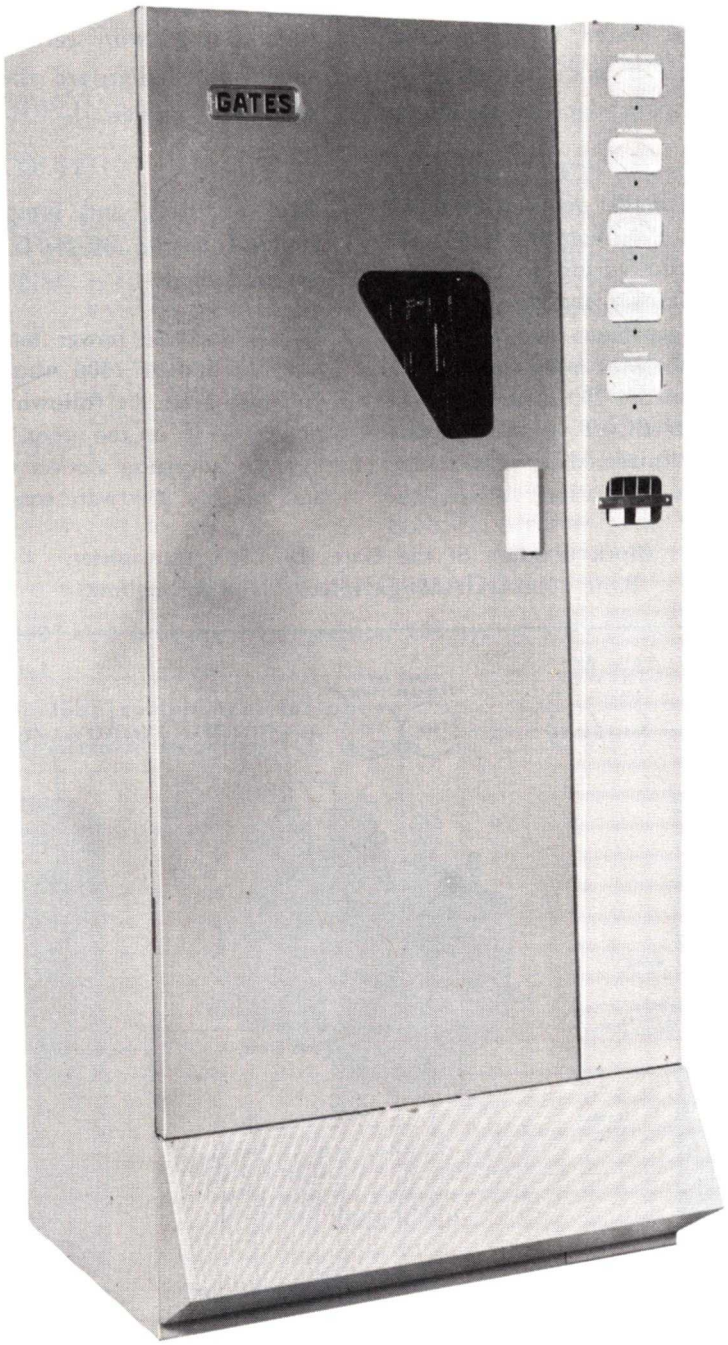
FCC tube complement (required FCC spares) TK-307

NOTE: State carrier frequency when ordering. Other primary voltages available on special order and without delay.



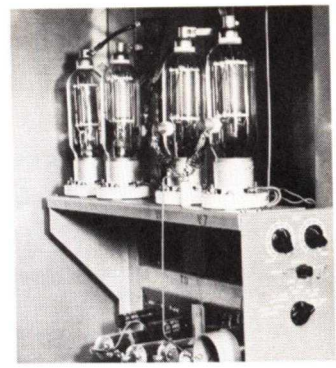
250 WATT AM BROADCAST TRANSMITTER

Model BC-250T
(with power step up design)



Model BC-250T is a basic 1000 watt design modified and fully FCC approved for 250 watt operation. Broadcasters now operating on 250 watts with an eye to future higher power, may immediately own an ultra conservative 250 watt equipment and step up later to 500 or 1000 watts by purchasing a "power increase kit". — Change to higher power can be made in 2 hours' time, resulting in a fully FCC approved higher powered model.

MODEL BC-250T
250 WATT AM BROADCAST TRANSMITTER

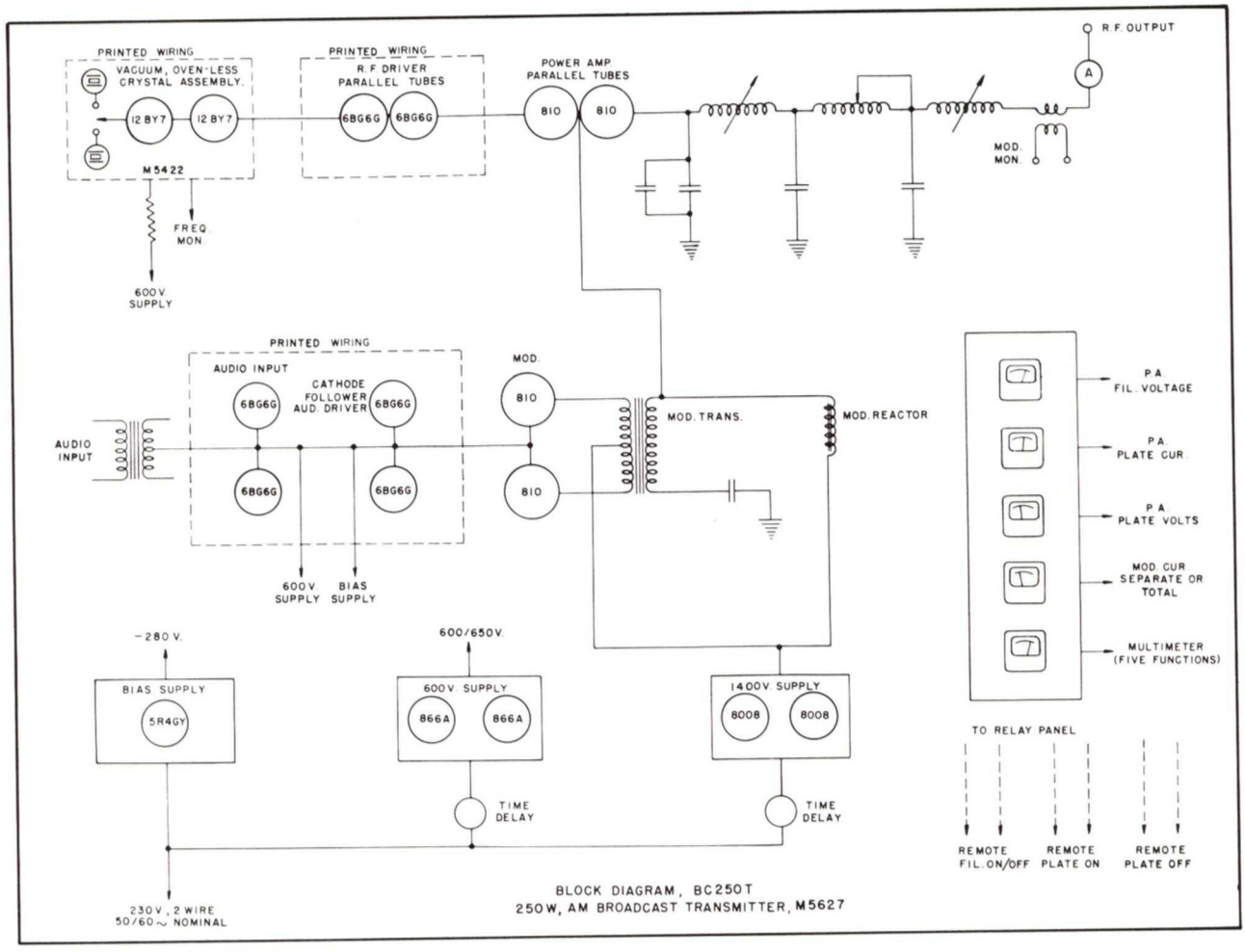


This model is offered to the broadcast industry to fill future expansions as well as the most conservative 250 watt equipment ever offered. — Actually the BC-250T transmitter is a model BC-1T, 1000 watt design, fully described in this catalog, with certain minor changes to meet 250 watt FCC and engineering requirements. So similar are the designs, the reader may obtain basic data by reading BC-1T descriptive matter.

Four 810 tubes in the 250 watt model replace the 833A tubes in higher powered models. Even here the tube socket chassis are interchangeable and wiring to either the 810 or 833A tubes is the same. Power, modulation, filter and reactor transformers, filter capacitors and mica tank capacitors are specifically for the 250 watt model. All other components are the same in the 250 watt BC-250T, 500 watt BC-500T or 1000 watt BC-1T. — Such items as tank coils, Tee-network coils, intermediate power supplies, metering, protective relays, insulation, cabinet design, oscillator and intermediate power amplifier are identical in the BC-250T transmitter to that of higher powered models.

If you increase power later, order the "power increase kit" for 500 or 1000 watts as listed in this catalog and you may start the following day's broadcasting at higher power. — If, on the other hand, you never increase power, your broadcasting station will own the most conservative and reliable 250 watt equipment ever built.

Block diagram of the Gates BC-250T transmitter.
Basic 1000 watt design is employed throughout.

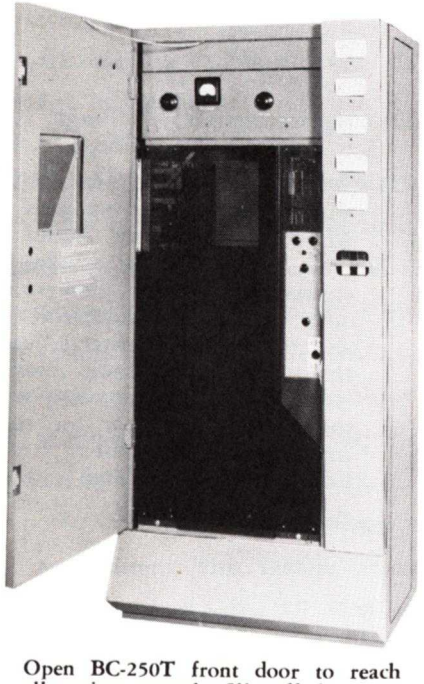


BC-250T SPECIFICATIONS

POWER OUTPUT: Rated 250 watts, Capability 300 watts.
RF OUTPUT IMPEDANCE: 50/70 ohms.
OUTPUT CONNECTOR: Type RF feed-thru bushing.
RF RANGE: 540-1600 Kc.
FREQUENCY STABILITY: ±10 cycles.
FREQUENCY MONITOR COUPLING IMPEDANCE: 50/70 ohms.
MODULATION MONITOR COUPLING IMPEDANCE: 50/70 ohms.
RF HARMONICS: Suppression of harmonics meets or exceeds FCC requirements.
AUDIO FREQUENCY RESPONSE: ±1½ db, 30-12,000 cycles. (Typical: ±1½ db 30-16,000 cycles under practical programming conditions.)
AUDIO HARMONIC DISTORTION: 3% or less 50-10,000 cycles (at 95% modulation).
AUDIO INPUT LEVEL: 7 db ±2 db for 100% modulation.
AUDIO INPUT IMPEDANCE: 150 or 600 ohms.
PRIMARY VOLTAGE: 230 volts, 3 wire, 50/60 cycles single phase.
POWER CONSUMPTION: 1100 watts at zero modulation, 1450 watts at average modulation, 1500 watts at 100% modulation.
CARRIER SHIFT: 3% or less at 100% modulation.
TUBES: 12BY7A oscillator, 12BY7A first IPA, (2) 6BG6G second IPA, (2) 810 power amplifier, (2) 6BG6 input audio, (2) 6BG6G cathode follower drivers, (2) 810 modulators, (2) 866A intermediate power recitifiers, (2) 8008 main power rectifiers, (1) 5R4GY bias rectifier.
TOTAL NUMBER OF TUBES: 17
TOTAL TUBE TYPES: 6
SIZE: 78" high, 36" wide, 32" deep.
WEIGHT: — 750 lbs. net, 1070 lbs. packed.
CUBAGE: — 71.
FINISH: Medium hand rubbed gloss gray in two tones.

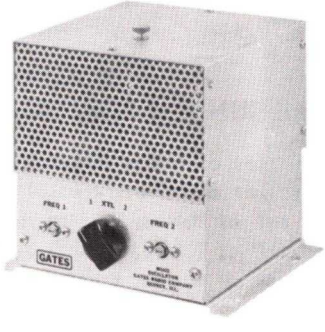
ORDERING INFORMATION

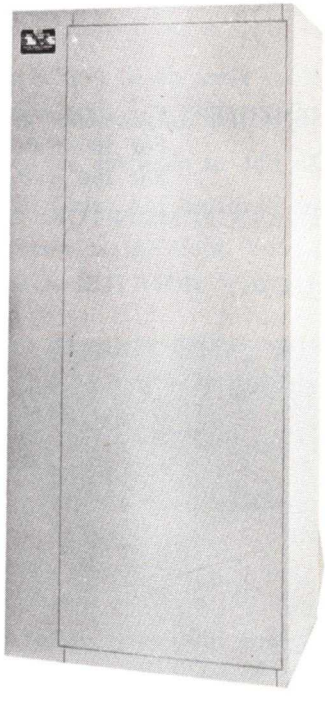
Model BC-250T AM broadcast transmitter, 250 watts, with tubes, one crystal BC-250T
Spare 100% tube complement for above TK-306
FCC tube complement (required FCC spares) TK-307



Open BC-250T front door to reach all tuning controls. Slip off the snap-on interlocked perforated grill to reach all parts from the front. BC-250T is the only transmitter manufactured today with complete parts visability during operation.

Dual vacuum mounted crystals are designed into a new oscillator with the emphasis on stability and dependability.





The back is removable but you will never need to with BC-250T as all servicing is from the front, or right side.

PACKAGED RADIO BROADCASTING EQUIPMENT

These three models of complete radio stations are ready to attach to studio and transmission lines. The 250 watt BC-250T, the 500 watt BC-500T or the 1000 watt BC-1T transmitters are joined with all necessary FCC approved monitors, audio equipment and with optional remote control apparatus. This equipment is mounted, wired and tested. Along with assured system performance is offered a most attractive and eye-catching broadcasting equipment installation.

PACKAGED RADIO BROADCASTING EQUIPMENT

(for 1000, 500, 250 watts ready to install)

For many years, the Gates complete packaged radio station has been very popular. Provided is everything necessary to attach studio equipment and transmission line to the antenna. Transmitter, monitors, audio equipment and remote control equipment, where used, is all packaged and ready to install. — The result is speedier installation through the purchase of a complete system. As wiring is complete, the installation engineer need not concern himself with the details ordinarily associated with piece by piece procurement.

Four input lines are switch selectable. A switch is also incorporated to bypass the limiting amplifier. In this manner an emergency tube change in the limiter does not necessitate leaving the air.

All equipment components of the accessory cabinet are fully described on a near adjacent page (see Index "Accessory Cabinet"). Remote control equipment referred to herein is also covered in detail elsewhere in this catalog.

SPECIFICATIONS

TRANSMITTER: For 1000 watts, Model BC-1T.
For 500 watts, Model BC-500T.
For 250 watts, Model BC-250T.

MODULATION MONITOR: Gates M-5693 (FCC approved).

FREQUENCY MONITOR: Gates M-4990 (FCC approved).

LIMITING AMPLIFIER: Gates SA-39B.

SWITCHING PANEL: 4 switch selectable 600 ohm inputs to limiter. One input selector switch to limiter or transmitter direct.

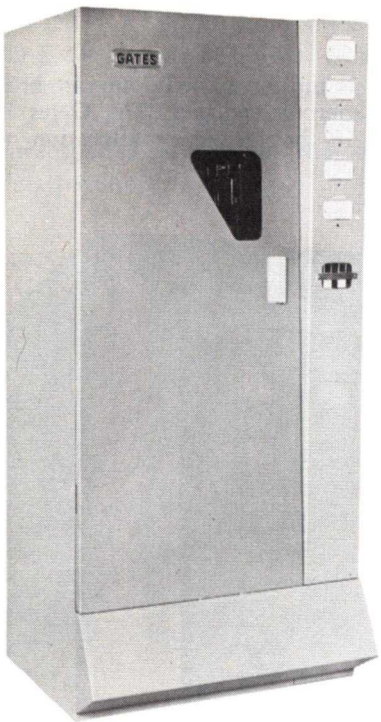
SIZE OVERALL (including transmitter): 78" high, 59½" wide, 32" deep.

REMOTE CONTROL (optional): Gates Model RDC-10 with transmitter unit mounted and wired in cabinet and studio unit ready to install in studios, includes plate current, plate voltage and tower light extension kits, also motor tuned power adjusting rheostat. Also includes modulation monitor and frequency monitor extension meters for studio installation, (see Index "Remote Control" for full detail).

ORDERING INFORMATION

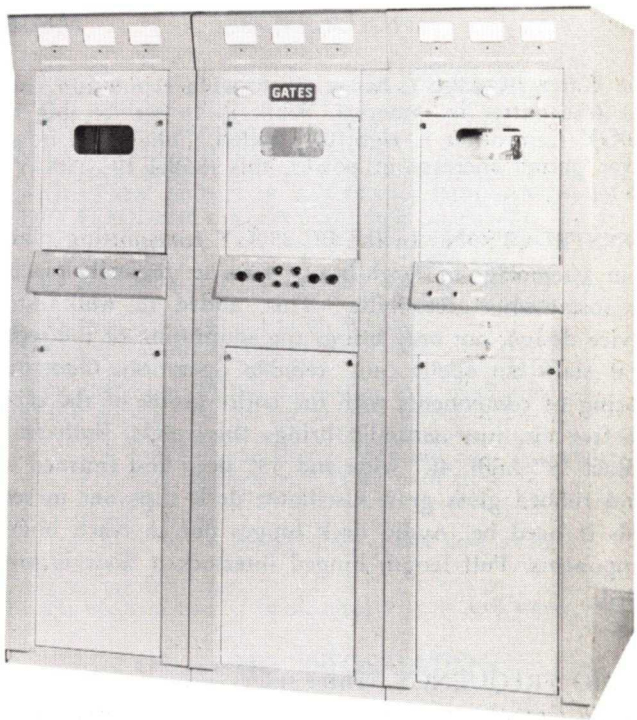
Complete 1000 watt radio station with one set of tubes, crystal, less remote control	**GY-1000B**
Complete 1000 watt radio station with one set of tubes, crystal and with remote control	**GY-1000BRDC**
Complete 500 watt radio station with one set of tubes, crystal, less remote control	**GY-500B**
Complete 500 watt radio station with one set of tubes, crystal and with remote control	**GY-500BRDC**
Complete 250 watt radio station with one set of tubes, crystal, less remote control	**GY-250B**
Complete 250 watt radio station with one set of tubes, crystal and with remote control	**GY-250BRDC**

CONELRAD



LEFT: Gates "T" series transmitters, 250 watts through 1000 watts.

RIGHT: Gates "P" series, 5000 and 10,000 watts.

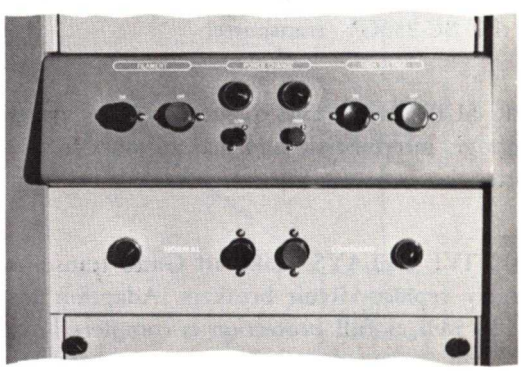


With the increased importance of the CONELRAD program in the national defense picture, and with the expected intensification of CONELRAD participation, it becomes extremely important to consider just how well your transmitting equipment will adapt to CONELRAD, now and in the future.

CONELRAD operation has been carefully considered in the design of all current Gates transmitters through ten kilowatts in the AM broadcast line. Each Gates broadcast transmitter, 250 watts through 5000 watts, is available with factory installed CONELRAD switching on specific order and at modest cost. The Gates BC-5P-2 5000 watt AM transmitter may also be supplied with an extra 5 kilowatt RF cubicle for CONELRAD operation, utilizing the power and audio cubicles, which are a part of the regular transmitter. This feature offers the advantage of having a complete extra RF 5000 watt cubicle available in an emergency. The 5 kilowatt CONELRAD cubicle can also be used in connection with the Gates BC-10P 10,000 watt AM transmitter, providing full 5 kilowatt output on either CONELRAD frequency.

The Gates "T" series transmitters, 250 watts through 1 kilowatt, have been designed for instantaneous CONELRAD switching by remote control or from front panel controls.

Whether it is internal switching or an extra cubicle, the change to CONELRAD is instantaneous and is as simple as pushing a button. Kits are available to add CONELRAD to any current model Gates AM broadcast transmitter through 10 kilowatts now in the field. Your inquiry is invited.



Switching to and from CONELRAD frequencies on the BC-5P-2 5000 watt transmitter is accomplished by merely pushing a button for each function.

250 WATT BROADCAST TRANSMITTER

Model BC-250GY

The Gates BC-250GY has a world-wide reputation for long trouble-free service, and is the most used 250 watt broadcast transmitter in America. Walk in to service, big component design and extra generous facilities. The Gates BC-250GY transmitter is rightfully called, "The work horse of the broadcast industry." If the frequency allocation will never permit increase in power, this model BC-250GY is the proper selection.

CONSTRUCTION. In the BC-250GY transmitting plant is an assemblage of large heavy parts strategically placed for instanteous accessibility. This, added to walk-in-to-service design, not only brings the admiration of the technical staff but spells cool, reliable operation. Generous spacing of components with the entire center of the cabinet free air, just naturally brings this result. Built in a cabinet 78″ high, 40″ wide and 33″ deep and finished in hand rubbed gloss gray. Oscillator deck slips out in seconds if need be. Audio deck hinges out to reach under components. Full length hinged interlocked door is provided.

RADIO FREQUENCY. Three stages, provision for 2 crystals in temperature controlled ovens, 813 RF driver provides abundance of drive and long tube life, 2 type 810 single ended power amplifiers feed an output coupling network that will match specified impedances from 30 to 300 ohms.

AUDIO FREQUENCY. Two audio stages consist of push-pull 6L6's driving two 810 tubes operating as Class B high level modulators. Conservatively rated 810's in the modulator insure reliable operation and added tube life.

METERING. Eight meters, more than in any other 250 watt broadcast transmitter. Includes: oscillator plate, RF driver plate, PA grid, PA plate, plate volts, filament volts, modulator plate and RF output. There is no multi-metering in the BC-250GY transmitter.

POWER SUPPLIES. Two power supplies develop the high voltage, intermediate and bias voltages for the entire transmitter.

PROTECTIVE RELAYS. Like all Gates transmitters, relays largely replace circuit breakers. Adaption to remote control, as well as full protection is complete in this type design. Two overload relays for power amplifier and modulator are incorporated plus plate contactor relay and vacuum time delay relay. Ease of attaching remote control is self-evident.

POWER RESISTORS. All heavy sized power resistors are of the ferrule or plug-in type. This not only assures easy replacement but is indispensable for cleaning and assures no breakage during shipment.

BC-250GY 250 WATT BROADCAST TRANSMITTER

COOLING. As the large roomy design allows convection cooling, the absence of blowers or fans assures quiet operation. In properly treated room design, operation may be near a microphone, though it is always recommended that the transmitter be isolated from operating procedures by a glass partition or similar.

TRANSFORMERS. As all Gates transmitters are designed for 50 and 60 cycle operation, the transformers must be built with larger core and coil sections. This offers extra conservatism to 60 cycle user and no waiting for 50 cycle users.

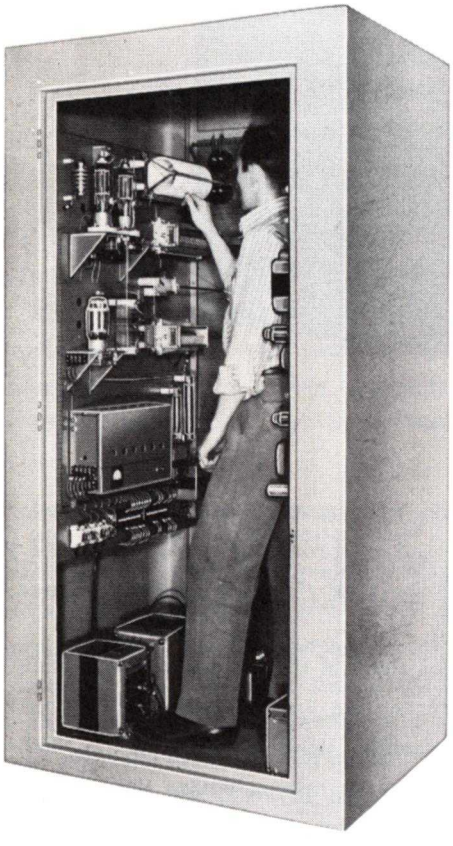
PERFORMANCE. Low distortion and noise, wide frequency response and excellent stability, both RF and in regulation of the power supply, forms smooth sounding equipment that will delight musical audiences, and develop the rich full quality required in all programming.

SPECIFICATIONS

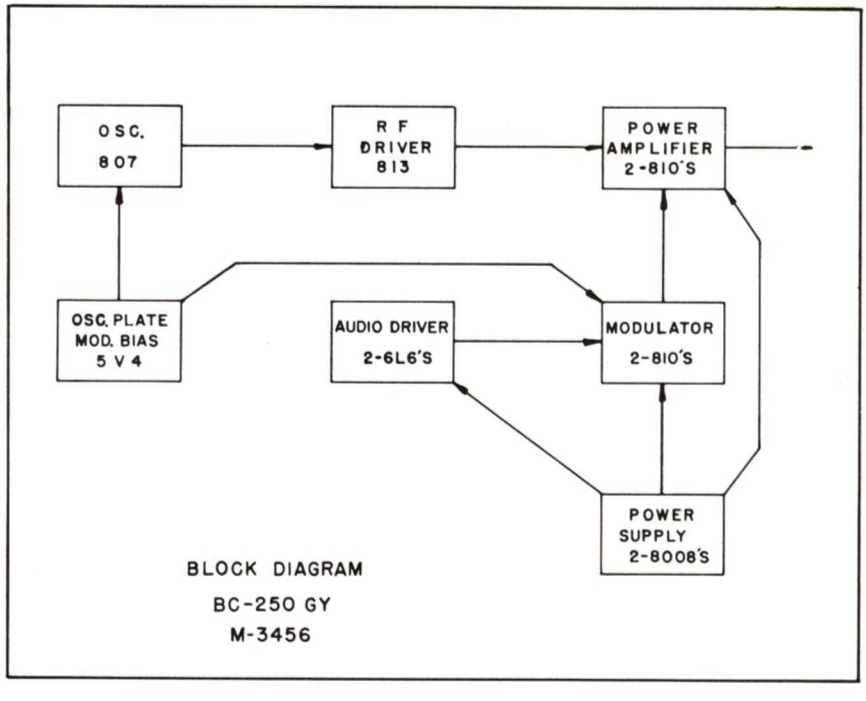
POWER OUTPUT: Rated 250 watts, capability 280 watts.
RF OUTPUT IMPEDANCE: 30-300 ohms (as ordered).
OUTPUT CONNECTOR: Type Feed thru
RF RANGE: 540-1600 Kc (as ordered).
FREQUENCY STABILITY: ±5 cycles.
FREQUENCY MONITOR COUPLING IMPEDANCE: 70 ohms.
MODULATION MONITOR COUPLING IMPEDANCE: HI Z.
AUDIO FREQUENCY RESPONSE: 90% modulation 1 ±1½ db. 30-10,000 cycles, ±2 db. 30-12,000 cps.
AUDIO HARMONIC DISTORTION: 3% or less 50-7500 cps at 90% modulation.
AUDIO INPUT LEVEL: +14 db ±2 db.
AUDIO INPUT IMPEDANCE: 600 ohms.
PRIMARY VOLTAGE: 230 volts, 2 wire, 50/60 cycles.
POWER CONSUMPTION: 1.6 Kw at 95% modulation.
CARRIER SHIFT: 3% or less at 95% modulation.
TUBES: 807 oscillator, 813 IPA, (2) 810 power amplifiers, (2) 6L6 (1622) audio drivers, (2) 810 class B modulators, (2) 8008 rectifiers and 5Y4G rectifier.
TOTAL NUMBER OF TUBES: 11
TOTAL TUBE TYPES: 7
SIZE: 78" high, 40" wide, 33" deep. Front door swing.
WEIGHT: 900 lbs. packed.
CUBAGE: 112 cubic feet.
FINISH: Medium hand rubbed, gloss gray in two tones.

ORDERING INFORMATION

Complete 250 watt broadcast transmitter with one set tubes, crystal and oven BC-250GY
100% spare tube complement for BC-250GY transmitter M-3074
FCC spare tube complement for BC-250GY transmitter TK-201
Extra crystal and oven for BC-250GY transmitter JK57M



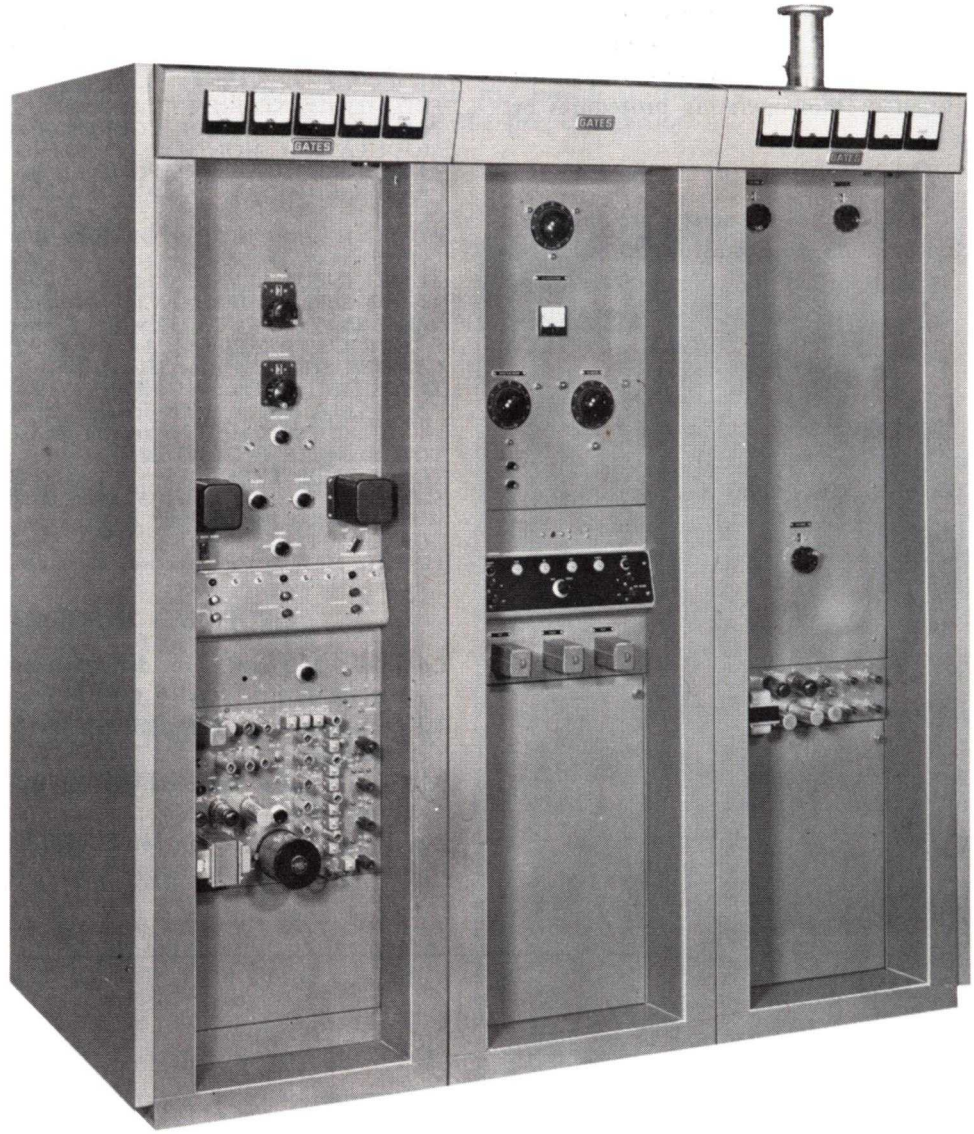
Rear illustration shows roomy big transmitter design with walk-in-to-service feature.



BLOCK DIAGRAM
BC-250 GY
M-3456

10,000 WATT FM BROADCAST TRANSMITTER

Model FM-10A

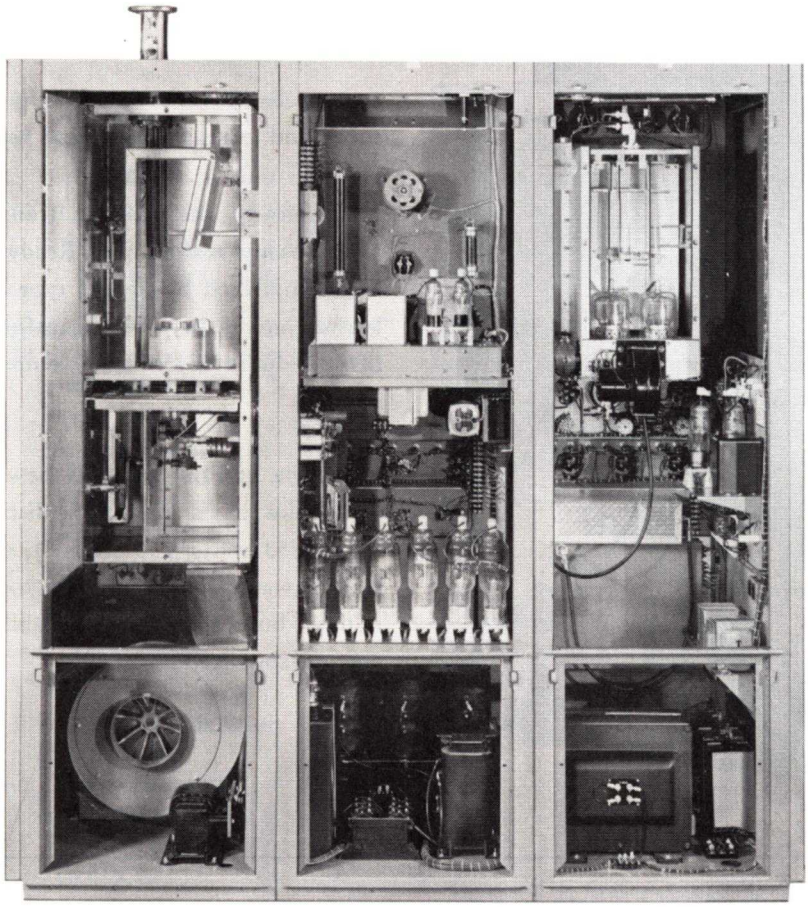


The FM-10A 10,000 watt FM transmitter, representing a cumulation of more than 15 years of research and development experience in FM transmitters, offers a new design for long tube life, much lower distortion at wider response, and includes the all new Gates exciter with high stability.

An exclusive feature of this new transmitter is *Varia-line tuning*. Varia-line tuning is a new method of tuning a single ended VHF amplifier. A portion of a parallel plate transmission line is made variable to capacity tune the line to operating frequency. The tuning is directly from the front panel. With this exclusive new development, neither mica nor vacuum capacitors are needed in the tank circuit, and by providing optimum Q, the general efficiency of the tank circuit is greatly increased.

The left cubicle of the FM-10A transmitter is a complete 1000 watt FM transmitter, and includes two intermediate power amplifiers, control panel, exciter and the 3500 volt power supply. The center cabinet houses the control portion and the 6000 volt supply for the 10 kw amplifier, and also the control panel for the 10 Kw amplifier. The right hand cubicle houses the 10 kw amplifier, bias supply, blower and other complimentary materials.

MODEL FM-10A 10 KW FM TRANSMITTER



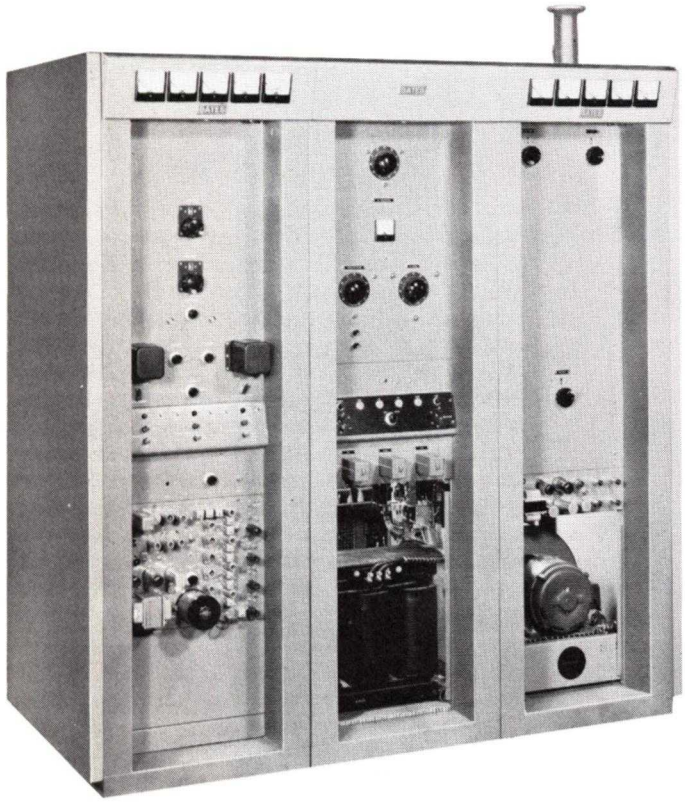
The new Gates exciter with high stability employs a phase shift modulator with pulse timing techniques, and may be adapted to single or dual channel multiplexing on a plug-in basis, with blank panel space provided for this future addition. From exciter output to transmission line at 10,000 watts, there are only three radio frequency stages.

In the center cubicle is located the complete 6000 volt power supply, relay equipment for starting and stopping the amplifier, overloads and safety protection for the amplifier — all 100% independent of the 1 KW driver transmitter. One type 6166 tube is used in a single ended amplifier to produce a liberal 10 KW of power. This stage operates the tube well under its maximum ratings, assuring long tube life. The main power supply develops 6000 volts from a three phase full wave rectifier supply. An important feature of this new transmitter is the lack of frequency multiplication after the exciter. This aids in eliminating spurious frequencies and adds tube life, as power type tubes doubling or tripling frequency are seldom operated at their most stable life lengthening conditions.

The output of the transmitter is standard 3⅛" coax transmission line. Directly preceding the 3⅛" coax elbow is a micro-match unit, which is used to meter the RF output and indicate the standing wave ratio on the transmission line. A notch or "T" type filter is supplied after the micro-match as standard equipment. This is a quarter-wave stub to substantially eliminate the second harmonic that may fall in the TV broadcast band. After this notch or "T" type filter is a low pass filter to eliminate third and higher order harmonics. Both low pass filter and "T" notch filter are supplied as part of the transmitter, tuned to the customer's frequency.

The 10 KW power amplifier and the intermediate power amplifier are totally enclosed both electrically and mechanically. Both tubes and components are in a non-ferrous

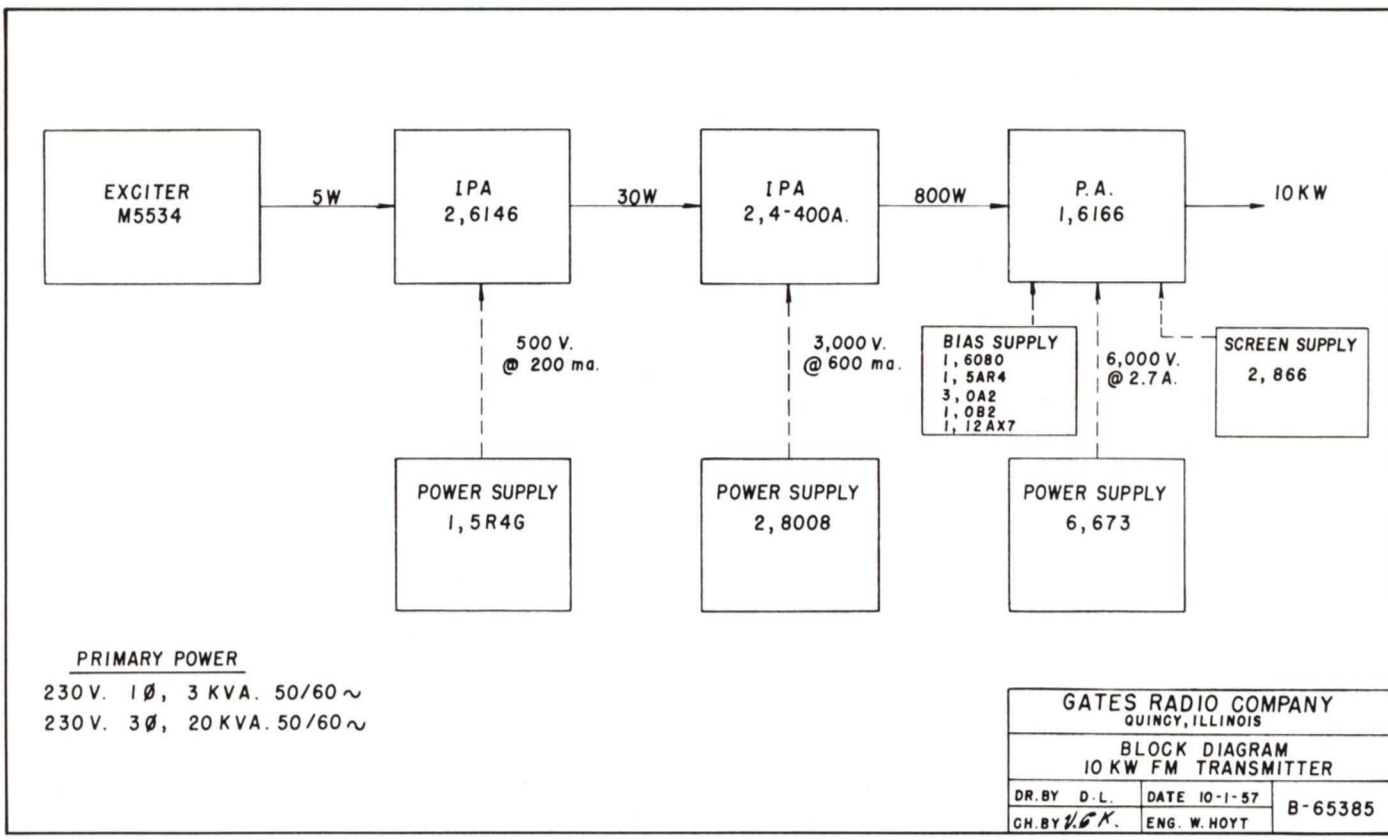
MODEL FM-10A 10 KW FM TRANSMITTER



type housing. Air from individual blowers cool both tubes and parts within these housings.

Mechanically, the FM-10A transmitter has been designed to be easily maintained. Ready accessibility to all parts is accomplished by lift-off type doors. Accessibility to the blower and main power transformer is provided by other lift-off doors in front of center and extreme right end cabinets.

With the addition of this new 10 kilowatt transmitter, Gates now has available six distinctive FM transmitters—10 and 50 watts, 250 watts, 1,000 watts, 5,000 watts and 10,000 watts. These are all top-quality precision transmitters, built for greater reliability and higher than ever performance standards.



MODEL FM-10A 10 KW FM TRANSMITTER

SPECIFICATIONS

POWER OUTPUT: 10,000 watts.

FREQUENCY RANGE: 88 to 108 megacycles.

FREQUENCY STABILITY: ±.001%.

R.F. OUTPUT IMPEDANCE: 50.0 ohms.

TYPE OF OSCILLATOR: Direct Crystal Controlled.

R.F. OUTPUT CONNECTOR: 3⅛" coax flange.

MODULATION CAPABILITY: ±100 KC (+75 KC is considered 100% modulation).

R.F. HARMONCS: Suppression of harmonics meets the new FCC requirements. Second harmonic down at least —82 db.

FREQUENCY RESPONSE: Within 1 db of standard 75 micro-seconds pre-emphasis curve, or flat ±1 db, 50 to 15,000 cycles whichever is desired. (Specify).

DISTORTION AT 100% MODULATION:
1% or less, 50 to 100 cycles.
.5% or less, 100 to 10,000 cycles
1% or less, 10,000 to 15,000 cycles

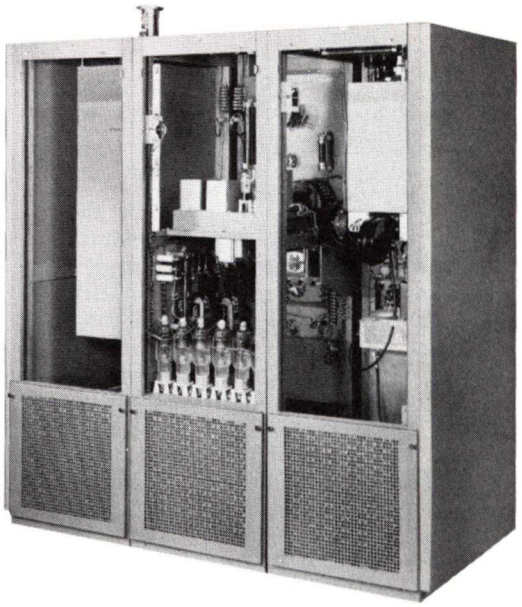
AUDIO INPUT IMPEDANCE: 600 ohms.

AUDIO INPUT LEVEL: For 100% modulation — +10 dbm, ± 2db.

NOISE: 65 db below 100% modulation (FM)
50 db below equivalent 100% (AM) modulation.

POWER CONSUMPTION: 19.8 KW.

POWER INPUT: 10 KW amplifier, 230 volts, 50/60 cycle, 3 phase 30 KVA demand.
1 KW driver: 230 volts, 50/60 cycle, 1 phase grounded neutral, 5KVA demand.



TUBE COMPLEMENT:

7 - 6AU6	1 - 6360
4 - 12AX7	1 - 6AQ5
3 - 6J6	2 - 6080
5 - OA2	2 - GZ34/5AR4
1 - OB2	1 - 5R4GYA
2 - 6146	6 - 673
2 - 4-400A	1 - 6166
2 - 8008	2 - 866

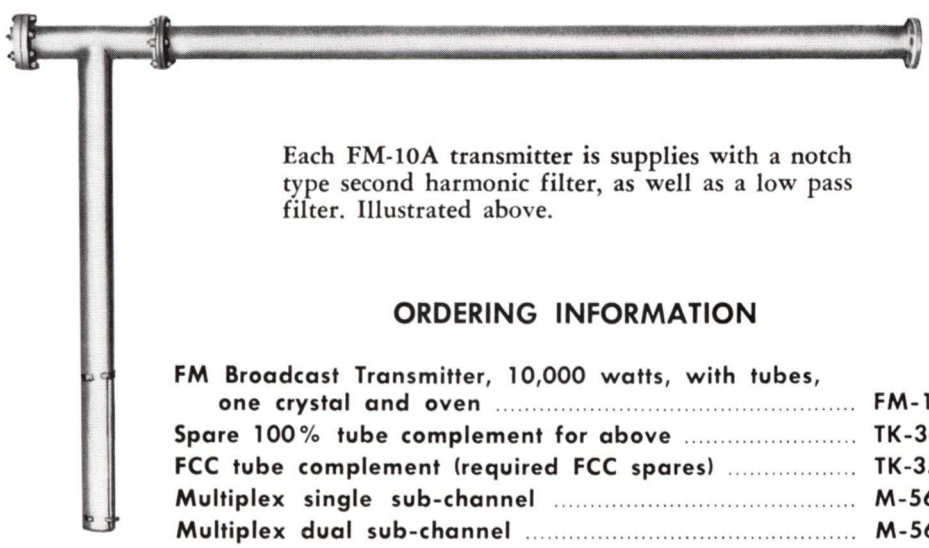
TOTAL NUMBER OF TUBES: 42

TOTAL TUBE TYPES: 16

SIZE: Width—72", height—78", depth—36½".

WEIGHT: Packed 2825 lbs. approx.
Net 1985 lbs. approx.

CUBAGE: 290 cu. ft. packed.



Each FM-10A transmitter is supplies with a notch type second harmonic filter, as well as a low pass filter. Illustrated above.

ORDERING INFORMATION

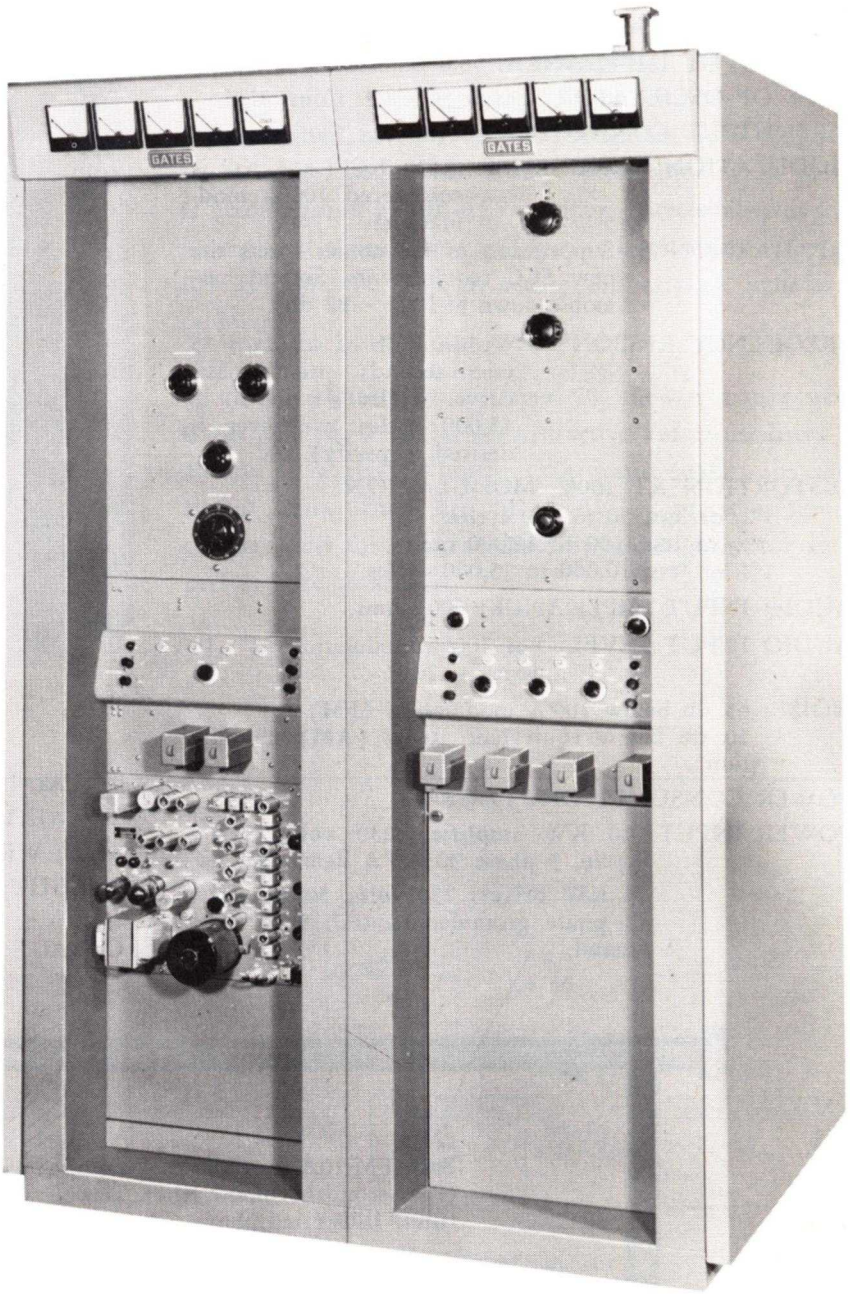
FM Broadcast Transmitter, 10,000 watts, with tubes, one crystal and oven	**FM-10A**
Spare 100% tube complement for above	**TK-349**
FCC tube complement (required FCC spares)	**TK-350**
Multiplex single sub-channel	**M-5633A**
Multiplex dual sub-channel	**M-5633**

Note: Please specify carrier frequency when ordering.

5000 WATT FM TRANSMITTER

Model FM-5B

(MULTIPLEXING OPTIONAL)



Here is a 5KW FM transmitter with the emphasis on stability, ease of maintenance and long tube life. — A new exciter design eliminates the delicacy often associated with earlier FM generators. The driver is a complete 250 watt FM transmitter coupled low impedance (50 ohms) to the 5000 watt power amplifier. Driver and power amplifier are entirely independent, even to control circuits and power supplies. RF harmonic filter is standard equipment while multiplex for single or dual channel operation may be installed at any time. The Gates FM-5B, 5000 watt FM transmitter is new from crystal to output, yet already time proven in many of America's leading broadcasting stations.

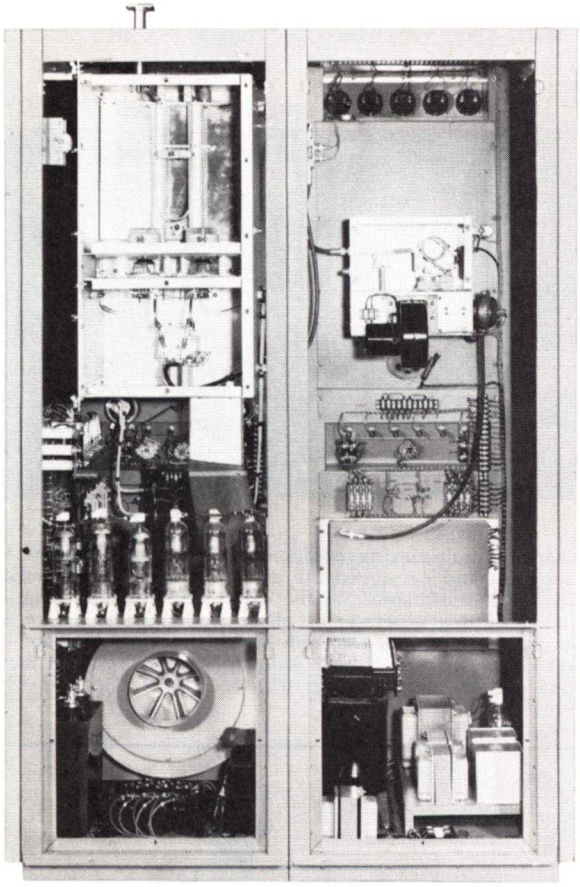
From the output of the exciter unit to transmitter output there are only two radio frequency stages, the 4X250B driver amplifier and the push-pull 6076 power tubes for 5000 watts. Combined with an abundance of excess air and the very conservative use of the 6076 tubes, much longer tube life should be expected. — Ten watts are developed at the exciter output. A phase shift oscillator with pulse timing techniques, permits the use of standard off-the-shelf, low cost tubes and without special selection. Continued low distortion readings after tube changes may be expected without retuning or adjustment.

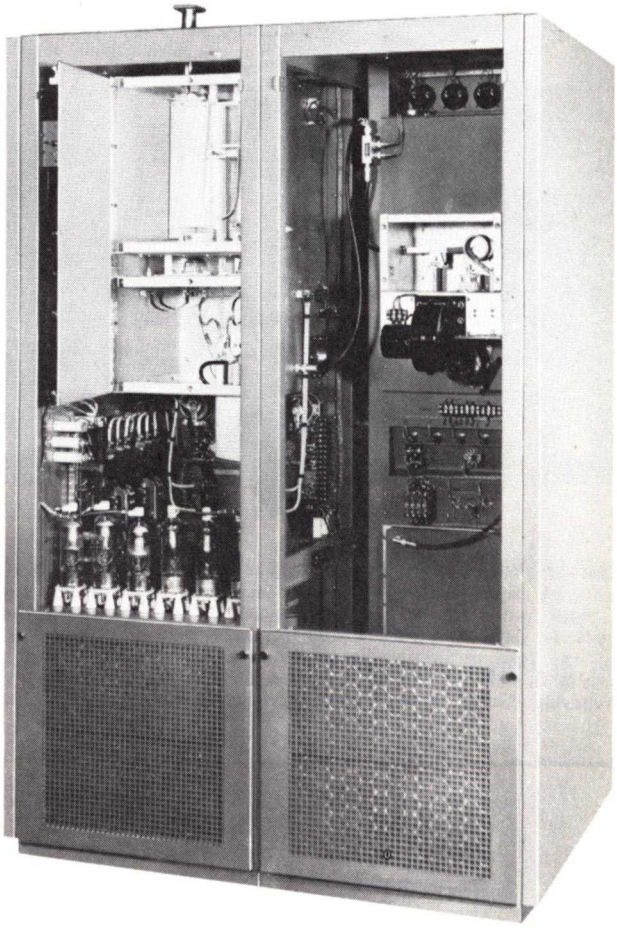
Provision for single or dual channel multiplex eliminates adaptor arrangements when multiplex is added. The new Gates multiplex system is widely acclaimed for its new approach in simplicity and effective operation.

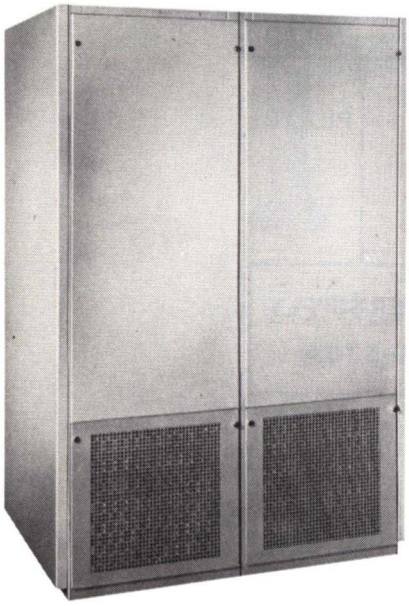
GENERAL DESIGN: The left cubicle is the driver section, which is the complete 250 watt FM transmitter. In this cubicle are located the exciter, provision for multiplex, 250 watt amplifier, control circuits and power supplies. The 250 watt metering complement has included, a VSWR meter. This aids greatly in the correct adjustment for driving the 5KW amplifier as related to both power transformer and low RF harmonics to the input point of the power amplifier.

To the right is the 5000 watt cubicle. This is a single stage push-pull amplifier with its 3 phase, full wave power supply, control circuits and metering self-contained. A VSWR meter indicates power output and standing wave ratio to the transmission line. The tank components and power tubes are enclosed in a non-ferrous housing. This provides air cooling to both tubes and components. Electrically it should be noted that both driver and power amplifiers are at fundamental frequency. This aids greatly in lowering spurious radiation and longer tube life whereas tubes doubling or tripling frequency require greater power input.

MODEL FM-5B 5000 WATT FM TRANSMITTER







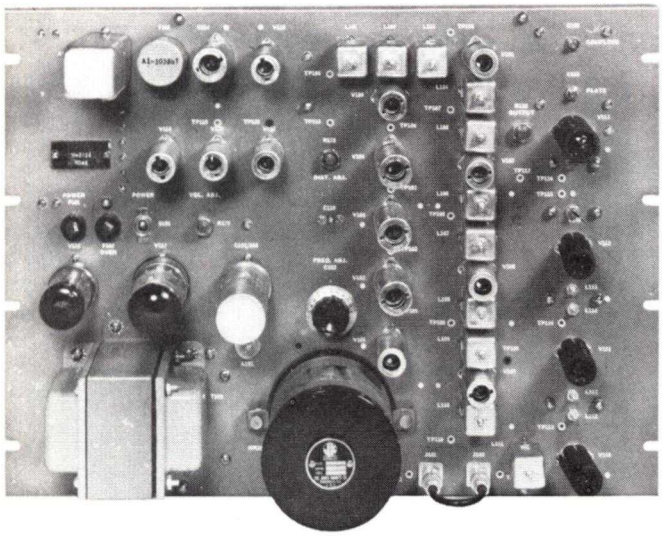
Refinements are expected in new equipment. The FM-5B has these refinements. Diaphragm air pressure switches replace damper type disconnects in protecting air flow to valuable power tubes. Generosity in the relay complement contributes to equipment and personal protection as well as ease in adopting remote control. The 5KW blower develops $3\frac{1}{2}$" static pressure, far in excess of needs. The blower is shock mounted for lower aural and transmitted noise. Air intakes are provided with replaceable filters that may be replaced without transmitter shut down.

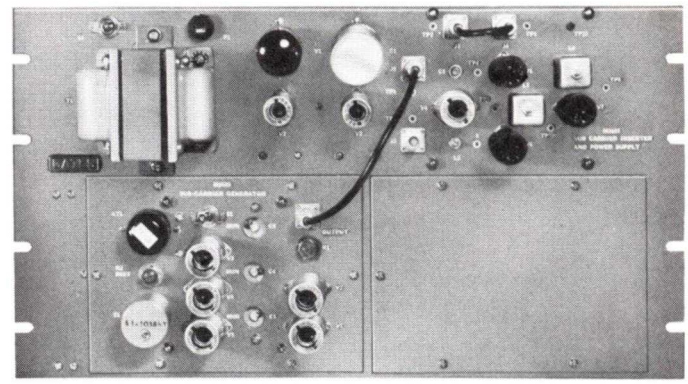
Rear doors are of the slip on/off type, allowing full rear access without door obstruction during maintenance. All components are quickly accessible and ease of servicing is obvious at a glance.

An external notch or Tee filter is provided and illustrated herein. This filter, of coaxial standards, connects between the transmitter output coaxial connector and the transmission line. This is a quarter wave stub to substantially reduce the second harmonic that may otherwise fall in the TV band. Other harmonics are attenuated in the transmitter proper.

Stability in FM broadcasting equipment is tantamount to reliability. Thus, stability was the engineering objective during FM-5B research and design. The driver amplifier is actually the Gates FM-250B, 250 watt FM transmitter. It may be operated as such. The 5000 watt power amplifier receives its drive at fundamental frequency and at low impedance. This stability feature alone greatly reduces interaction such as might be caused by antenna icing. With the 5000 watt amplifier as a single stage unit in a separate cubicle or cabinet, much more attention can be given to effective tank circuit shielding and component efficiency.

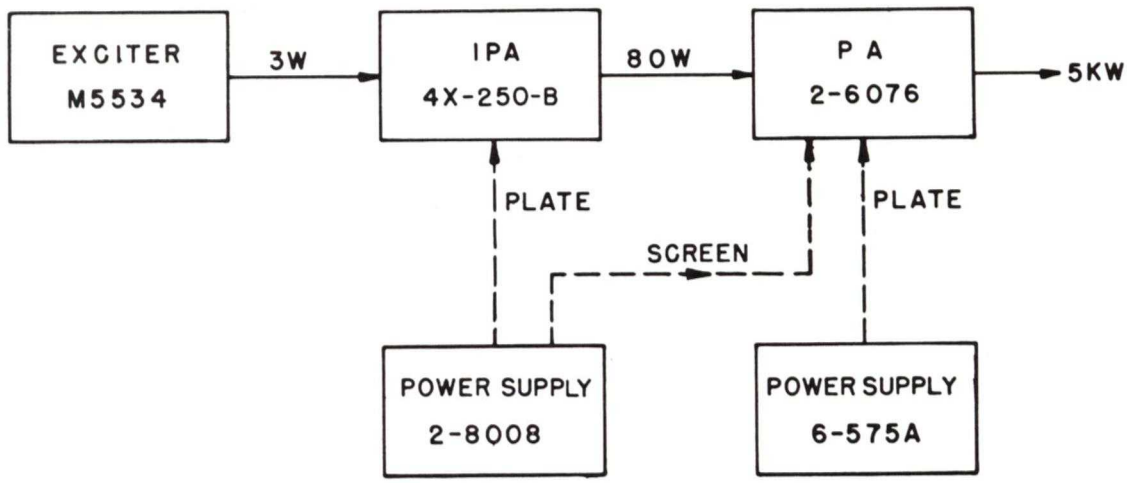
MODEL FM-5B 5000 WATT FM TRANSMITTER





Heart of all Gates FM broadcast transmitters is the M-5534 exciter with direct crystal controlled oscillator, phase shift modulator with pulse timing techniques, and 10 watts output. Power supply is self-contained. During research period, extreme attention was paid to intermediate frequency coil design, circuit constants and stability. All Gates exciters will operate multiplex by purchasing Gates multiplex sub-generators either now or later.

Pioneers in multiplexing equipment, Gates discarded the heterodyne system and developed the direct system of multiplexing that utilizes each sub-channel on the direct sub-frequency. The output of the multiplex generator is phase modulated to arrive at program content. The Gates system of multiplexing does not require crystal controlled sub-channel generators and plugs into the Gates M-5534 exciter.



BLOCK DIAGRAM FM-5-B

5KW FM BROADCAST TRANSMITTER

MODEL FM-5B 5000 WATT FM TRANSMITTER

SPECIFICATIONS

POWER OUTPUT: Rated 5000 watts, capable 5500 watts.

FREQUENCY RANGE: 88-108 Mc. (as ordered).

FREQUENCY STABILITY: ±0.001%.

RF OUTPUT: 50 ohms to type 1⅝ RF flange female connector.

FREQUENCY SWING: ±75 Kc equals 100% modulation.

RF HARMONICS: All are 60 db or better.

AUDIO FREQUENCY RESPONSE: Within one db of standard 75 microsecond pre-emphasis curve or flat ±1 db. 50-15,000 cycles, as desired (or if preference, state when ordering).

AUDIO DISTORTION: 1% or less 50-15,000 cycles, ½% or less 100-10,000 cycles. 1% or less 10,000-15,000 cycles.

AUDIO INPUT IMPEDANCE: 600 ohms.

AUDIO INPUT LEVEL: +10 dbm to ±2 db.

NOISE: 65 db or better below 100% modulation (FM)

60 db or better below 100% modulation (AM)

PRIMARY POWER: 230 volts, 50/60 cycles.

POWER CONSUMPTION: 11,900 watts.

TUBES: (7) 6AU6, (6) 8008, (3) 12AX7, (3) 6J6, (2) OA2, (2) 6076, (2) 866A, one each 6360, 6AQ5, 6080, GZ34/5AR4, 4X250B, 12AT7.

TOTAL NUMBER OF TUBES: 31

TOTAL TUBE TYPES: 13

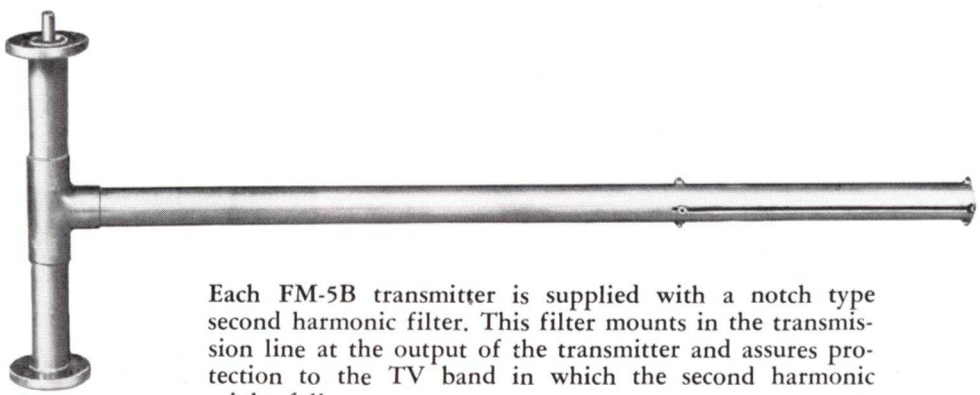
CONNECTOR REQUIRED: 1⅝" flange RF male.

SIZE: 78" high, 51" wide, 36½" deep.

WEIGHT: 1800 lbs., unpacked; 2375 lbs., packed.

CUBAGE: 78 cu. ft., total shipment.

FINISH: Medium gloss gray with escutcheons in black and hardware chrome.



Each FM-5B transmitter is supplied with a notch type second harmonic filter. This filter mounts in the transmission line at the output of the transmitter and assures protection to the TV band in which the second harmonic might fall.

ORDERING INFORMATION

5000 watt FM broadcast transmitter, with tubes and one crystal and oven	**FM-5B**
Spare 100% tube complement for above	**TK-313**
FCC tube complement (required FCC spares)	**TK-319**

1000 WATT FM TRANSMITTER

Model FM-1B

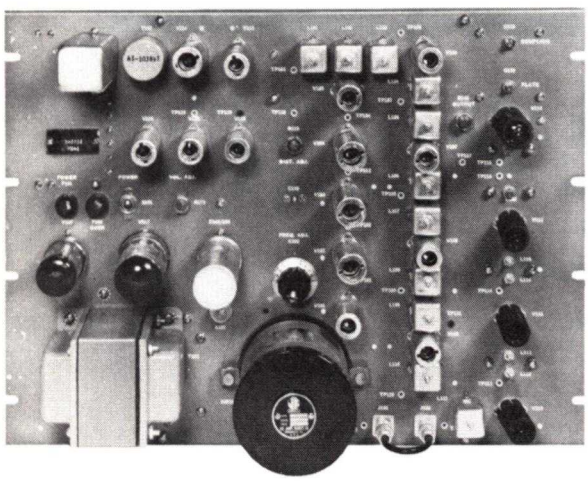
(MULTIPLEXING OPTIONAL)

In the design of any FM transmitter, due to VHF frequencies and the always potential unattended operation, the word stability is foremost in the design engineer's mind. Field experience from two other 1 KW models in the past ten years and advanced technology in high frequencies, partially the result of guided missile transmitters researched and built by Gates, has resulted in what we believe is an advanced design.

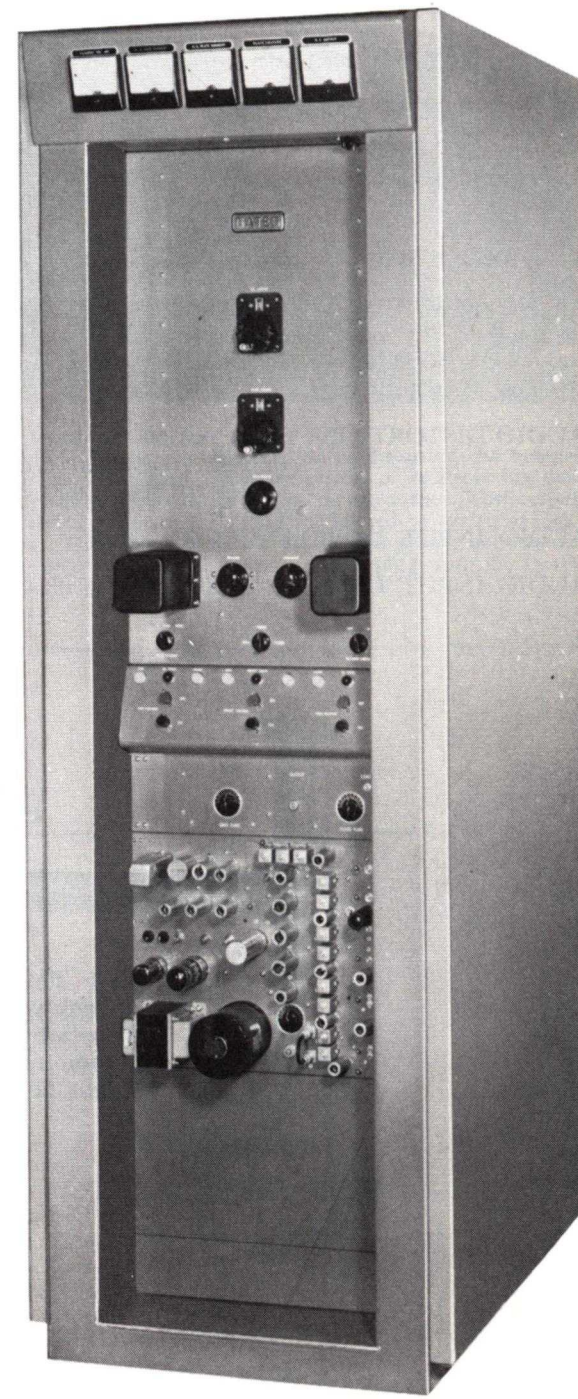
The M5534 exciter, described in detail in this catalog, employs a phase shift modulator with pulse timing techniques. Tube change from off the shelf tubes does not require realignment to retain top-grade performance. Multiplexing may be plugged in at any time. The exciter develops a full 10 watts output.

From the exciter a push-pull IPA stage with 6146 tubes drives the final P.A. 4-400A tubes to develop an easy 1000 watts. Coupling between exciter to driver and driver to final amplifier is at 51 ohms. This eliminates trouble causing high impedance coupling and again emphasizes stability. Both the driver and power amplifier stages are totally shielded in a non-ferrous housing and the entire power amplifier section including components is in an air chamber. This chamber is protected by a diaphragm type air pressure switch disconnecting high voltage in case of air failure. A low pass filter is incorporated to attenuate both harmonics and spurious radiation, vital in today's crowded use of the radio frequency spectrum. Relay complement is most complete for both equipment and personnel protection. Use of remote control is a simple and routine attachment, if desired.

There are dual power supplies for low and high voltage. Cabinet is of 16 gg stretcher level steel, resistance welded and attractively finished in two tones of gloss gray. Rear door is lift off type ¾ full length. Front is recessed to protect extruding front panel equipment. Metering includes a VSWR output meter for reading power and standing wave ratio. Air intake is filtered and filters may be easily removed for cleaning.



Heart of all Gates FM broadcast transmitters is the M5534 exciter with direct crystal controlled oscillator, phase shift modulator with pulse timing techniques and 10 watts output. Power supply is self-contained. During research period, extreme attention was paid to intermediate frequency coil design, circuit constants and stability. All Gates exciters will operate multiplex by purchasing Gates multiplex sub-generators either now or later.



MODEL FM-1B SPECIFICATIONS

POWER OUTPUT: Rated 1000 watts, capability 1100 watts.

FREQUENCY RANGE: 88-108 Mc (as ordered).

FREQUENCY STABILITY: 0.001%.

RF OUTPUT: 50.0 ohms into a 7/8" coaxial flange connector.

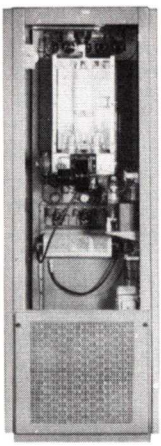
FREQUENCY SWING: ±75 Kc equals 100% modulation.

RF HARMONICS: Suppression of harmonics meets or exceeds FCC requirements.

AUDIO FREQUENCY RESPONSE: Within 1 db of standard 75 microsecond pre-emphasis curve or flat ±1.0 db from 50-15,000 cycles, as desired. (If preference, state when ordering.)

AUDIO DISTORTION: 1% or less 50-100 cycles; 0.5% or less 100-10,000 cycles; 1% or less 10,000-15,000 cycles.

AUDIO INPUT IMPEDANCE: 600 ohms.



AUDIO INPUT LEVEL: 600 ohms +10 dbm ±2 db.

NOISE: 65 db below 100% modulation (FM); 50 db below equivalent 100% modulation (AM).

PRIMARY POWER: 230 volts, 50/60 cycles, single phase grounded neutral three wire.

POWER CONSUMPTION: 3800 watts.

TUBES: (7) 6AY6 oscillator, (3) 12AX7 multipliers, (3) 6J6, (2) OA2, (2) 6146, (2) 4-400A, (2) 8008, and one each 6360, 6AQ5, 6080, GZ34/5AR4, 5R4GYA and 12AT7.

TOTAL NUMBER TUBES: 27

TOTAL TUBE TYPES: 13

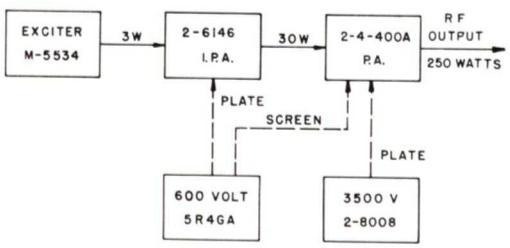
CONNECTOR REQUIRED: 7/8" E1A flange.

SIZE: 78" high, 27" wide, 36½" deep.

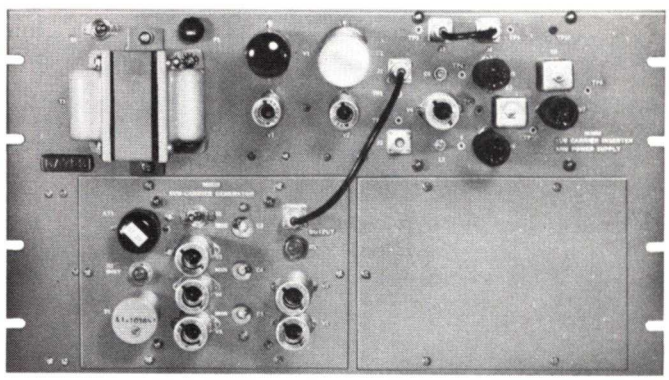
WEIGHT: 880 lbs. unpacked; 1140 lbs. packed.

CUBAGE: 44 cu. ft., total shipment.

FINISH: Two-tone medium gloss gray.



BLOCK DIAGRAM FM-1-B
1-KW-FM
BROADCAST TRANSMITTER



Pioneers in multiplexing equipment, Gates discarded the heterodyne system and developed the *direct system* of multiplexing that utilizes each sub-channel on the direct sub-frequency. The output of the multiplex generator is phase modulated to arrive at program content. The Gates system of multiplexing does not require crystal controlled sub-channel generators and plugs in the Gates M5534 exciter.

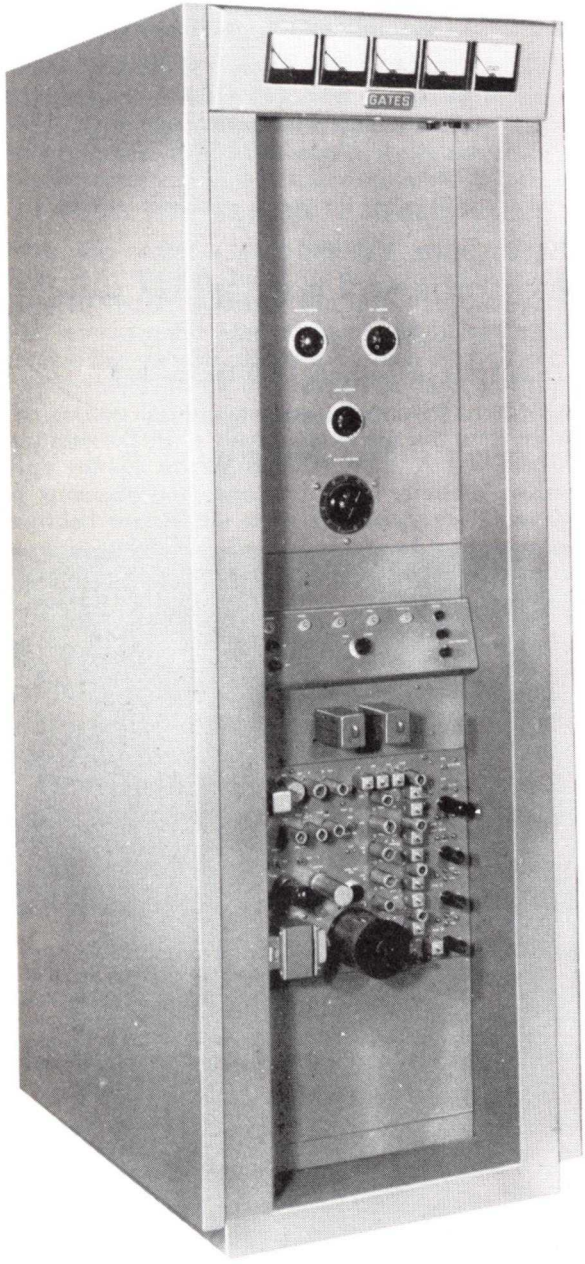
ORDERING INFORMATION

FM transmitter, 1000 watts with tubes, one crystal and oven FM-1B
Spare 100% tube complement for above TK-312
FCC tube complement (required FCC spares) TK-318

250 WATT FM TRANSMITTER

Model FM-250B

(MULTIPLEXING OPTIONAL)

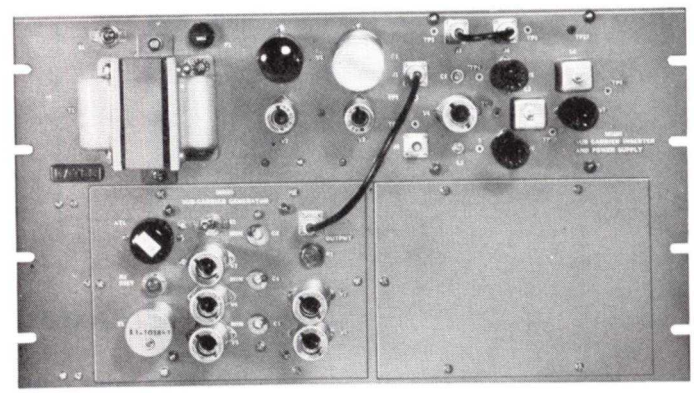


Since the very beginning of FM broadcasting, Gates engineers have applied continual product research. The FM-250B transmitter incorporates the results of this research. Because above normal VSWR will nearly always affect stability, particular attention has been paid to retain stability under abnormal conditions such as icing on the antenna. An improved tak circuit, a complete non-ferrous shield housing for the final amplifier combined wth the M5534 excter wherein the 10 watts output from this exciter drives the final amplifier direct, results in top stability, so necessary for good everyday service with minimum technical attention.

The superiority of the Gates M5534 exciter is emphasized by noting that either single or dual channel multiplexing is possible at any time by simply plugging in the multiplex equipment. Exacting basic exciter design is mandatory in multiplexing and complementary in monaural service. The exciter and multiplexing equipment are described in detail in this catalog.

Interesting to note is that the power amplifier stage is single ended. Metering is complete including a VSWR meter in the transmission line to read both power output and standing wave ratio. The relay complement is complete for both protection and ease in attaching remote control. No circuit breakers are employed, important in unattended operation. A diaphragm type air pressure switch immediately disconnects high voltage in case of air failure. Air intake is filtered.

Cabinet design is sturdy with lift off rear door and front panels recessed to protect extruding components. As the FM-250B transmitter is the driver for the Gates FM-5B 5000 watt transmitter, the possibilities for later expansion are without price penalty. The FM-250B transmitter is available on special order in frequency ranges of 40-88 Mc and 108-220 Mc. The 88-108 Mc FM band is standard stock equipment.



MULTIPLEXING UNIT — OPTIONAL

Pioneers in multiplexing equipment, Gates discarded the heterodyne system and developed the *direct system* of multiplexing that utilizes each sub-channel on the direct sub-frequency. The output of the multiplex generator is phase modulated to arrive at program content. The Gates system of multiplexing does not require crystal controlled sub-channel generators and plugs in the Gates M5534 exciter.

MODEL FM-250B SPECIFICATIONS

POWER OUTPUT: Rated 250 watts, capability 280 watts.

FREQUENCY RANGE: FM-250B (Broadcast), 88-108 Mc. FM-250C (Communications), 40-88 Mc.

FREQUENCY STABILITY: 0.001% via temperature controlled crystal.

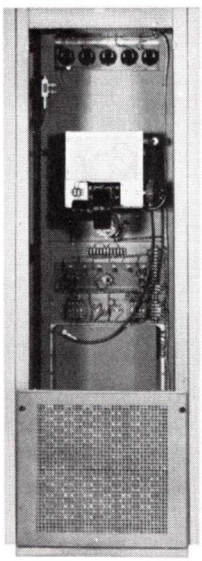
RF OUTPUT: 50 ohms to coaxial line to Type N connector.

FREQUENCY SWING: FM-250B, ±100 Kc (75 Kc considered 100% modulation).
FM-250C, available as ordered.

RF HARMONICS: Suppression meets or exceeds all FCC requirements, with second harmonic filter in-built.

FREQUENCY RESPONSE: Within 1.0 db of standard 75 microsecond pre-emphasis curve or flat ±1.0 db, 50-15,000 cycles as desired (if preference, state when ordering).

DISTORTION: 1% or less 50-100 cycles.
0.5% or less 100-10,000 cycles.
1% or less 10,000-15,000 cycles.



AUDIO INPUT IMPEDANCE: 600 ohms.

AUDIO INPUT LEVEL: + 10 dbm, ± 2 db.

NOISE: 65 db below 100% modulation (FM). 50 db below equivalent 100% AM modulation.

PRIMARY POWER: 115 volts, 50/60 cycles.

POWER CONSUMPTION: 800 watts.

TUBES: (7) 6AU6, (3) 12AX7, (3) OA2, (2) 866A and one each 6360, 6AQ5, 6080, GZ34/5AR4, 4X250B, 12AT7.

NUMBER TUBES: 22.

TOTAL TUBE TYPES: 11.

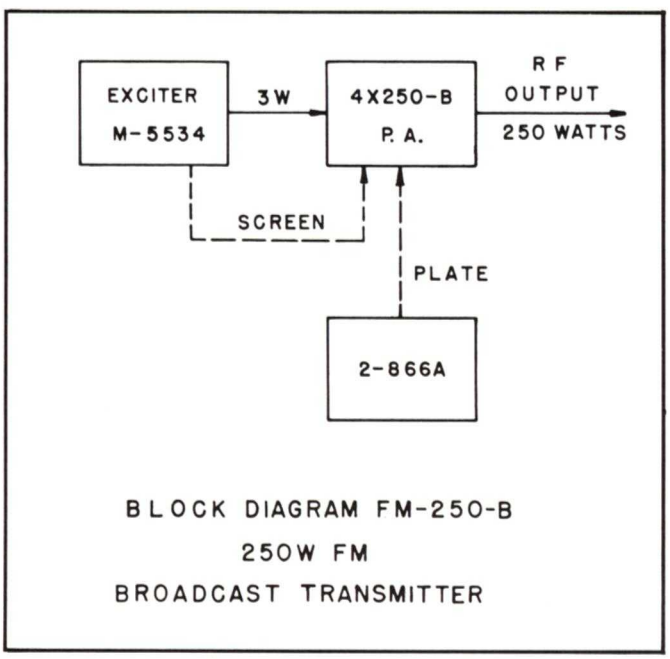
RF CONNECTOR REQUIRED: Type N male.

SIZE: 78" high, 27" wide, 36-1/3" deep. If end bells removed, width reduces to 24".

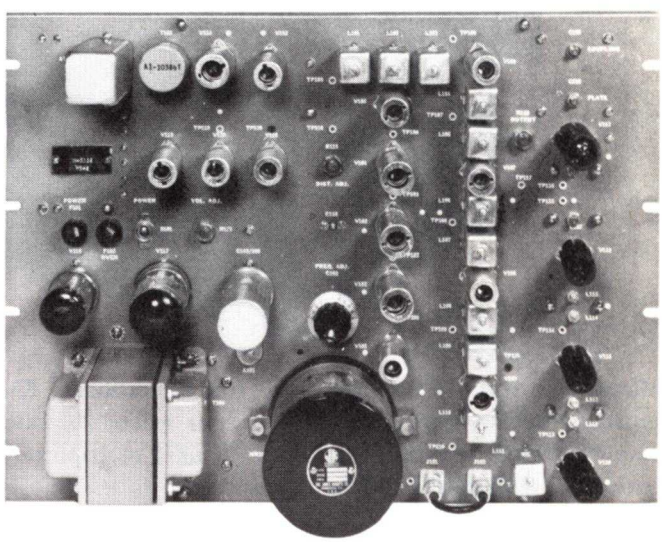
WEIGHT: Net 510 lbs. Packed 820 lbs.

CUBAGE: 44.

FINISH: Medium gloss gray with escutcheons in black and trim in chrome.



BLOCK DIAGRAM FM-250-B
250W FM
BROADCAST TRANSMITTER



Heart of all Gates FM broadcast transmitters is the M5534 exciter with direct crystal controlled oscillator, phase shift modulator with pulse timing techniques and 10 watts output. Power supply is self-contained. During research period, extreme attention was paid to intermediate frequency coil design, circuit constants and stability. All Gates exciters will operate multiplex by purchasing Gates multiplex sub-generators either now or later.

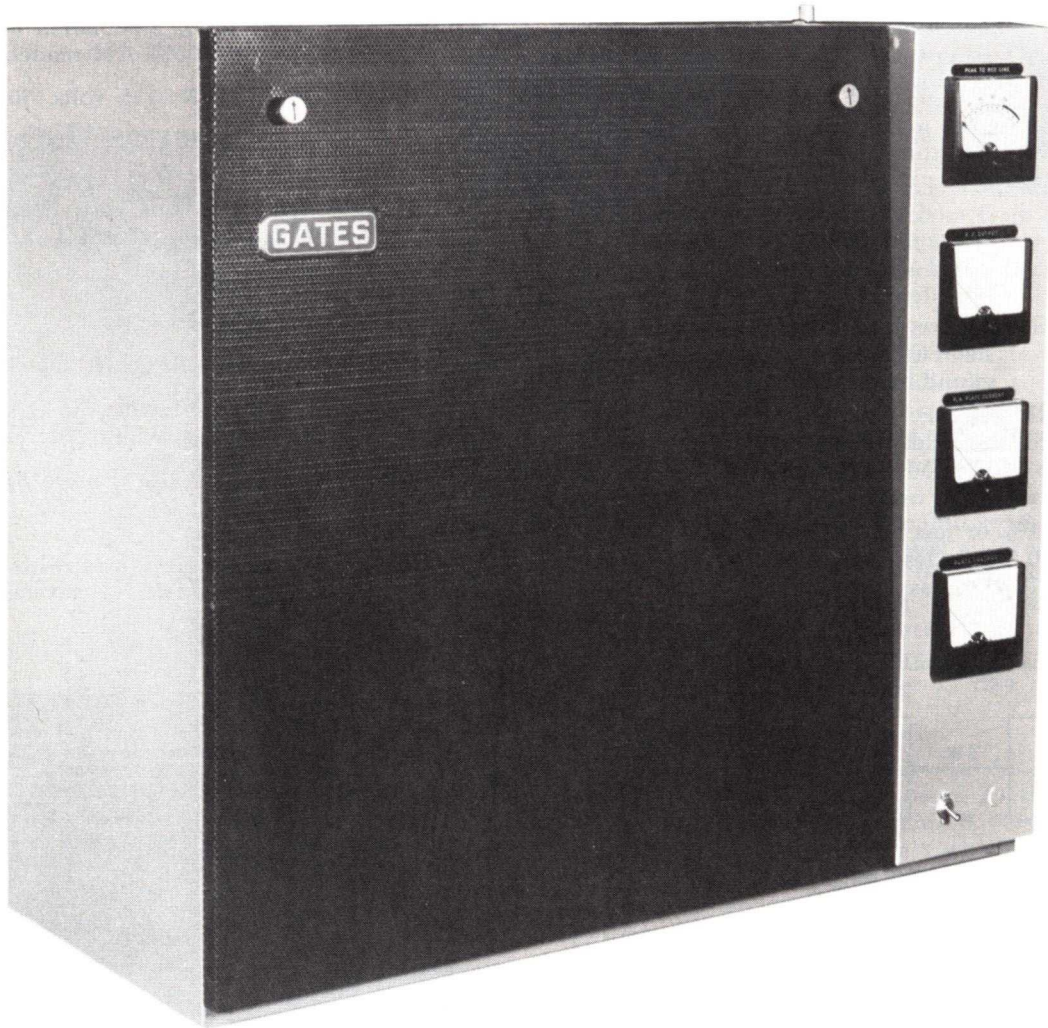
ORDERING INFORMATION

FM transmitter, 250 watts, with tubes, one crystal and oven	FM-250B
Spare 100% tube complement for above	TK-311
FCC tube complement (required FCC spares)	TK-317

10 AND 50 WATT FM TRANSMITTERS

Models BFE-10B & BFE-50B

(MULTIPLEXING OPTIONAL)



Model BFE-10B: FCC approved for educational FM broadcasting but used in all applications where 10 watts output is sufficient. Single or dual channel multiplexing optional either now or when required.

Model BFE-50B: Similar to the BFE-10B FM transmitter but with 50 watts amplifier added to provide 50 watts output. Single or dual channel multiplexing is optional.

Modern in both electrical and mechanical design, these two transmitters provide unusually low distortion and wide frequency response. Along with other metering (see Specifications, opposite page), an audio level meter indicates modulation level. This feature makes the transmitter 100% complete without external accessories other than antenna and audio equipment. Heart of this equipment is the M5796 exciter, utilizing a phase shift modulator with pulse techniques. The upgrading demanded because of multiplexing adds much to monaural performance as well.

Construction is pleasing to the eye and unusually convenient to service. The full length, perforated front grill removes quickly by loosening two thumb nuts to reveal tubes, adjustments and crystal oven. There is a full length slip off rear door. The depth of only 14" is a space saver.

Multiplexing, either single or dual sub-channels, is available and is fully described on another page. In the BFE-50B fifty watt model, the 50 watt P.P. 6146 amplifier and its separate power supply, mount directly above the exciter.

10 WATT AND 50 WATT SPECIFICATIONS

POWER OUTPUT: BFE-10B, ten watts. BFE-50B, fifty watts.

FREQUENCY RANGE: 88-108 Mc, as ordered.

STABILITY: 0.001% or better.

RF OUTPUT: 51 ohms (Type N connector).

FREQUENCY SWING: ±100 Kc (±75 Kc = 100% modulation in FM broadcasting).

RF HARMONICS: Suppression meets or exceeds all FCC requirements.

RESPONSE: Within 1 db of standard 75 microsecond pre-emphasis curve or flat ±1 db, 50-15,000 cycles, as desired. (If preference, state when ordering).

DISTORTION: 1% or less 50-100 cycles. ½% or less 100-10,000 cycles. 1% or less 10,000-15,000 cycles.

INPUT: ±10 dbm ±2 db at 600 ohms impedance.

NOISE: 65 db below 100% modulation (FM). 50 db below equivalent 100% AM modulation.

POWER: 115 volts, 50/60 cycles.

POWER CONSUMPTION: BFE-10B, 120 watts. BFE-50B, 230 watts.

TUBES: BFE-10B — (7) 6AU6, (3) 12AX7, (3) 6J6, (2) OA2, and one each 6AQ5, GZ34/5AR4, 6080, 6360, 12AT7.

BFE-50B — Same as above, with (2) 6146 and (1) 5R4GYA tubes added.

TOTAL TUBES: 15

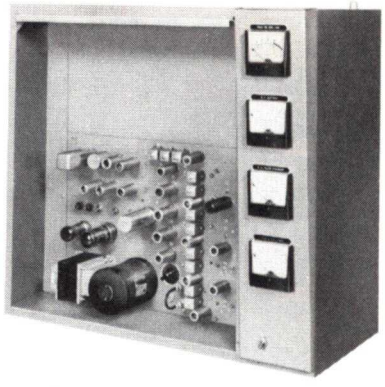
TOTAL TUBE TYPES: 9 (BFE-10)

CONNECTOR REQUIRED: Type N Female.

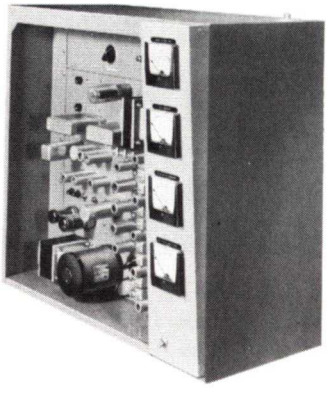
SIZE: 26½" high, 28" wide, 14" deep.

WEIGHT: BFE-10B — packed 115 lbs. BFE-50B — packed 165 lbs.

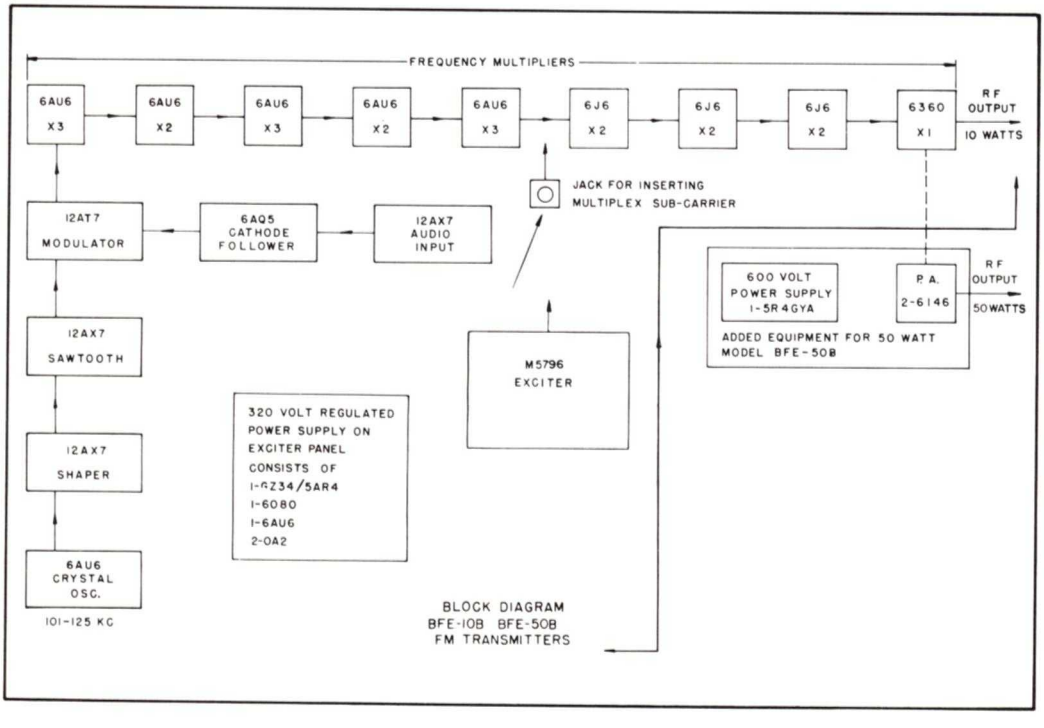
CUBAGE: BFE-10B — 8.5. BFE-50B — 8.5.



Front View (cover removed) of BFE-10B Ten Watt Model



Front View (cover removed) of BFE-50B Fifty Watt Model



ORDERING INFORMATION

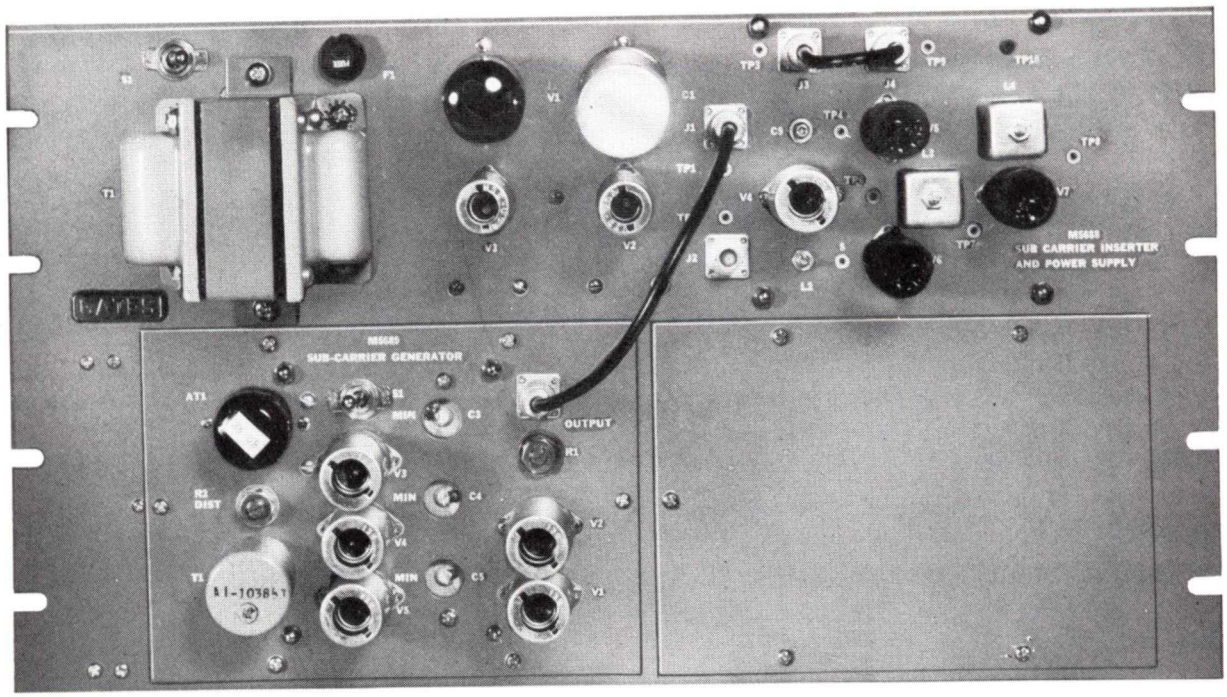
Model BFE-50B FM broadcast transmitter with tubes and crystal BFE-50B

Model BFE-10B FM broadcast transmitter with tubes and crystal BFE-10B

FCC tube complement (required FCC spares)
(BFE-10B) TK-359
(BFE-50B) TK-360

MULTIPLEXING EQUIPMENT FOR FM

Single and Dual Sub-Channels



Gates sub-carrier inserter with single sub-carrier generator for FM broadcasting on main and one sub-carrier channel. Note space provided for second sub-channel generator that may be installed now or later (See illustration).

By the reason of pioneering in multiplexing for FM broadcasting, the current Gates multiplexing system for single and dual sub-channels instead of a near rack full of equipment, is a compact, non-complex, highly effective and reliable system.

The complete multiplex system for one or two sub-channels is built on a panel 19" x 10½" in size. This panel consists of a sub-carrier inserter, power supply and either one or two sub-carrier generators for multiplexing. The sub-carrier inserter consists of a phase splitter, balanced phase modulator and amplifier. There is no effect upon main carrier modulation caused by passage through the sub-carrier inserter. The sub-carriers, either one or dual, which might be at 41 Kc and 67 Kc, are inserted on the main carrier by phase modulation. Thus, program material placed on the sub-carrier/s by frequency modulation in the sub-carrier generators can then be detected at the receiver end by the sub-carrier receiver or adaptor.

Earlier multiplex systems employed a heterodyne system to arrive at a sub-channel frequency. This requires extreme care in alignment as well as continued effort to keep aligned. Misalignment developed so-called birdies in the program content. Also, the providing of a second sub-carrier became very complex and costly along with even greater alignment problems. In Gates multiplexing, the sub-channel frequency is generated within the sub-channel generator and is then phase modulated to arrive at program content. These sub-channel generators need not be crystal controlled as the discriminators in the receivers are always broad enough to permit 1% stability. This eliminates any possibility of heterodyne signals (birdies) in the program content. It also makes more than one sub-carrier not only practical but almost ridiculously simple.

Gates multiplexing systems are successfully in use today in numerous FM stations. This is mentioned to assure the reader that the contents herein is not theory. The simplicity of Gates multiplex, contrasted to earlier systems, will logically cause the prospective user to ponder. The answer partially is that Gates multiplex must be used with the new Gates M-5534 main carrier exciter. Both exciter and multiplex are a compatible engineering group of equipment. The advanced design of the exciter contributes to the good performance of Gates multiplex equipment. The balance of the answer is in the specifications on the opposite page. It is well to state that Gates does not hesitate to recommend dual sub-channels as practical and highly workable. This is perhaps the best endorsement of the good results where in other systems the second sub-channel has caused some engineering problems.

MULTIPLEXING EQUIPMENT SPECIFICATIONS

FREQUENCIES: Any sub-carrier frequency between 25 Kc and 75 Kc. The sub-carrier receivers currently on the market indicate 41 Kc for the first sub-channel and 67 Kc for the second. Other models suggest 50 Kc for single sub-carrier use. State desires when ordering.

FREQUENCY STABILITY: 1.0% or less. Receiver discriminator circuits accept this percentage as a necessary tolerance.

OSCILLATOR: Phase shift.

MODULATION: Phase.

MODULATION CAPABILITY: 30% sub-carrier modulation of main carrier. In average conditions held to about 10%.

SUB-CARRIER SWING: (due to modulation) Max; ±8 Kc. 100% modulation; ±5 Kc. (See Note below)

AUDIO INPUT: 600 ohms at approximately +10 dbm.

FREQUENCY RESPONSE: (one or two sub-channels) ±2 db, 50-7500 cycles.

DISTORTION: 3% or less at 100% modulation.

FM NOISE: Down 60 db or better with ref. to 100% modulation (±5 Kc swing). Measured with main carrier removed.

CROSSTALK: Down 50 db or better with main carrier having sine wave modulation at 70%. (See Note below).

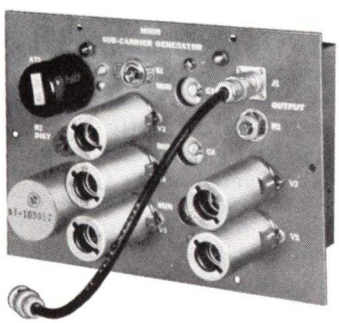
TUBES: For single sub-carrier; (2) 6BE6, (4) 12AX7, (1) 6AU6, (2) 12AY7, (2) OA2, and (1) 5Z3/5AR4.

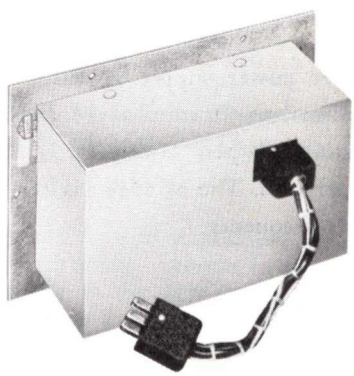
For two sub-carriers; (2) 6BE6, (7) 12AX7, (4) 12AY7, (1) 6AU6, (2) OA2, and (1) 5Z3/5AR4.

SIZE: 19" wide, 10½" high, 3¾" in front of panel and 4" behind panel including dust cover. This panel includes sub-carrier inserter and space for one or two sub-carrier generators.

NOTE 1: Crosstalk measurements are based on factory tests with recognized measuring equipment. As crosstalk can also be generated in the receiver, customer should also check receiver specifications to assure good systems performance.

NOTE 2: FCC requirements state the arithmetic sum of all multiplex sub-carriers shall not exceed 30% modulation of the main carrier. Tests indicate modulating the main carrier with a sub-carrier in excess of 10% (±7½ Kc) has little effect on the signal to noise ratio.





Front and rear view of sub-carrier generator. Illustration on previous page shows one sub-carrier generator installed on the sub-inserter panel with space for second sub-carrier generator provided. Sub-carrier generators are identical other than frequency of operation.

ORDERING INFORMATION

Complete single sub-carrier multiplex equipment including M-5688 sub-carrier inserter, one M-5688 sub-carrier generator and tubes M-5633A

Complete dual sub-carrier multiplex equipment including M-5688 sub-carrier inserter, two M-5688 sub-carrier generators and tubes M-5633B

NOTE 3: Above multiplex equipment must be used with Gates M5534 FM main channel exciter.

NOTE 4: When ordering, state sub-carrier frequency. This is usually obtained by choice of receivers which are designed for a specific sub-carrier frequency such as 41 Kc, 50 Kc, 67 Kc, etc.

FM EXCITER MODEL M-5534

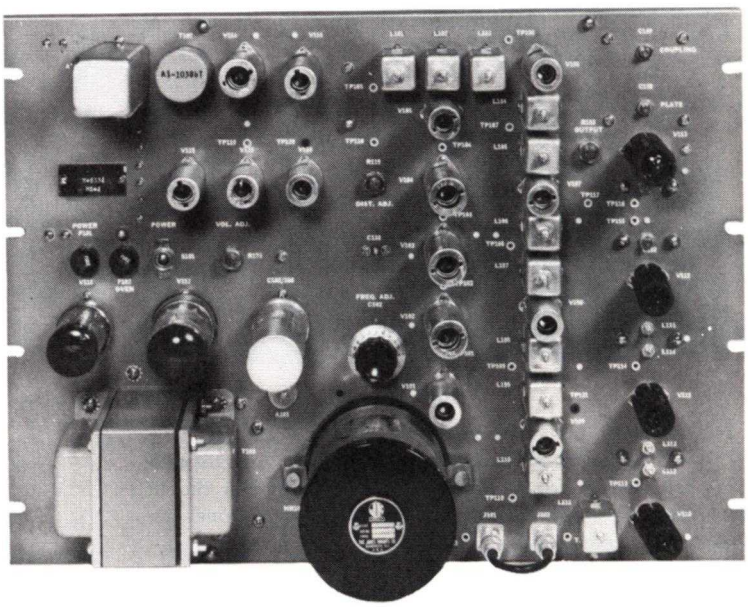
(MULTIPLEXING OPTIONAL)

The Gates M-5534 exciter for FM broadcasting in the 80-108 Mc band is offered to FM broadcasters for modernizing existing FM transmitters. With this exciter, multiplexing may be either immediately purchased or added at a future date. As the exciter output is 10 watts at 50 ohms and at operating frequency, the adaption to any existing transmitter is easily done. It may be mounted in a nearby rack cabinet and coupled to the transmitter with RG-8/U cable where it is not convenient to alter the existing transmitter.

Because of multiplexing, Gates engineers designed an entirely new exciter having definitely superior characteristics, whether or not multiplexing is employed. Unusual attention was paid to intermediate amplifier design. The use of pulse techniques in a phase shift modulator eliminates costly special tubes. In fact, tubes are standard receiving type and may be replaced with off the shelf tubes and full performance specifications will be met without retuning or alignment. FM broadcasters installing the Gates M-5534 exciter have reported very noticeable improvement in transmission quality and most important, complete freedom from high maintenance cost and touchy problems that accompanied earlier FM designs.

As the exciter power supply is self-contained, electrical installation involves attachment of audio, AC, and output terminations. When Multiplex is added, it becomes a plug-in operation. The M-5534 exciter is supplied tuned to customer's frequency.

It is believed the M-5534 exciter may be attached to any existing FM transmitter regardless of make. With 10 watts output, more than sufficient drive should be available for the succeeding R.F. power stage in most transmitters. Where the drive is in excess of requirements, this can be adjusted downward within the exciter itself. It can be said with reasonable accuracy that the trouble point of earlier FM transmitter designs, where existing, was in the lower level stages.



The Gates M-5534 exciter in this respect will offer complete modernization, signal quality improvement and solid reliability. As the M-5534 exciter is used in all new Gates FM transmitters and are fully FCC approved, the addition of this exciter to existing FM equipment should offer no problems as related to FCC approval of the modification.

SPECIFICATIONS

POWER OUTPUT: 0-10 watts (variable by control).

FREQUENCY RANGE: 88-108 Mc (supplied on customer's frequency).

RF OUTPUT: 50-72 ohms.

OSCILLATOR: Direct crystal control (crystal in temperature controlled oven supplied).

STABILITY: ±0.001%.

MODULATION: Phase shift, using pulse techniques.

AUDIO: 600 ohms at approximately +10 db.

RESPONSE: Within 1 db of 75 microsecond pre-emphasis curve or flat ±1 db. 50-15,000 cycles.

DISTORTION (at 100% mod.): 0.5% 100-10,000 cycles. 1% or less 50-100 cycles and 10,000-15,000 cycles.

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

NOISE: (AM) 60 db below equivalent 100% amplitude modulation.

POWER INPUT: 117 volts AC 50/60 cycles at approximately 120 watts.

TUBES: (7) 6AU6, (3) 6J6, (3) 12AX7, (2) OA2, and one each 6AQ5, 12AT7, GZ34/5AR4, 6080 and 6360.

SIZE: 19" wide, 14" high, 5" front panel component extension. 3" behind panel includes dust cover.

MULTIPLEXING: See Bulletin 104-A for complete information.

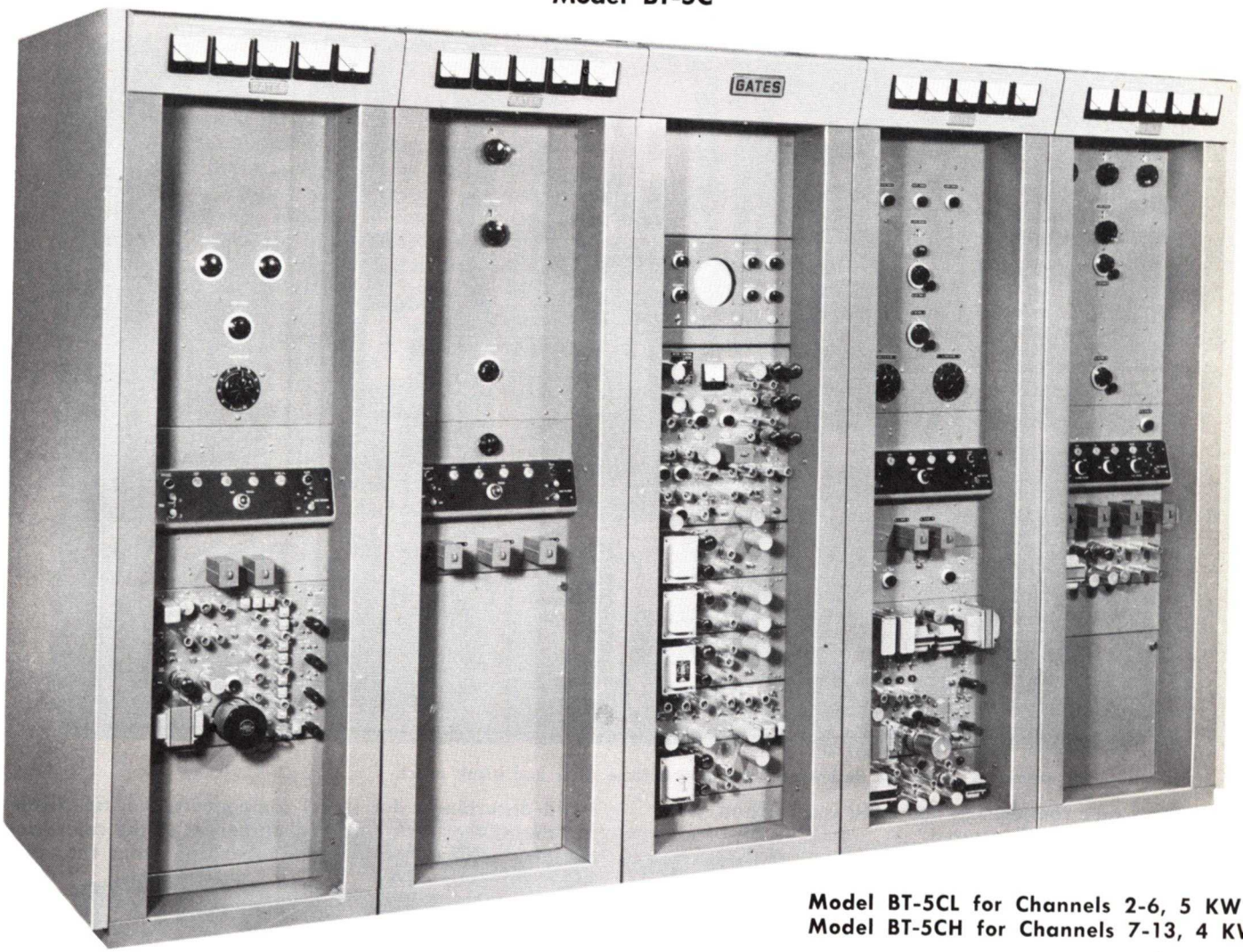
ORDERING INFORMATION

Complete exciter with self-contained power supply, crystal and oven and 100% tube complement M-5534

(Please state FM frequency and type transmitter when ordering.)

5000 WATT VHF TELEVISION TRANSMITTER

Model BT-5C



Model BT-5CL for Channels 2-6, 5 KW
Model BT-5CH for Channels 7-13, 4 KW

The Gates BT-5C is an entirely new five kilowatt designed for the most exacting color and monochrome television transmission. Completely self-contained (vestigial sideband filter mounted externally), including blowers and power components, the BT-5C requires total floor space of only 10 feet by 3 feet. The two aural cabinets and the three visual cabinets are mounted together as one complete transmitter — the aural being the two left hand cubicles and the visual, the remaining three. It is possible to supply separate side panels for both sections so the transmitters may be mounted in operating position separate from one another, however, to make a concise and complete transmitter, it is recommended that all five cubicles be mounted together.

Separate high voltage power supplies are provided for both the aural and visual transmitter. The BT-5C also includes a new and improved video modulator with keyed clamping and automatic switch over to AC coupling with reduced carrier power in case of sync or program failure.

The visual transmitter is grid modulated in the 500 watt visual driver by a dynamic cathode load modulator circuit. Video modulator of the new transmitter is equipped with RF bias failure alarm lamp, test meter, and an abundance of front panel test jacks. Rated power output is 5.0 Kw peak visual. The BT-5C uses 6076 tetrodes in final amplifier of both visual and aural transmitters.

The aural section is FCC rated at 2500 watts, but is capable of as much as 3 Kw. On most channels, operating characteristics generously exceed many FCC maximum requirements. The exciter employs a phase shift modulator with pulse timing techniques and delivers approximately 4 watts at the output. This drives a single IPA stage which drives the 2500 watt amplifier. Three power supplies are incorporated in the aural section: (1) low voltage, (2) 1500 volt intermediate, and (3) 5000 volt high voltage. Use of a single ended power amplifier stage combined with only one IPA stage between the exciter and power amplifier assures a stable circuitry. When added to a conserva-

BT-5C 5000 WATT VHF TELEVISION TRANSMITTER

Rear view with monochrome filter and blank panel.

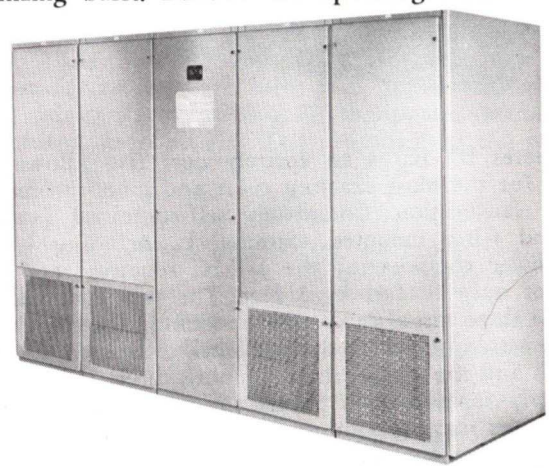
tively rated tube complement and rigid construction, trouble-free performance is assured.

Another important feature of the aural transmitter is the lack of frequency multiplication after the exciter. This aids in eliminating spurious frequencies and gives protection to tube life as power type tubes doubling or tripling in frequency are not always operated under their most stable and life lengthening conditions.

The 2.5 Kw power amplifier and the IPA driver amplifier are totally enclosed, both tubes and components, in a non-ferrous metal housing. Air from individual blowers cools both tubes and parts. Air intake for the transmitter is filtered by the replaceable filters in the lower portion of both cabinets.

The visual portion of the new BT-5C includes the exciter, IPA, 500 watt modulated amplifier, 5 Kw power amplifier, driver control unit, power amplifier control unit, regulated screen supply for the driver, regulated bias supply for the power amplifier, modulated, modulator power supplies, monochrome equalizer and 4.75 video cutoff filter, driver power supply and screen power supply for the power amplifier.

Among the latest technical advancements incorporated in the video modulator is sync-tip keyed clamping. Used to avoid disturbing color signal components, sync-tip clamping means no "back-porch" disturbances of the color synchronizing burst. Built-in and operating from the com-



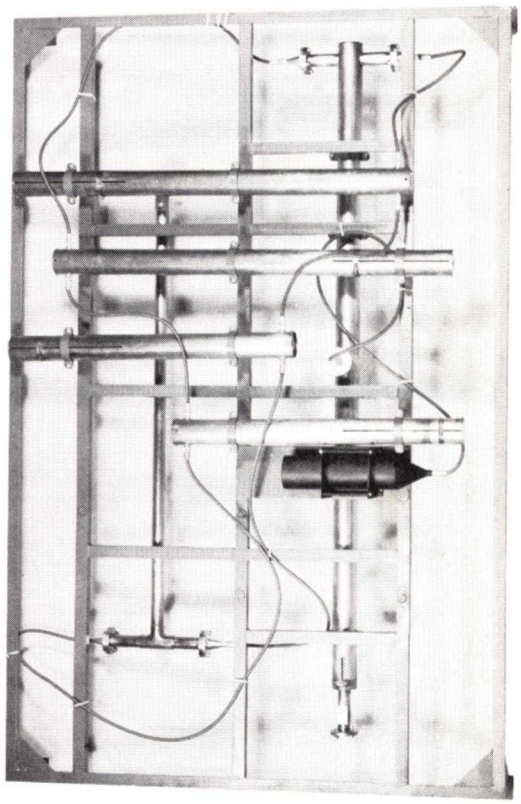
posit signal input, the keyed clamp generator uses a delay-line controlled keying pulse for maximum stability. Fail-safe protection circuits are provided which reduce power to mid-gray level in event of clamp or signal failure.

A white peak clipper is provided to considerably reduce the possibility of sync-buzz due to accidental over modu-

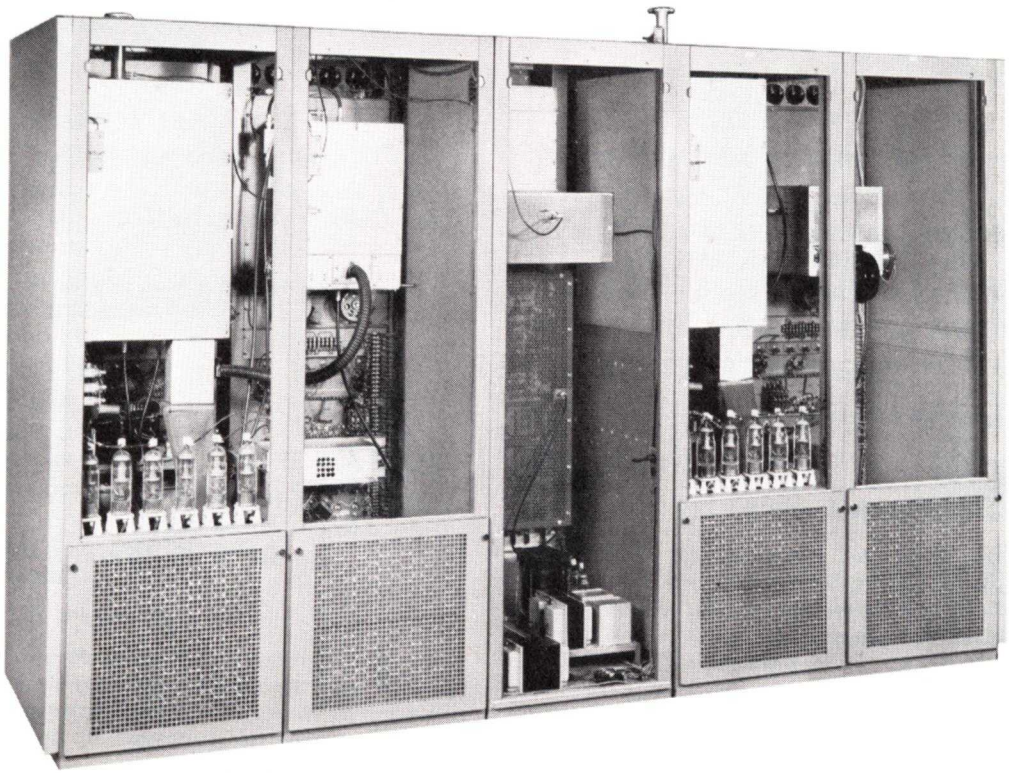
BT-5C 5000 WATT VHF TELEVISION TRANSMITTER

lation of white portion of picture that extends beyond the 10% point of carrier transmission. A white stretcher circuit improves differential gain. In-built feedback restoration is provided to remove hum and/or tilt, thus minimizing the need for a stabilizing amplifier. Visual input coaxial cable terminations are adjustable and time proven tubes are used in modulator and power supply. The visual oscillator is designed to control the visual carrier frequency of the transmitter of both low and high band TV channels. Output is multiplied 3 times for the low and 9 times for high band channels. Plate voltage to the oscillator is closely regulated for stability. Under normal operating conditions, the oscillator will hold carrier frequency to within 300 cycles. Since the aural carrier itself is held within 300 cycles, FCC requirements are exceeded in the transmission of both color and monochrome. Construction and circuitry is straight forward and direct, with exciter, oscillator and power supply contained in one panel. Crystal is in a thermostatically controlled oven. The visual transmitter consists of the oscillator/exciter, two intermediate stages and the push-pull 6076 power amplifier for 5000 watts peak. Tuning adjustments are all from the front. Two power supplies provide voltage to the IPA stages (full wave 866A) and 5000 volts to the PA stage (six type 8008 in a 3 phase full wave circuit).

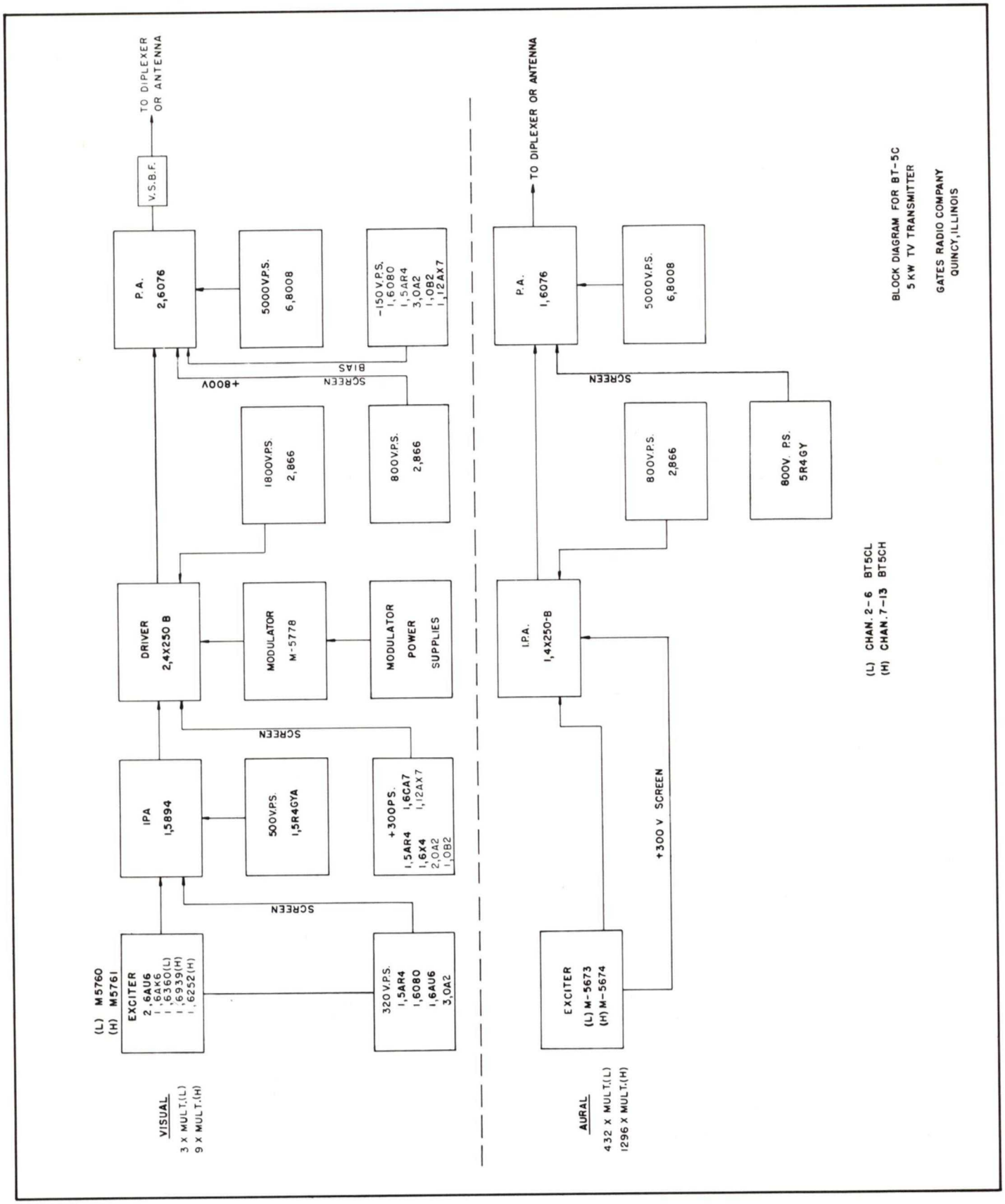
Twenty-one meters in the entire transmitter indicate all necessary circuits either direct or by multi-metering.



The vestigial sideband filter, illustrated above, is employed at the transmitter output prior to the transmission line and is standard equipment with all models.



BT-5C 5000 WATT VHF TELEVISION TRANSMITTER



BT-5C 5000 WATT VHF TELEVISION TRANSMITTER

SPECIFICATIONS

POWER INPUT: 230 volts, 50/60 cycles, three phase. Power consumption, approximately 28-KVA.

POWER OUTPUT:

Channels 2 thru 6 : Visual 5000 watts
Aural 2500 watts
Channels 7 thru 13: Visual 4000 watts
Aural 2000 watts
(generous excess to rated power is available for sideband filter and system losses).

RF OUTPUT IMPEDANCE: 50.0 ohms, 1-5/8 RETMA Flange.

INPUT IMPEDANCE: Video signal — 75 ohms, unbalanced. Audio signal — 600 ohms, balanced.

FREQUENCY RESPONSE:

Visual +2 to —2 db at 0.5 mcs.
Visual +2 to —2 db at 1.25 mcs.
Visual +2 to —2 db at 2.0 mcs.
Visual +2 to —2 db at 3.58 mcs.
The amplitude response will not vary more than +1 db to —2 db from the 3.58 mcs. response between 2.1 mcs. and 4.18 mcs. The amplitude at 4.75 mcs. is attenuated 20 db and frequencies higher than 4.75 mcs. are attenuated 20 db or greater.
Lower sideband response is
Visual —20 db at 1.25 mcs, and
—42 db at 3.58 mcs.
Aural Within 1.0 db of standard 75 microsecond preemphasis curve, 50-15,000 cycles.

FREQUENCY STABILITY: Visual ±500 cycles.
Aural ±500 cycles.

MODULATION CAPABILITIES:

Visual to 12½% +2½% of sync level. Aural ±40 Kc.

INPUT LEVEL: Visual 1.0 V. ±0.4 V. peak to peak.
Aural ±10 dbm ±2 db for 100% modulation.

NOISE: Aural 60 db below 100% modulation (FM).
50 db below equivalent 100% modulation (AM).
Visual 40 db below 100% AM modulation

AUDIO FREQUENCY DISTORTION:

50-100 cycles, 1.5% max.
100-10,000 cycles, 1% max.
10,000-15,000 cycles, 1.5% max. (at 25 Kc Swing).

AMPLITUDE VARIATION: 5% or less of peak sync. (one field).

SUBCARRIER PHASE vs BRIGHTNESS:
±7° maximum.

LINEARITY: ±15% maximum.

The power output for channels 7-13 has purposely been derated for conservative operation. Channels 7 through 10 may be operated at greater than 4 KW visual power with proportionate reduction in operating efficiency.

ENVELOPE DELAY TOLERANCE:
(From FCC Specified Curve).
±0.08 microseconds from 0.2-2.1 mc.
±0.04 microseconds at 3.58 mcs.
±0.08 microseconds at 4.18 mcs.

HARMONIC ATTENUATION: 60 db or better.

REGULATION OF OUTPUT: 7% from black to all white.

INPUT POLARITY: Black negative.

TYPE OF MODULATION: Phase shift employing pulse techniques.

TYPE OF OSCILLATOR: Direct crystal controlled (both aural and visual).

TUBES:

Visual	Aural
3 - 6AU6	1 - 12AT7
1 - 6AK6	7 - 6AU6
6 - GZ34/5AR4	3 - 12AX7
5 - 6080	3 - 6J6
11 - OA2	2 - OA2
9 - 12AT7	1 - 6360
2 - 6CL6	1 - 6AQ5
7 - 6CA7	1 - 6080
3 - 5651	1 - GZ34/5AR4
5 - OB2	1 - 4X250B
3 - 6AU8	1 - 6076
5 - 12AX7	2 - 866
1 - 6X4	6 - 8008
1 - 5894	1 - 6360
2 - 4X250B	3 - 12BH7
2 - 6076	1 - 6CS6
4 - 866	
6 - 8008	
1 - 5R4	

TOTAL NUMBER TUBES: Visual 82. Aural 30.

TOTAL TUBE TYPES: 24

SIZE (OVER-ALL): Width 96" (less end bells).
SIZE (OVER-ALL): Width 99" (with end bells).
SIZE (OVER-ALL): Height 78", Depth 36½".

WEIGHT: Packed 3000 lbs. Net 2500 lbs.

CUBAGE: 136 cu. ft. unpacked.

SIDEBAND FILTER: Mounted external to cabinet

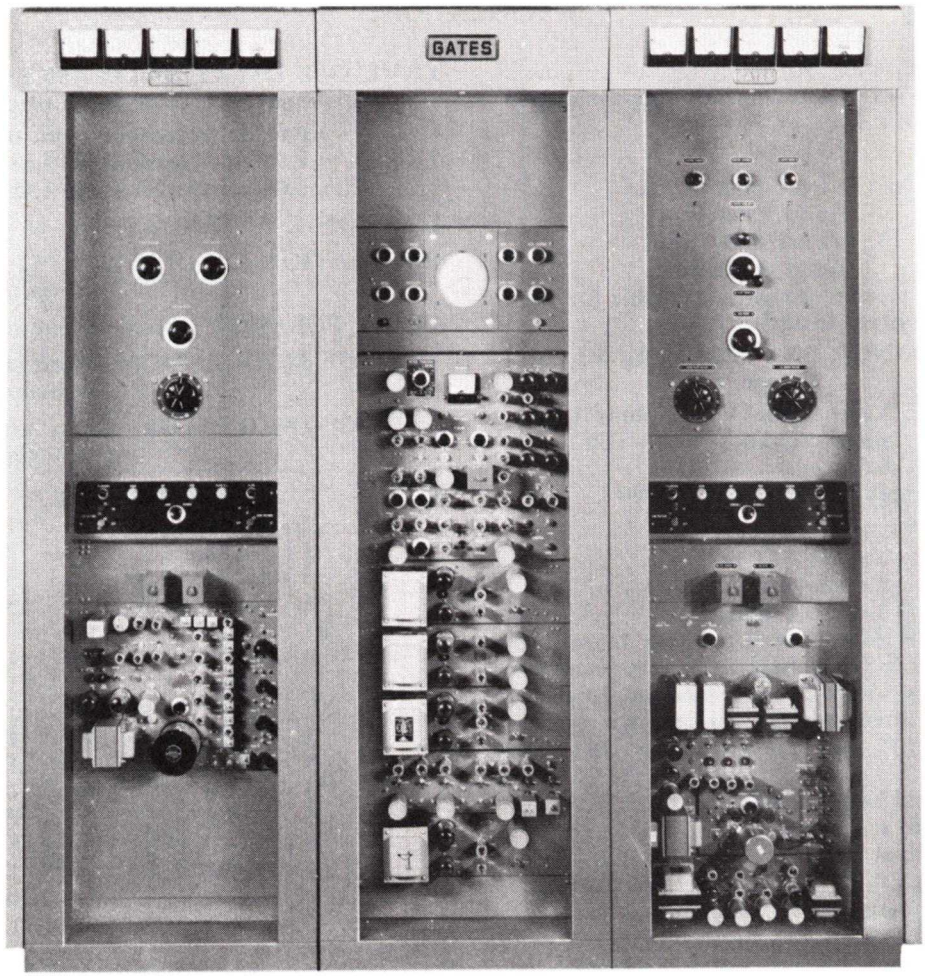
COOLING: Forced air

ORDERING INFORMATION

Transmitter for channels 2-6, 5000 watts BT-5CL
Transmitter for channels 7-13, 4000 watts BT-5CH
Spare 100% tube complement for BT-5CL TK-341
Spare 100% tube complement for BT-5CH TK-343
FCC Tube Complement
BT-5CL TK-342
BT-5CH TK-344
Color video filter (with power supply) M-5892

500 WATT VHF TELEVISION TRANSMITTER

Model BT-500C



Model BT-500CL Channels 2-6
Model BT-500CH Channels 7-13

The all new BT-500C 500 watt television transmitter is an outstanding expression of the latest achievements in television transmission. With a newly improved video modulator, sync-tip keyed clamping, white peak clipper, and a white stretcher circuit to improve differential gain, the most exactng color and monochrome transmission is possible.

The BT-500C is completely self-contained in three cubicles — the left cubicle being the aural section and the remaining two the visual. Cubicles can be mounted either separately or together as one complete unit. There are separate high voltage power supplies for the aural and visual sections. Type 4X250B tetrodes are employed in the final amplifiers of the aural and visual sections. The video modulator is equipped with bias-failure alarm lamp, test meters, and numerous front panel test jacks. Keyer clamping and automatic switch-over to AC coupling are used in the video modulator in case of program or sync failure. Visual transmitter is grid-bias modulated in the 500 watt visual amplifier by a dynamic cathode load modulator circuit. Rated power output is 500 watts peak visual with excess power available for losses in the system. The BT-500C can be enlarged to 5000 watts at anytime since it is actually a portion of the BT-5C 5000 watt TV transmitter.

The aural section is FCC rated at 250 watts, but is also capable of excess power for losses. On most channels, operating characteristics generously exceed many FCC maximum requirements. The exciter employs a phase shift modulator with pulse timing techniques delivering approximately 4 watts. This drives a single power amplifier stage. Two power supplies are incorporated in the aural section: (1) low voltage, (2) 1500 volt high voltage. When added to a conservatively rated tube comple-

BT-500C 500 WATT VHF TELEVISION TRANSMITTER

ment and rigid construction, trouble-free performance is expected. Lack of frequency multiplication after the exciter unit is another important feature of the aural transmitter. This aids in eliminating spurious frequencies and gives protection to tube life as power type tubes doubling or tripling in frequency are not always operated under their most stable and life lengthening conditions.

The 250 watt power amplifier, both tubes and components, is totally enclosed in a non-ferrous metal housing with air from individual blowers cooling both tubes and parts. Air intake for the transmitter is filtered by the replaceable filters in the lower portion of both cabinets.

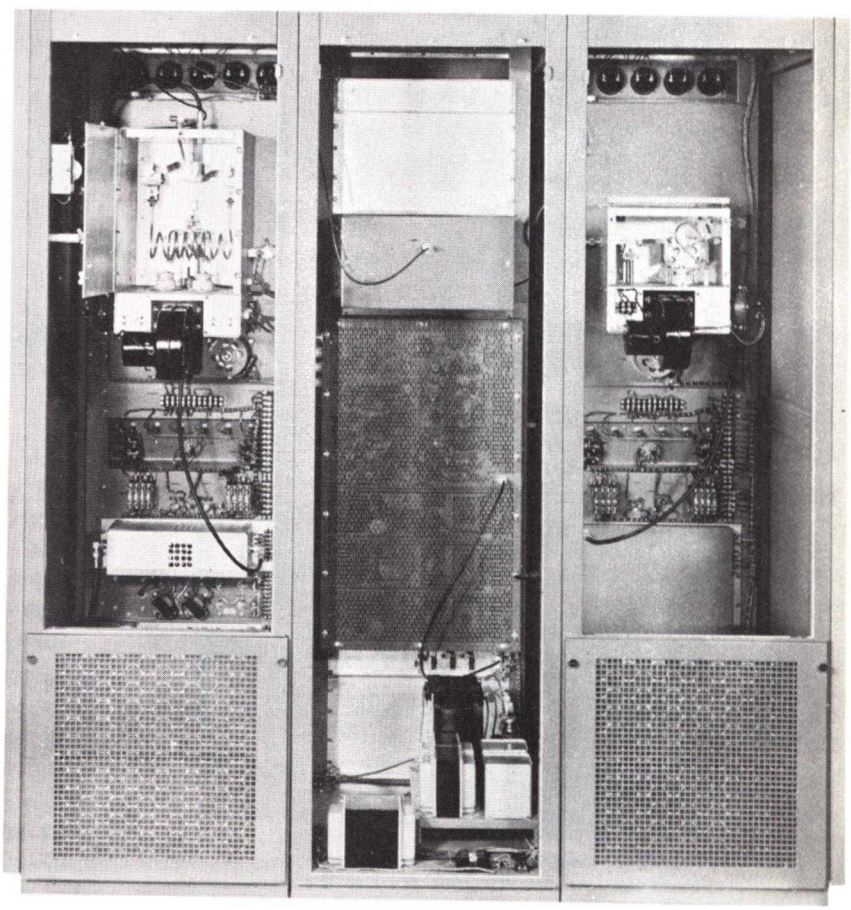
The visual portion of the new BT-500C includes the oscillator, exciter, IPA, 500 watt modulated amplifier, power amplifier control unit, regulated screen supply for the PA, regulated bias supply for the power amplifier, modulator, modulator power supplies, monochrome equalizer and 4.75 video cutoff filter.

Among the latest technical advancements incorporated in the video modulator is sync-tip keyed clamping. Used to avoid disturbing color signal components, sync-tip clamping means no "back-porch" disturbances of the color synchronizing burst. Built-in and operating from the composit signal input, the keyed clamp generator uses a delay-line controlled keying pulse for maximum stability. Fail-safe protection circuits are provided which reduce power to mid-gray level in event of clamp or signal failure.

A white peak clipper is provided to considerably reduce the possibility of sync-buzz due to accidental over modulation of white portion of picture that extends beyond the 10% point of carrier transmission. A white stretcher circuit improves differential gain. In-built feedback restoration is provided to remove hum and/or tilt, thus minimizing the need for a stabilizing amplifier. Visual input coaxial cable terminations are adjustable and time proven tubes are used in modulator and power supply. The visual oscillator is designed to control the visual carrier frequency of the transmitter of both low and high band TV channels. Output is multiplied 3 times for the low and 9 times for high band channels. Plate voltage to the oscillator is closely regulated for stability. Under normal operating conditions, the oscillator will hold carrier frequency to within 300 cycles. Since the aural carrier itself is held within 300 cycles, FCC requirements are exceeded in the transmission of both color and monochrome. Construction and circuitry is direct, with exciter, oscillator and power supply contained in one panel. Crystal is in a thermostatically controlled oven. The visual transmitter consists of the oscillator/exciter, one intermediate stage and the push-pull 4X250B power amplifier for 500 watts peak. Tuning adjustments are all from the front. Eleven meters in the entire transmitter indicate all necessary circuits either direct or by multi-metering. Latch-on type back doors are used. All incoming air is filtered and filter removes quickly for cleaning. Finish is two-tone gloss gray with chrome trim and black escutcheons.

The Gates BT-500C should be ordered with the optional M-5892 color video filter for color transmission. The filter replaces a blank panel space in the monochrome transmitter.

With the BT-500C, you can have complete confidence that your television transmission will be pleasing to your viewers.



BT-500C 500 WATT VHF TELEVISION TRANSMITTER

SPECIFICATIONS

POWER INPUT: 230 volts, 50/60 cycles, single phase. (120 volts for crystal heaters). Power consumption, 4.5 KVA.

POWER OUTPUT: Visual 500 watts peak. Aural 250 watts. (excess to rated power is available for sideband filter and system losses).

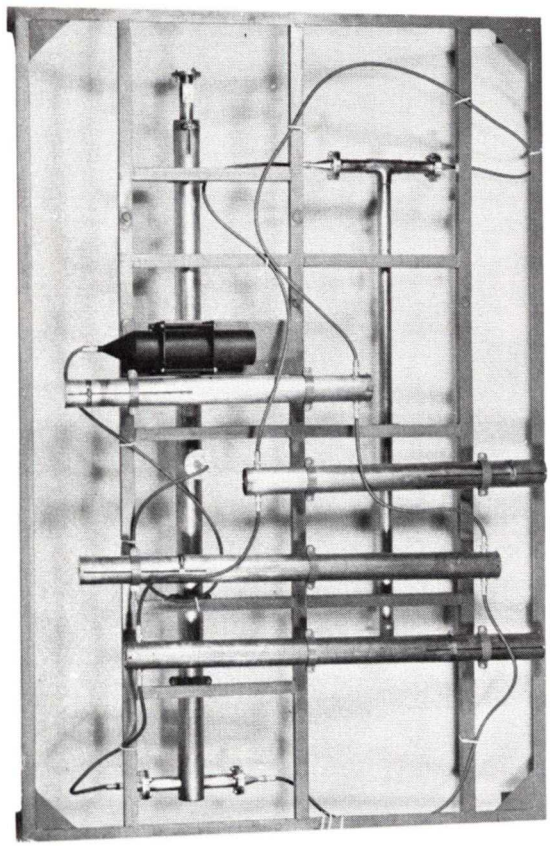
RF OUTPUT IMPEDANCE: 50.0 ohms, type N female.

INPUT IMPEDANCE: Video signal — 75 ohms, unbalanced. Audio signal — 600 ohms, balanced.

FREQUENCY RESPONSE:
Visual — +2 to —2 db at 0.5 mcs.
+2 to —2 db at 1.25 mcs.
+2 to —2 db at 2.0 mcs.
+2 to —2 db at 3.58 mcs.
(The amplitude response will not vary more than +1 db to —2 db from the 3.58 mcs. response between 2.1 mcs. and 4.18 mcs. The amplitude at 4.75 mcs. is attenuated 20 db and frequencies higher than 4.75 mcs. are attenuated 20 db or greater.)
Lower sideband response is;
—20 db at 1.25 mcs. and
—42 db at 3.58 mcs.
Aural — Within 1.0 db of standard 75 microsecond pre-emphasis curve, 50-15,000 cycles.

FREQUENCY STABILITY: Visual ±500 cycles.
Aural ±500 cycles.

MODULATION CAPABILITIES: Visual to 12½% ±2½% of sync level. Aural ±40 Kc.



The vestigial sideband filter, illustrated above, is employed at the transmitter ouput prior to the transmission line and is standard equipment with all models.

INPUT LEVEL: Visual 1.0 V ±0.4 V. peak to peak. Aural ±10 dbm ±2 db for 100% modulation.

NOISE: Aural 60 db below 100% modulation (FM). 50 db below equivalent 100% modulation (AM). Visual approximately 45 db below 100% AM modulation.

AUDIO FREQUENCY DISTORTION:
50-100 cycles, 1.5% max.
100-10,000 cycles, 1% max.
10,000-15,000 cycles, 1.5% max. (at 25 Kc Swing).

AMPLITUDE VARIATION: 5% or less of peak sync. (one field)

SUBCARRIER PHASE vs BRIGHTNESS: ±7° maximum.

LINEARITY: ±15% maximum.

ENVELOPE DELAY TOLERANCE:
(From FCC Specified Curve).
±0.08 microseconds from 0.2-2.1 mc.
±0.04 microseconds at 3.58 mcs.
±0.08 microseconds at 4.18 mcs.

HARMONIC ATTENUATION: 60 db or better.

REGULATION OF OUTPUT: 7% from black to all white.

INPUT POLARITY: Black negative.

TYPE OF MODULATION: Phase shift employing pulse techniques. (Aural)

TYPE OF OSCILLATOR: Direct crystal controlled (both aural and visual).

TUBES: Visual — (3) 6AU6, (1) 6AK6, (4) 6080, (8) OA2, (9) 12AT7, (2) 6CL6, (7) 6CA7, (3) 5651, (4) OB2, (3) 6AU8, (1) 6CS6, (3) 12BH7, (4) 12AX7, (1) 6X4, (1) 5894, (2) 4X250B, (2) 866, (5) 5AR4, (1) 5R4, (1) 6360L.
Aural — (1) 12AT7, (7) 6AU6, (3) 12AX7, (3) 6J6L, (2) OA2, (1) 6360L, (1) 6AQ5, (1) 6080, (1) 4X250B, (2) 866, (1) 5AR4.

TOTAL NUMBER TUBES: Visual 65. Aural 23.

TOTAL TUBE TYPES: 22.

SIZE (OVER-ALL). Width 72" (less end bells).
Width 75" (with end bells).
Height 78", Depth 36½".

WEIGHT: Packed 2000 lbs. Net 1500 lbs.

CUBAGE: 117 cu. ft. unpacked.

SIDEBAND FILTER: Mounted external to cabinet.

COOLING: Forced air.

ORDERING INFORMATION

Model M-5901 broadcast television transmitter, 500 watts, with tubes, one crystal and oven for channels 2-6 ..... BT-500CL

Model M-5902 broadcast television transmitter, 500 watts, with tubes, one crystal and oven for channels 7-13 ..... BT-500CH

Spare 100% tube complement for BT-500CL .. TK-357

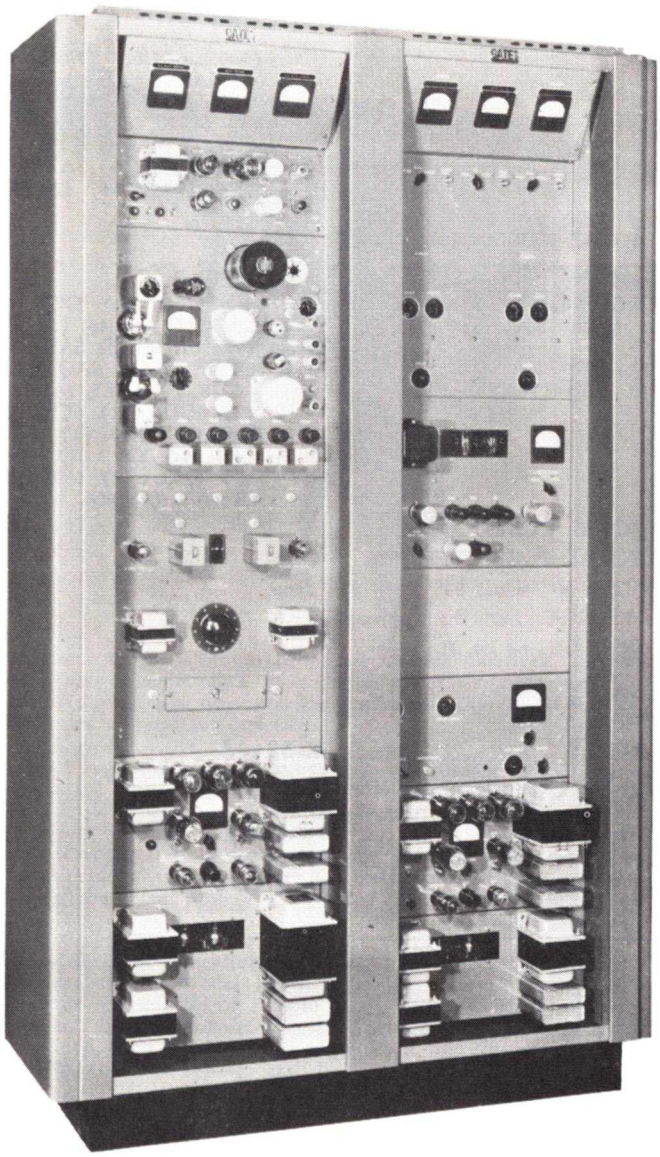
Spare 100% tube complement for BT-500CH TK-358

FCC tube complement (required FCC spares)
BT-500CL TK-365
BT-500CH TK-366

Color video filter (with power supply) M-5892

100 WATT TV TRANSMITTER

Model BT-100A



Low power television or satellite operation is becoming more and more popular. For VHF channels 2-13, the BT-100A excellently fills this need in providing both picture sharpness and aural quality second to none. The BT-100A transmitter is built in two standard rack cabinets. Use of vertical construction assures 100% access to all parts. Top quality characteristics of Gates equipment is certainly amplified in the BT-100A transmitter by fine workmanship and the use of the best components money can buy. A 50 watt model, identical to the BT-100A in appearance, is also available with 50 watt video and 30 watt aural output.

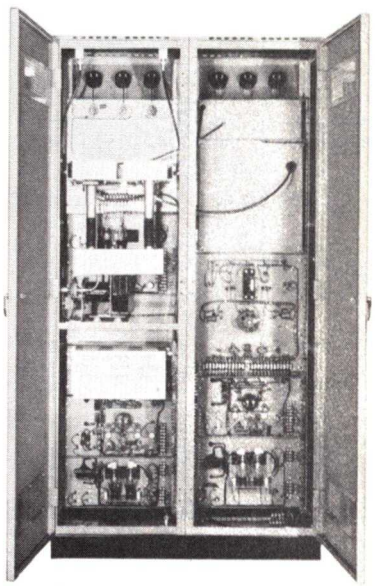
The Gates BT-100A television transmitter is a complete aural-visual equipment ready to attach to aural and video input and antenna. Though the maximum power rating is 100/60 watts for visual-aural, the BT-100A may be operated at lower powers also. Ideal as a low power TV transmitter, it may be employed as an exciter for higher powered transmitters and will find good acceptance for production line testing of TV receivers as well as laboratory use.

The aural section of the transmitter consists of an exciter modulator and a power amplifier. Referring to the block diagram on the next page, the oscillator is crystal controlled with the output coupled to the shaping and modulating circuits. Audio voltage is applied in such a manner to cause a phase shift in the oscillator frequency of the audio rate. The oscillator frequency is then multiplied through a series of multipliers to the operating frequency. The output of the exciter modulator is at operating frequency and is used to drive the power amplifier. Conventional circuitry is used throughout.

Visual section design consists of an RF exciter, video modulator, and power amplifier. The exciter multiplies the crystal oscillator frequency to the operating frequency and at the proper power level to drive the power amplifier. The modulator is a video amplifier that amplifies a standard video input voltage to the power required to modulate the power amplifier. The power amplifier is grid-bias modulated. A diode is used to restore the DC component at the grid of the modulating stage. The modulating stage is DC coupled to the grid of the power amplifier.

A direct reading power output and VSWR indicator is standard equipment. Also provided is a video demodulator wave form and modulation monitor, indicating modulation percentage and wave shape. The monitor output may be attached to a wave form or picture monitor.

Vertical construction is employed for ease in servicing. Cabinets are finished in hand rubbed gloss gray and provided with full length rear doors.



Rear BT-100A view. Left cabinet contains visual and aural power amplifiers, visual exciter, modulator and power supplies. Right cabinet, demodulator, aural exciter, control and protective panel and power supplies.

MODEL BT-100A 100 WATT TV TRANSMITTER

SPECIFICATIONS

POWER INPUT: 117 volts, 50/60 cycles, 1700 watts.

POWER OUTPUT: Visual 100 watts, aural 60 watts.

RF OUTPUT IMPEDANCE: Visual 50 ohms, aural 50 ohms.

INPUT IMPEDANCE: Visual 75 ohms, aural 600 ohms.

FREQUENCY RESPONSE: Visual ±2 db at 500 Kc. ±2 db at 1.5 Mc. ±2 db at 2 Mc. ±2 db at 3 Mc. ±3 db at 4 Mc.

Aural ±1½ db, 50-15,000 cycles (Reff. 75 micro-sec. pre-emphasis curve or flat).

CARRIER STABILITY: Visual ±500 cycles, aural ±500 cycles.

MODULATION CAPABILITY: Visual 85%, aural ±40 Kc.

INPUT LEVEL: Visual 1.4 VPP, aural ±10 dbm.

NOISE: Visual 40 db below peak carrier,

Aural FM 55 db below 100% mod., AM 50 db below 100% mod.

DISTORTION: Aural 1½% or less 50-15,000 cycles.

AMPLITUDE VARIATION: 7% or less of peak sync (one field).

LINEARITY: ±20% max.

HARMONIC ATTENUATION: 60 db or better.

BT-100AL(2-6) Tube Complement: (5) OA2, (2) OC3, (2) 5AR4, (2) 5U46, (1) 5V4, (10) 6AU6, (1) 6AR6 (4) 6AS76, (1) 6AQ5, (1) 6AH6, (1) 6AL5, (4) 6A67, (3) 6CD6, (1) 6CL6, (1) 6SH7, (3) 6J6, (1) 6X5, (1) 12AT7, (4) 12AX7, (2) 6080, (2) 6360, (2) 866, (2) 4X15A.

TOTAL TUBES: 56.

TOTAL TUBE TYPES: 23.

BT-100AH(7-13) Tube Complement: (5) OA2, (2) OC3, (2) 5AR4, (2) 5U46, (1) 5V4, (10) 6AU6, (3) 6AK6, (4) 6AS76, (1) 6AQ5, (1) 6AH6, (1) 6AL5, (4) 6A67, (3) 6CD6, (1) 6CL6, (1) 6SH7, (1) 6X5, (1) 12AT7, (4) 12AX7, (2) 6080, (2) 6252, (2) 6939, (2) 4X150A, (2) 866.

TOTAL TUBES: 57.

TOTAL TUBE TYPES: 23.

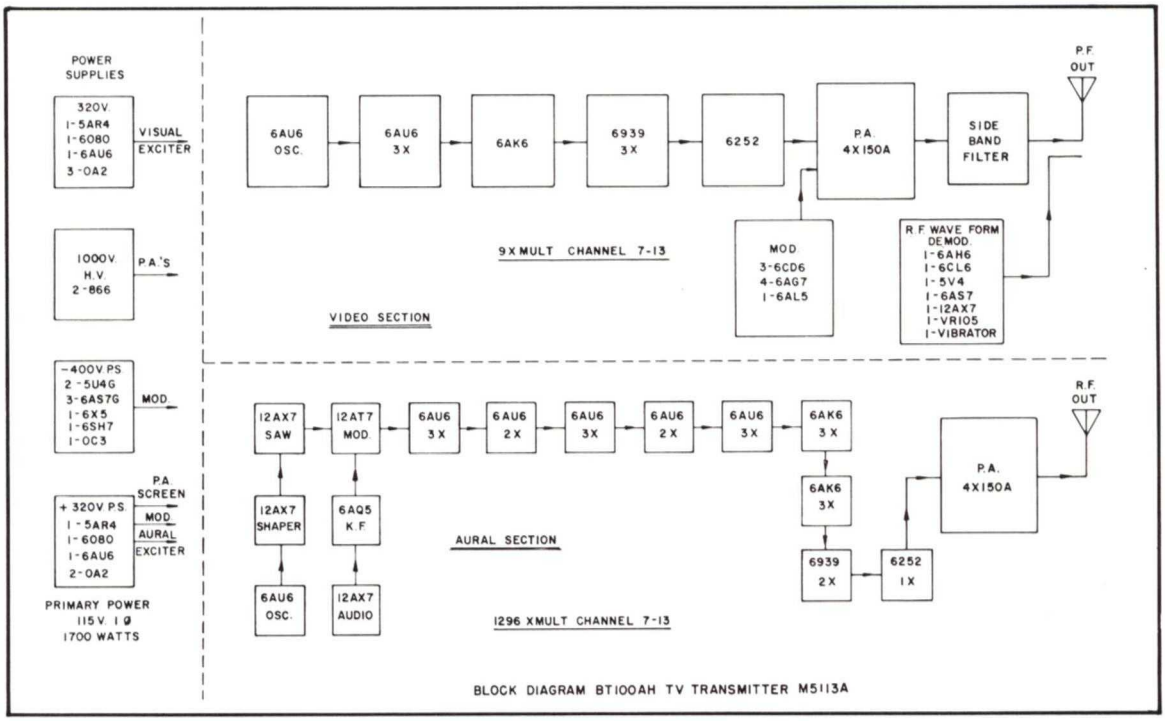
SIZE: 50" wide, 84" high, 21" deep.

WEIGHT: 1400 lbs. approximately.

CUBAGE: 68 cu. ft.

ORDERING INFORMATION

Model BT-100AL transmitter for channels 2-6 ..... M-5364A
Model BT-100AH transmitter for channels 7-13 ..... M-5113A
Spare 100% tube complement for BT-100AL TK-289
Spare 100% tube complement for BT-100AH TK-354
FCC tube complement (required FCC spares) BT-100AL TK-372
FCC tube complement (required FCC spares) BT-100AH TK-370

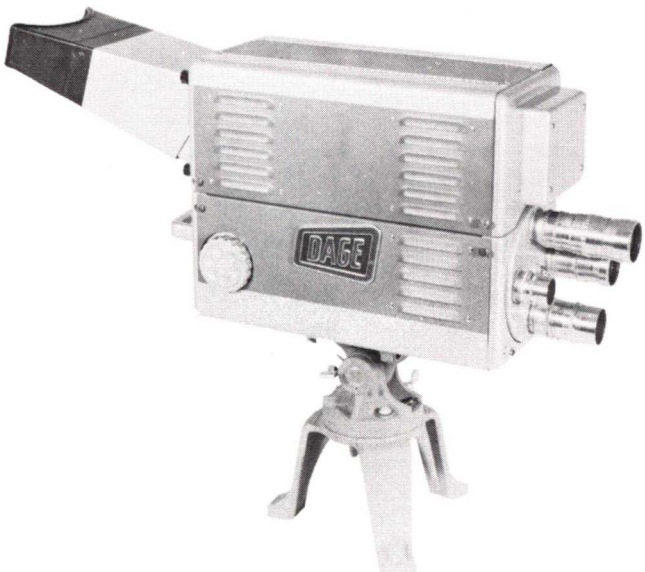


BLOCK DIAGRAM BT100AH TV TRANSMITTER M5113A

DAGE PROFESSIONAL VIDICON CAMERA

Models 320-B/V & 320-B/F

700 LINE RESOLUTION BROADCAST



The Model 320-B/V Studio Broadcast Camera has been designed from years of experience in vidicon camera engineering. The result is a precision television camera, production built to work long hours without maintenance.

Complete accessibility to all components and multiple check points are standard equipment with the Model 320-B series of cameras. Fold out sides and fold down chassis provide for instantaneous adjustment by operating personnel for optimum performance. Complete removal of individual chassis for bench service can be accomplished by removing several screws from the hinge and unplugging the taper pins. No soldering iron or wrenches are required.

A four-lens, rear-controlled, turret is also supplied as standard equipment on the Model 320-B series of cameras. Adaptability to provide rear control of a zoom lens is also offerede as optional equipment. Built in circuitry for two-way intercom and tally lights is provided, making this camera the ideal unit for every studio or remote function.

The 5″ electronic viewfinder is a completely separate unit which can be removed from the camera head with no change in performance of the camera itself. The camera can then be used as a film camera or for other non-viewfinder applications.

MODEL 320-B/F

The Model 320-B/F camera is identical to the Model 320-B/V with exception that the electronic viewfinder has been removed and replaced by a dust cover-blower assembly. The camera can now be used as a film camera or for any other non-viewfinder application, such as on a remote servo pan and tilt.

SPECIFICATIONS

ELECTRICAL:

Input From Camera Control	
Scanning	EIA or CCIR standards
Vertical Drive	4 volts p-p 50 cps for 625 line scanning 60 cps for 525 line scanning
Horizontal Drive	4 volts p-p 15,625 cps for 625 line, 50 field scanning. 15,750 cps for 525 line, 60 field scanning.
Power	
Camera	105-125V AC 60 cps 35 watts for filaments 280V DC @ 150 milliampers
Viewfinder	105-125V AC 60 cps 20 watts for filaments 280 V DC @ 160 milliampers
Output From Camera	
Video Response	Flat within ±0.5 db to 8 mc and within 3 db to 10 mc measured without aperture correction.
Resolution	700 TV lines horizontal resolution at center of picture and over 525 TV lines resolution at corner circles.
Picture Signal	0.03 volts p-p (Black Negative Polarity).
Aperture Correction	20 db of correction variable over a range of 6 db.
Impedance	51.5 ohms.
Cable Length	Up to 1000′ maximum.

OPTICAL:

Light Requirement	100-150 foot candles incident illumination for quality noise free picture with f/1.5 lens.
Spectral Response	Approximately the same as the human eye (7325/7038 vidicon).
Lenses	16mm "C" mount. Turret provisions for 4 lenses. Special mount for rear controlled zoom lens available.
Viewfinder	5″ Electronic (5AYP4 Tube) utilizing magnetic deflection and electrostatic focus. Safety glass provided for operator protection.

MECHANICAL:

Finish	Blue and silver lustre baked enamel.
Weight	30 lbs. (with viewfinder)
Mounting	¼″ 20 tapped for standard tripod screw.

PHYSICAL DIMENSIONS:

Height	12″
Weight	7¾″
Length	18½″

ORDERING INFORMATION

Live Camera; including 320-B Camera Head with rear controlled 4 lens turret, side focus, A-1490 Viewfinder with hood and 50 ft. of camera cable 320-BV

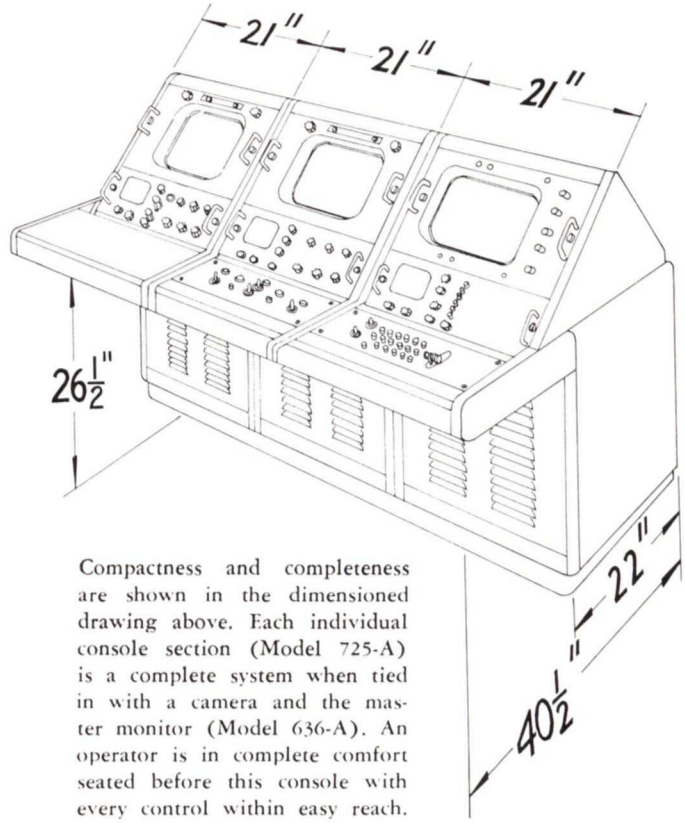
Film Camera; including 320-B Camera Head with rear controlled 4 lens turret, side focus, A-2580 Top Assembly (replacement for Viewfinder) and 50 ft. camera cable 320-BF

DAGE EPS-21 TELEVISION SYSTEM

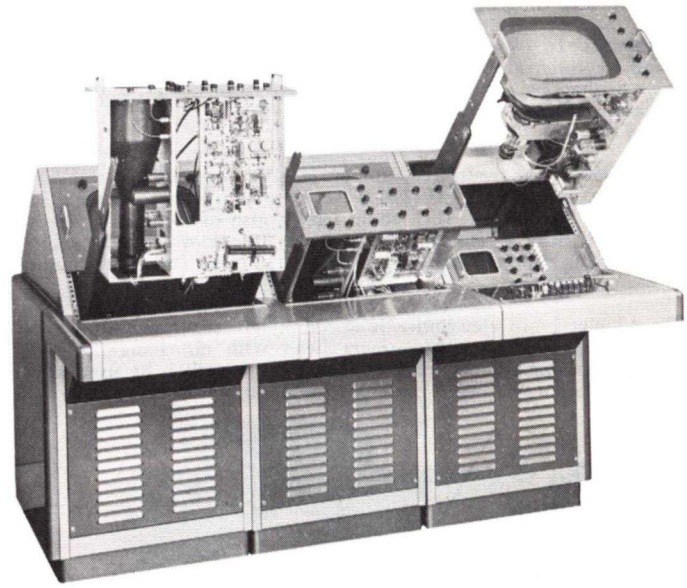
The EPS-21 Professional Television System consists of equal numbers of cameras and control consoles (Model 725-A), plus one Master monitor console (Model 636-A). Any number of Dage 320-B Series cameras and controls can be added to the studio system with switcher-fader capacity for six cameras. Two switcher-fader units could be placed in series to feed a total of eleven cameras.

Packaged in attractive Emcore "Low-Boy" Cabinets, the EPS-21 presents an appealing studio appearance while providing top quality broadcast performance. The console equipment can also be placed in standard 19" vertical racks should you so desire. Its ease of operation coupled with the economy of original purchase makes the EPS-21 System an asset to any television studio.

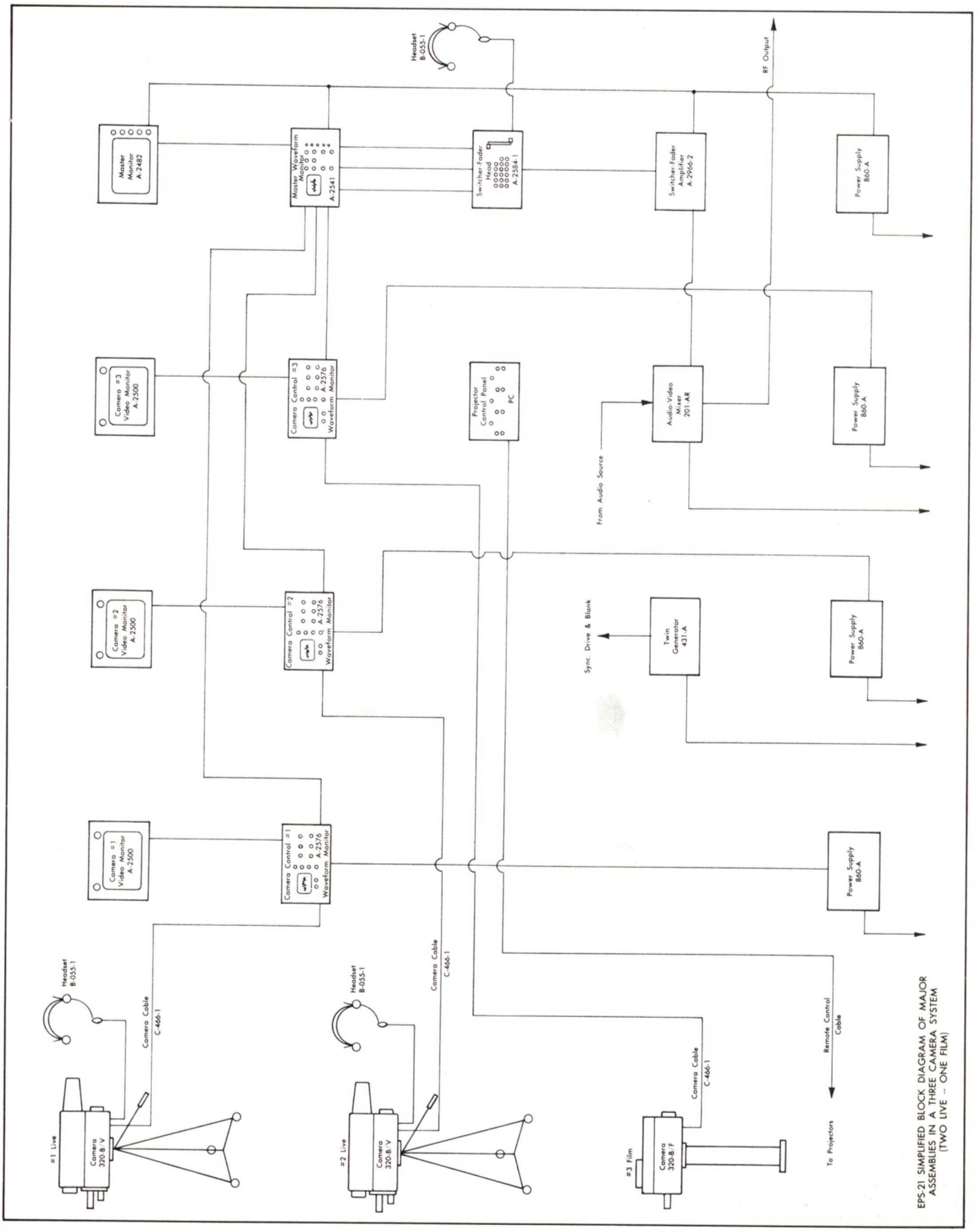
- FLEXIBILITY—A simple system can be expanded with additional camera chain units with no complicated installation.
- VERSATILITY—Can handle all studio situations while providing standard Broadcast Quality signal.
- SIMPLICITY OF OPERATION—The camera and console controls are in panel groupings easily mastered even by inexperienced operators.
- EASE OF MAINTENANCE—Monitors and camera controls are mounted on slide-out rails. Camera controls also pivot for complete accessibility.
- ECONOMY—Modular design accommodates increased capability by adding cameras and controls without obsolescence of present equipment.



Compactness and completeness are shown in the dimensioned drawing above. Each individual console section (Model 725-A) is a complete system when tied in with a camera and the master monitor (Model 636-A). An operator is in complete comfort seated before this console with every control within easy reach.



With all of its compactness, the EPS-21 System is the easiest equipment to service in the business. From the 320-B series of cameras with their fold-down sides and fold-out chassis, to the pull-out and tilt chassis in the consoles, every component can be reached without taking out screws and lifting down racks. The chassis in the console housings pull out on sliding rails, then lock in position for servicing. Should it be necessary to remove a unit for bench service, this is equally easy and requires only the depressing of two snap pins to completely remove any of the controls.



EPS-21 SIMPLIFIED BLOCK DIAGRAM OF MAJOR ASSEMBLIES IN A THREE CAMERA SYSTEM (TWO LIVE -- ONE FILM)

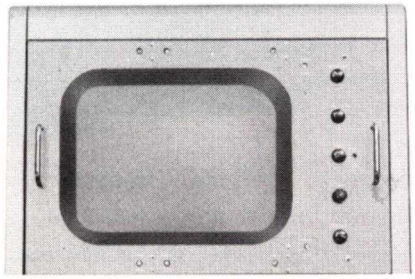
EPS-21 TELEVISION SYSTEM ASSEMBLIES

A few of the various assemblies which make up the EPS-21 System are listed on this page. For detailed information on all major assemblies as shown in block diagram on previous page, write Gates for Bulletin E-29.

MODEL C-466-1, CAMERA CABLE

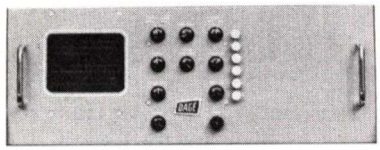
This cable provides the flexible connection between camera and console for carrying picture signal and intercom conversation between camera and console operators. A variety of cable lengths are available.

MODEL A-2482, MASTER MONITOR



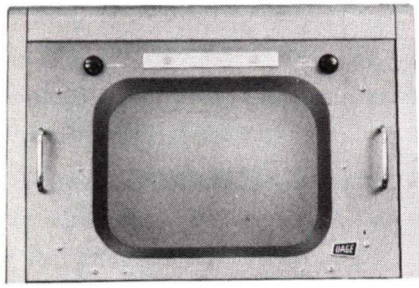
This broadcast monitor allows a constant check on the quality of the video picture being "aired" or placed on closed circuit. Pulse cross display for easy monitoring of sync standards is built into the monitor providing maximum efficiency of operation.

MODEL A-2541, MASTER WAVEFORM MONITOR



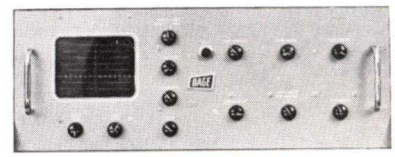
The waveform monitor presents the same picture information as the line monitor except in a calibrated oscilloscope type display. This permits accurate analysis of picture characteristics being transmitted by the camera "on the line" plus selectable preview facilities.

MODEL A-2500, VIDEO MONITOR



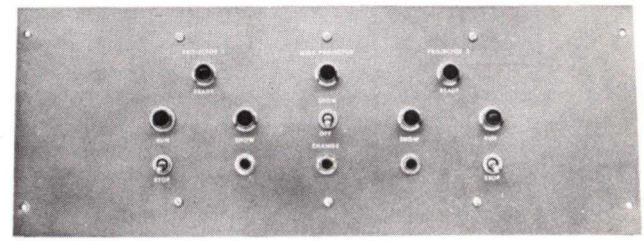
This monitor allows the console operator to view camera images at all times. A check is thus provided on camera focus and picture composition before selecting and switching the camera image for distribution. The monitor may also be used as a broadcast standard for the evaluation of picture quality.

MODEL A-2576, CAMERA CONTROL AND WAVEFORM MONITOR ASSEMBLY



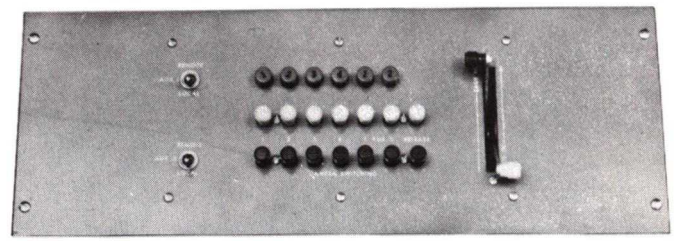
The camera control allows for adjustment of picture characteristics of each camera from the console position. A 5" calibrated waveform monitor is provided as an aid for picture adjustment and set up. Tally lights on the panel, controlled by the switcher-fader, indicate which camera is "on the air."

MODEL PC, PROJECTOR CONTROL



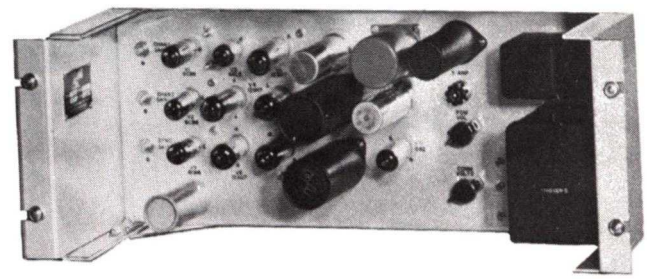
Remotely located slide projector and motion picture projectors are controlled through this panel. Starting and stopping of all projectors is accomplished with tally lights indicating the running projector unit.

MODEL A-2584-1, SWITCHER-FADER HEAD



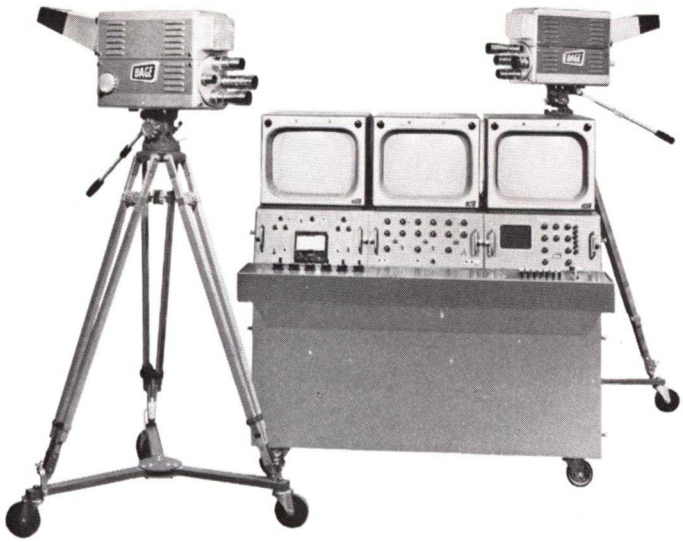
This switcher-fader head and the Model A-2966-2 amplifier go together to form the Model 521-B Switcher-Fader Assembly. Instantaneous picture change, fading, superimposition and lap dissolve are all standard functions of this unit.

MODEL A-2966-2, SWITCHER-FADER AMPLIFIER



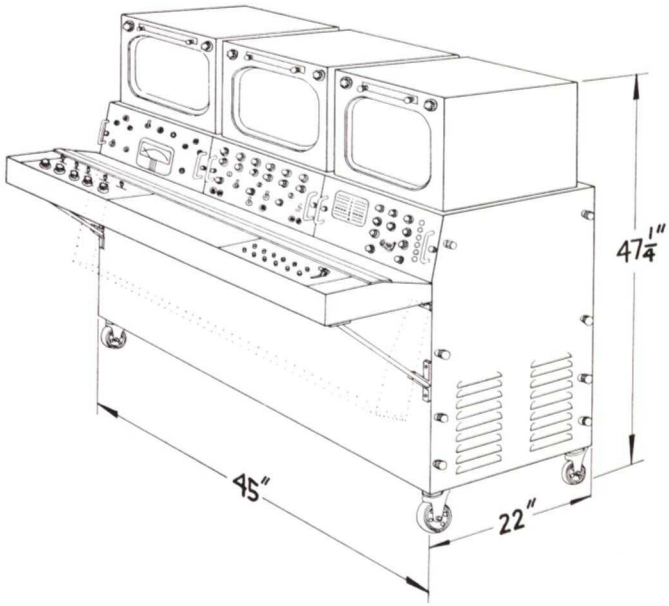
As indicated above, this amplifier is an integral part of the Model 521-B Switcher-Fader Assembly. Without this unit, all functions except simple picture switching would be impossible.

DAGE ETS-1 TELEVISION SYSTEM

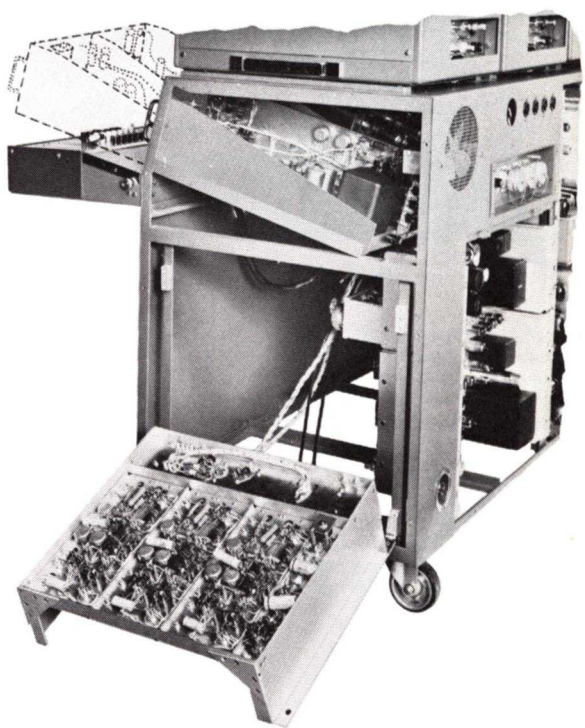


The ETS-1 is a professional broadcast-quality television system designed specifically for professional requirements. This system employs one, two or three Dage Model 320 series vidicon cameras. System components are attractively packaged in a mobile console. The ETS-1 is RUGGED, COMPACT, EASY TO OPERATE, EASY TO MAINTAIN, FLEXIBLE AND VERSATILE.

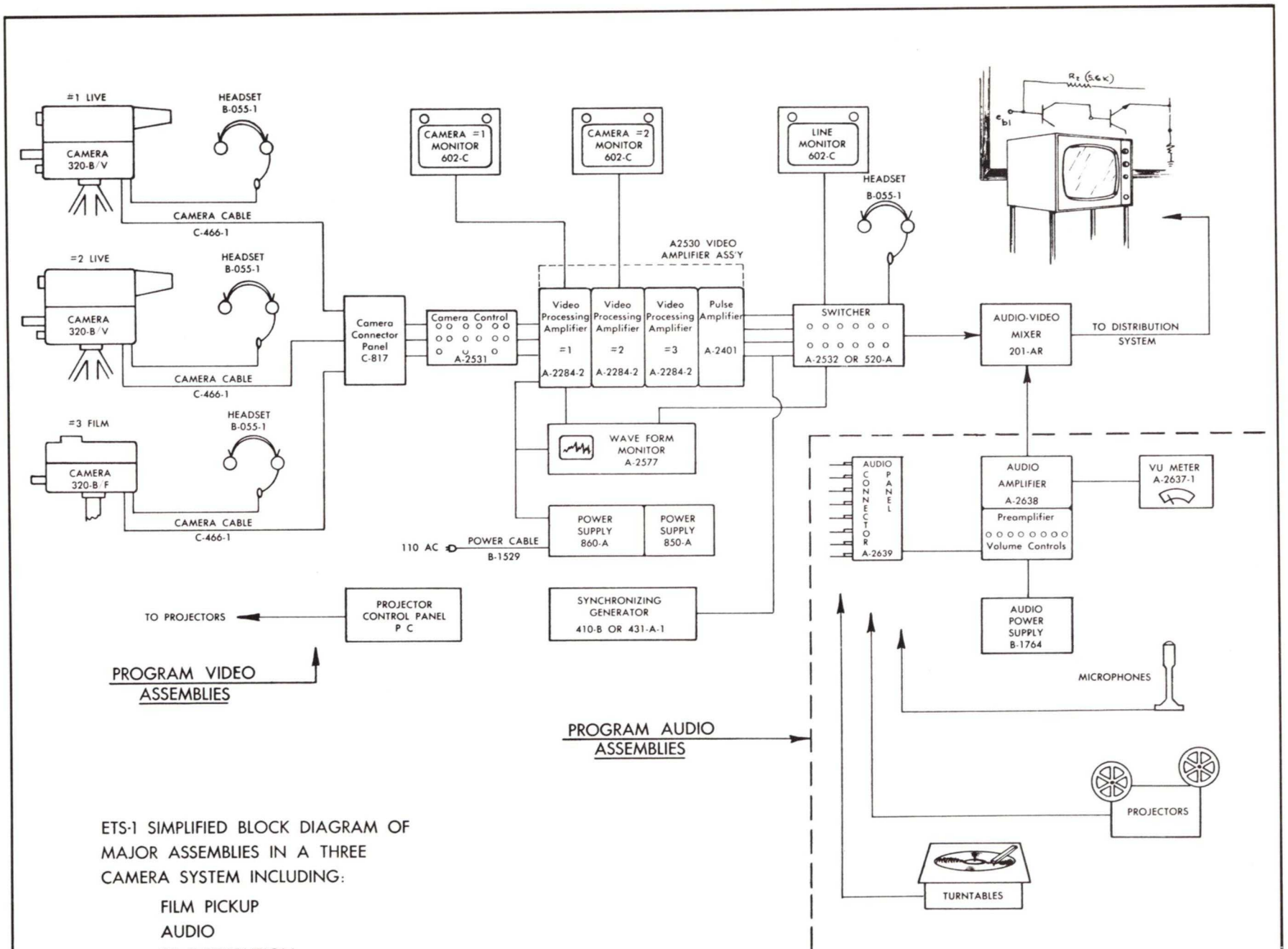
- FLEXIBILITY . . . achieved through modular construction. Optional units can be selected to make the ETS-1 a "custom" installation engineered to meet your needs.
- MOBILITY . . . achieved by packaging system components in a console capable of passing through 30″ doorways on free running wheels with the operating panel folded into the storage position.
- VERSATILITY . . . in pick up of live teaching situations in all subject areas, also slide and motion picture projection images, as well as magnification of microscopic or other small demonstration materials.
- SIMPLICITY OF OPERATION . . . The camera and console controls are in panel groupings easily mastered even by inexperienced operators.
- EASE OF MAINTENANCE . . . Major console assemblies are in pull-out or swing-out rack mountings for complete accessibility.
- ECONOMY . . . by modular design anticipating growth from a single camera chain to studio originating facilities by the addition of individual units rather than replacement of complete equipments.



Compactness and mobility of the ETS-1 are shown in the drawing above. By assembling all equipments into the one console housing, a completely mobile, professional quality system is available to any studio, laboratory, lecture hall or classroom. With the operating table folded down, standard 30″ doorways offer no problem to movement of the unit. Requiring only 34″ x 45″ of floor space, the ETS-1 is one of the most compact and complete Television Systems in existence.



Although extremely compact, the ETS-1 provides complete accessibility to all assemblies through REMOVABLE PANELS . . . SWING-OUT MOUNTINGS . . . SLIDE-OUT RACKS . . . CONVENIENT TEST POINTS. No special tools are required.



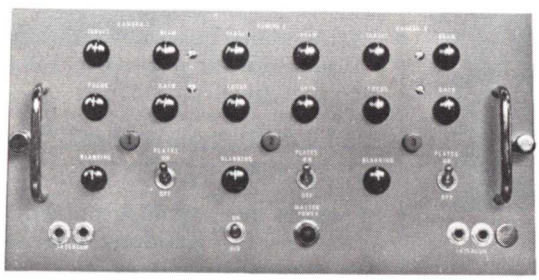
ETS-1 SIMPLIFIED BLOCK DIAGRAM OF MAJOR ASSEMBLIES IN A THREE CAMERA SYSTEM INCLUDING:

- FILM PICKUP
- AUDIO
- RF DISTRIBUTION

ETS-1 TV SYSTEM ASSEMBLIES

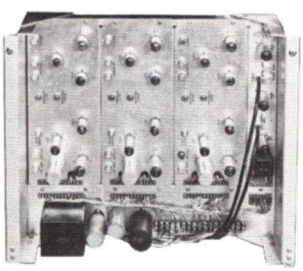
A few of the various assemblies which make up the ETS-1 System are listed on this page. For detailed information on all major assemblies as shown in block diagram on previous page, write Gates for Bulletin E-14.

MODEL A-2531, CAMERA CONTROL PANEL



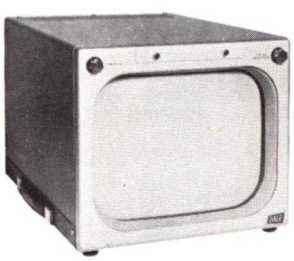
The camera control panel allows for adjustment of picture characteristics of each camera from the console position, so that cameras can be matched for sensitivity, contrast and other functions. Tally lights on the panel indicate which camera is "on the air." Output jacks provide connection for the console operators' headset. Camera main power switches are also located on this panel.

MODEL A-2530, VIDEO PROCESSING ASSEMBLY



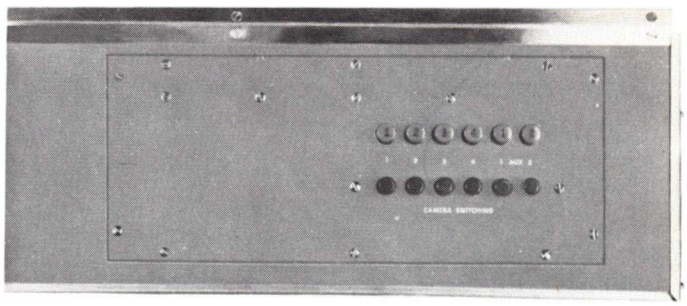
Amplification of video signal received from the camera is accomplished by means of one Model A-2401 pulse amplifier and a separate Model A-2284-2 processing amplifier for each camera in the system, up to three. This is the video processing assembly. Through this unit adjustment of gray scale by gamma correction is also accomplished. By virtue of this gamma correction circuitry, the system can be matched for compatibility with other systems including image orthicon equipment.

MODEL 602-C, VIDEO MONITORS

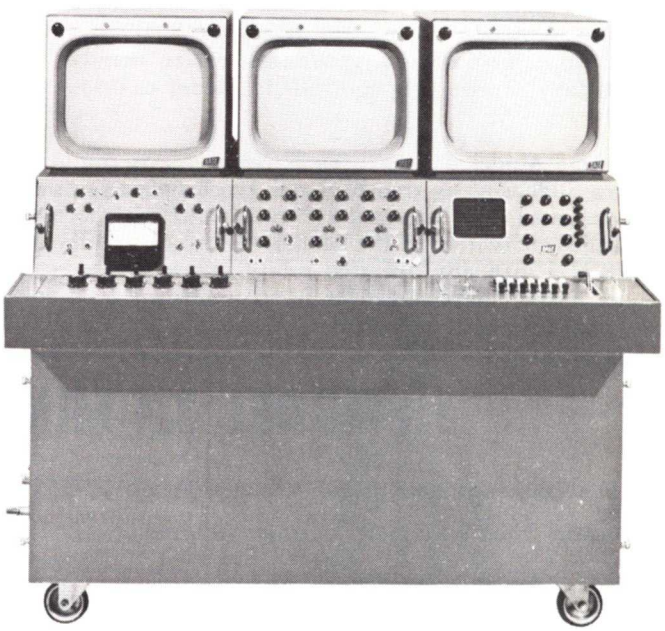


These monitors allow the console operator to view camera images at all times. A check is thus provided on camera focus and picture composition before selecting the chosen camera image to be sent to the classroom receivers.

MODEL A-2532, SWITCHER



This switcher is the basic unit providing instantaneous picture change from one camera to another. No gradual transition of pictures or superimposition of pictures can be accomplished with this unit.



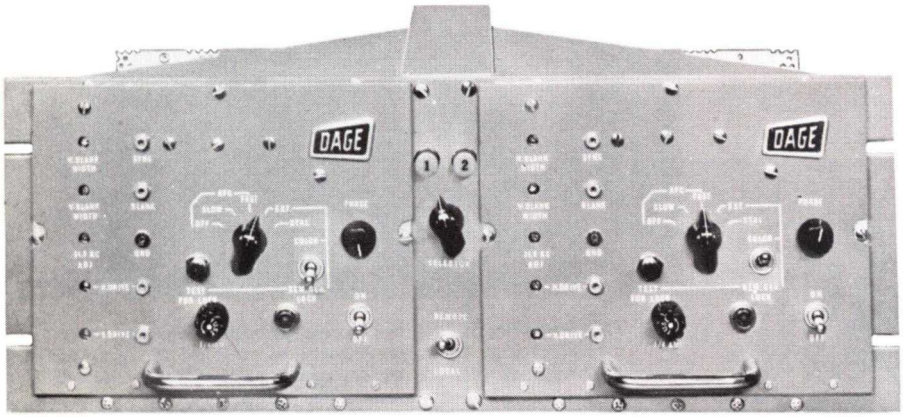
The ETS-1 system shown above is the complete deluxe system with full facilities for three cameras, projection control, audio intercom and RF distribution. A system can be designed for your specific needs embodying as many or as few of these features as you may desire.

The absolute minimum system which can be employed incorporates only one camera, one monitor serving both as a line monitor and a video monitor and contains no facility for audio, projection control, or intercommunication. This equipment contains all of the necessary space and fittings for expansion to a complete three camera system.

For complete information on the ETS-1 TV system, write Gates for Bulletin E-14.

DAGE TWIN GENERATOR

Model 431-A/B



- Two independent, plug-in, transistorized synchronizing generators.
- Switchover between generators either manual (Model 431-A) or remotely controlled (Model 431-B).
- Each synchronozing generator comprised of plug-in modules for rapid replacement.
- Standard UHF type connectors on outputs.
- Extremely low power consumption.
- All modules guaranteed one full year. Module exchange service available after that time.
- Individual, transistorized, regulated power supplies, with silicon rectifiers.
- Outputs meet all EIA and FCC specifications for broadcast synchronizing generators.
- No complex operating adjustments required.

The Dage Model 431-A/B Twin Generator is comprised of two independent transistorized synchronizing generators, mounted on a standard 19″ rack panel together with a changeover switch. In the Model 431-A, this changeover switch is a manually operated rotary switch, while in the Model 431-B, the changeover is accomplished by a solenoid driven switch actuated by a selector on the front panel or at a remote location. Each generator is a separate plug-in unit containing its own regulated power supply. The outputs meet all EIA and FCC specifications.

(For further information, write Gates for Bulletin E-6)

DAGE Twin Generator ..... Model 431-A/B

MODEL 334 MINIATURE TV CAMERA

Complete transistorization, No Vacuum Tubes.

Automatic, No Functional Controls Required.

Self-contained, No External Circuits.

Extreme Reduction in Size and Weight.

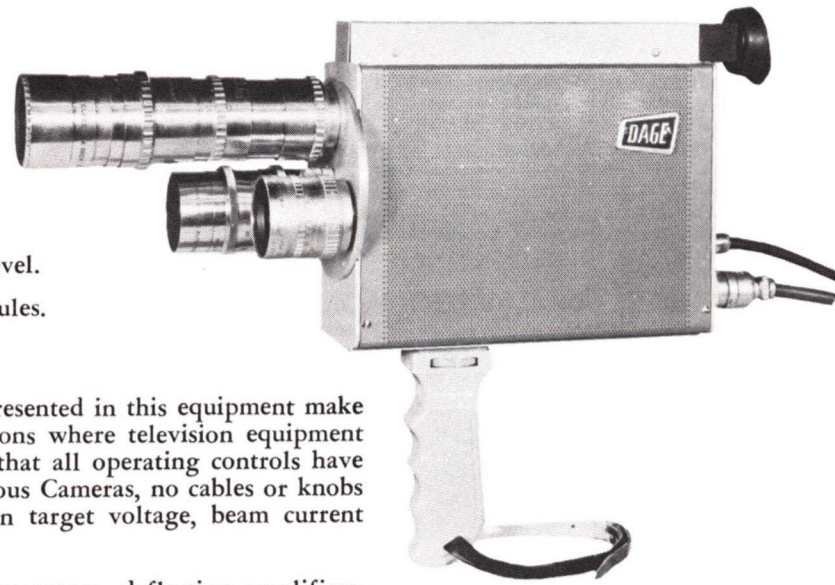
High Quality "600" picture.

Full EIA "Broadcast" Synchronization.

Automatic Electronic Self-Adjustment to Light Level.

Printed Circuits with Potted Plug-in Circuit Modules.

Rugged, Non Microphonic, Ultra Reliable.



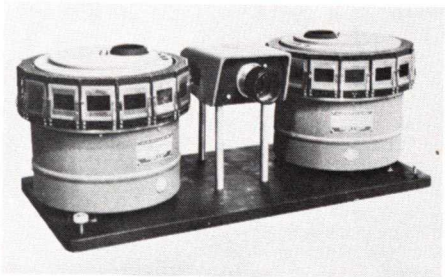
The tremendous savings in weight and volume represented in this equipment make it possible to employ television in difficult situations where television equipment was not previously feasible. Important is the fact that all operating controls have been removed from Model 334. Thus, unlike previous Cameras, no cables or knobs are required for operational adjustment of vidicon target voltage, beam current and electronic focus current.

The 334 Camera contains its own synchronizing generator, deflection amplifiers, power supply and video amplifiers in one compact unit and, therefore, operates without any need for complex power supplies and control units in adjacent areas.

DAGE miniature TV Camera ..... Model 334

ACCESSORY EQUIPMENT

TV TWIN SELECTROSLIDE JUNIOR



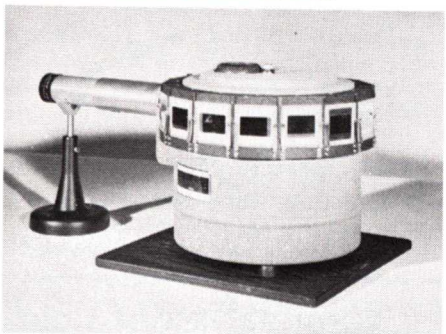
Holds 32 slides; 16 in each turret. Slide turrets are interchangeable and are keyed for accurate alignment. Accurate focusing is assured. Atmospheric condensing system assures perfect illumination. Two prisms and beam splitter prism are provided. Pictures may be superimposed, faded, or rapidly changed by switching or dimming projection lamps. 500 line resolution is guaranteed. Each projector can be operated independently of others by remote control or by push button. No vibration. Turret rotates by hand for checking of slides. Lamp capacity is 50 to 150 watts. Operates on 110-120 V, 60 cycle.

Lenses from 7½" to 11" are available — insure clear monochrome or color images. Please specify type of camera to be used with projector when ordering.

TV Twin Selectroslide Jr. w/o lens 330A

TV Twin Selectroslide Jr. w/15 slide previewing feature 330C

SELECTROSLIDE JUNIOR



The TV Selectroslide Jr. holds 16 slides in its turret. Slide turrets are interchangeable and are keyed for accurate alignment. Four registering pins for each slide insure perfect focusing.

With the new aspheric condensing system, even light distribution over the entire picture area is assured.

The turret can be shifted by pressing a button situated on the side of the housing or a line cable can be connected to a terminal board inside the lower part of the housing for remote operation from the control panel. The slide mechanism is absolutely free from vibration. For quick checking and re-setting of slides, the turret can also be rotated by hand from one direction.

Well corrected, coated anastigmat lenses insure clear and well defined images for either monochrome or color, in the iconoscope or multiplexer. Lenses from 5" to 11" are available.

Lamp capacity 50 to 300 watts — 150 watts generally used. Diameter is 11" — Height: 10½" including base board. Wooden base board: 11½" x 12".

TV Selectroslide Jr. w/o lens 322A

TV Selectroslide Jr. w/15 slide previewing feature w/o lens 322C

Spare turret for 16 slides 323

LENSES FOR SELECTROSLIDES

5" lens in special TV focusing mount 343

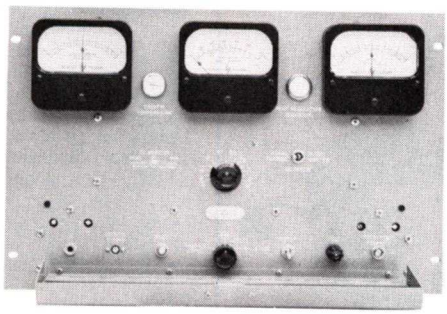
7" lens in special TV focusing mount 344

7½" lens in special TV focusing mount 344A

9" lens in special TV focusing mount 345

11" lens in special TV focusing mount 348

MODEL 335ER VHF-UHF TV MONITOR



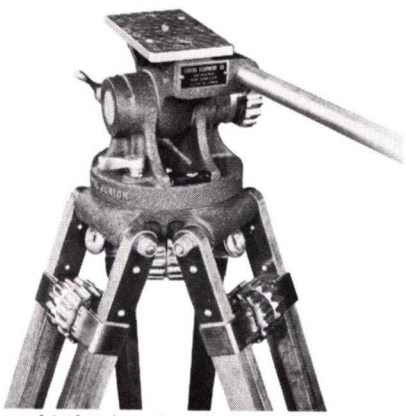
Model 335ER is the most compact and inexpensive quality TV monitor offered. Yet this versatile instrument performs every imporant TV carrier monitoring function continuously and without adjustment, and with the dependability and accuracy you expect from Hewlett-Packard. The instrument is equally useful in monochrome or color broadcasting; you can buy it now for black-and-white monitoring and later use the same low-cost monitor—without modificaion — when you convert to color.

In addition to continuous, precise indication of visual and aural frequency deviation and percentage of aural modulation, Model 335ER shows inter-carrier separation directly. No calculation is required.

Carefully engineered crystal reference oscillators provide accuracy in excess of F.C.C. requirements for all channels. Because discriminator accuracy does not depend on a tuned circuit, no time-consuming adjustments are required during operation. It is never necessary to reset carrier level or realign circuits. Proper operation of the monitor can be checked conveniently by controls located behind the hinged panel cover.

The three panel meters monitor visual and aural carrier frequency and percent modulation of the aural carrier with 100% modulation equal to 25 KC deviation. A peak modulation indicator lamp is included as standard equipment; the instrument also has provision for remote indicating meters, remote peak modulation indicating lamp, and a demodulated signal for measuring FM and AM noise levels, frequency response and distortion of the aural transmitter and for continuous program monitoring.

CAMERA TRIPODS
SPRING HEAD TRIPOD

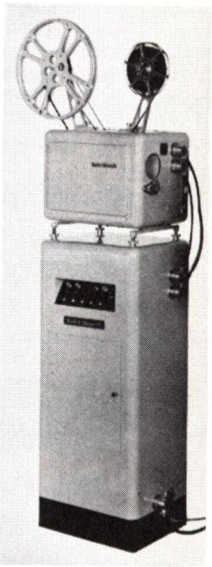


This model ideal for vidicon cameras weighing up to 25 lbs. Constructed with spring load tilt which assures camera returning to neutral position when lever is in unlocked position. Range, 44½" low to 73" high.
Built-in spirit level. Model B triangle is optional base unit to keep legs from spreading and marring floors.

Professional Jr. spring head tripod GR-973

Model B triangle GR-974

BELL AND HOWELL TV PROJECTOR



BELL & HOWELL "614 JAN" is a TV projector for 16 mm designed for use with vidicon film chains and having an important exclusive feature of being able to play back magnetic sound tracks as well as the normal optical sound track. Originally designed for the Army to JAN Specs, is self-evidence of ruggedness. Design eliminates need for synchronizing pull down with sync generator. Light output is 50 lumens with a 300W, 25 hour lamp. — All functions "On", "Off", "Show", "Forward" or "Reverse" may be remotely operated, if desired.

SPECIFICATIONS

REEL CAPACITY: 2000'.
SOUND: Optical and magnetic.
LOOP SETTER: Push-button.
SHUTTER: 120 cycles per second.
LENS: 2" f/1.6 (up to 5.4 where desired).
DISTORTION: 2% or less, 100-7000 cps.
RESPONSE: 80-8000 cps ±1½ db.
FLUTTER: 0.25% or less.
POWER: 105-129 volts, 50/60 cycles.
SIZE: (with pedestal) 51¾" high, 12⅛" wide, 16¼" long. Lens to floor: 48" ±1".

Projector complete with pedestal 614CBVM

FRICTION HEAD TRIPOD

For vidicon or cameras 25 pounds or less. Equipped with friction type pan and tilt head, with tilt tension adjustment and pan and tilt lock levers. Equipped with spirit level. Range, 44½" low to 73" high. Legs of sturdy maple with quick positive locking devices.

Professional Jr. friction head tripod GR-975

Carrying case for outside use GR-976

LENSES

As lenses are of various focal lengths, a complete listing will be found in the price list with this catalog.

ACCESSORY EQUIPMENT

KLIEGL FRESNEL LENS SPOTLIGHTS

Front and back spindle adjustment control. Heat resisting lens. Perfect light control without spill light or side glare. Adjustable from wide spread to minimum spot. Includes 3′ asbestos leads and connector.

3″ lens, 100/150W lamp 44N3TVG
6″ lens, 500/750W lamp 44N6TVG
8″ lens, 1000/1500/2000W lamp 44N8TVG
12″ lens, 2000W lamp 44N12TVG

19″ roller caster floor stand for 6″ and 8″ lens models 1420CR
25″ roller caster floor stand for 8″ and 12″ lens models 1421CR

KLIEGL POLE-OP 8″ FRESNEL

Turns, tilts, adjusts barn doors — all by pole — from studio floor. Has 8″ fresnel lens and basic light design very similar to 44N8TVG listed above. Includes C clamp, swivel, asbestos leads and connector. Pole is accessory item. Size: 23½″ high, including cradle. 13″ wide and 13″ deep.

Pole-Op Kliteglight 44NP8G
Sectional 12′ pole, handle and loop 44

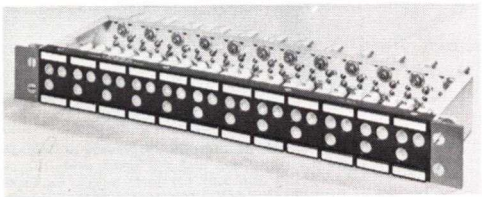
LAMP SIZES

For fresnel lights listed above, use following lamp sizes:

44N3TVG	100/150W Bayonet Base
44N6TVG	500/750W T20 Med. PF Base
44N8TVG	1000, 1500, 2000W, G40 Mog. PF Box
44NP8G	1000, 1500, 2000W, G40 Mog. PF Box
44N12TVG	2000 watt, G48 Mog. BP Base

IMPORTANT: See price list for added discount to regular Kliegl light users applicable to TV stations.

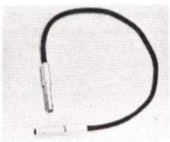
VIDEO PATCH PANEL



For patching coaxial circuits. 12 groups of 3 jacks on a strip 2⅛″ x 19″. Contacts heat treated beryllium copper. Outer braid of coaxial cable may be soldered directly to jacks for complete shielding. Patch cords and plugs listed and illustrated below.

Video patch panel 963
Looping plug 965
18″ patch cord 967A
24″ patch cord 967B

965



967

KLIEGLIGHTS

Klieglights are spot-flood lights and differ completely from plano-convex and fresnel lens units. Klieglights have been perfected to a degree that arc spotlights are no longer needed. Produce a brilliant, clear, uniform light, easily controlled and molded into any desired pattern. Perfect for highlighting areas or front spotlighting. Outstanding when used with projected scenery, as beam can be cut at any point. Available in hanging and floor models.

Klieglight for 250/500/750 watts up burning spot lamps. Included T14 Med. bi-post base, up burning spot lamps. Included are reflector, 4 independently adjusted square framing shutters, 6″ stepped lens, asbestos wires, yoke and C clamp. Hanging type ... 1365EG

Same as 1365EG but with built-in iris shutter 1365EG-IRS

Same as 1365EG but for 1500/2000 watt T base up burning, 200 hour life lamps 1366EG

Same as 1366EG but with built-in iris shutter 1366EG-IRS

Super Klieglight for 2000W T30 base up burning lamp. Rear operated curtain and iris shutter, 12″ lens. Includes 25′ cable, roller caster floor stand and switch. Rating, 450 foot candles at 4′, spot at 25′ 1174G

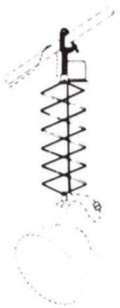
Dyna-beam Klieglight similar to 1174G above but uses 3000W T32 base up burning lamp. Added feature, in-built rear operated horizontal spread lens which doubles width or projected spot when desired. Rating, 1000 foot candles at 4′, spot at 25′ 1178G

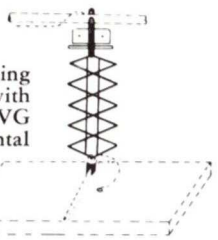
KLIEGL 18″ SCOOP LIGHT

Popular Kliegl light has socket cap with universally adjustable yoke and C clamp, permitting straight down as well as up lighting. Spring tension adjustment. Light weight, ideal for field work. Hood of 16 gg. Alzak-finished aluminum. Includes 3′ asbestos leads, connector and takes PS52 lamps from 750W to 2500W in size.

Scoop Light TV1155G

HANGING DEVICES



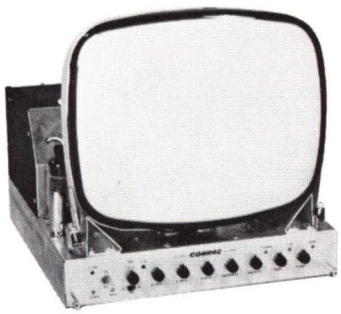


Single spring counter-balance raising and lowering device for use with models TV111 scoop and 44N6TVG fresnel lens units, 360° horizontal rotation and vertical tilt. Illustrated to left. Ideal method of positioning light where needed TV111

Same as TV111 only designed to hold fresnel lens model 44N8TVG TV112

Double spring counter-balanced device as illustrated to right for use with 44N12TVG fresnel lens light TV113

CONRAC TELEVISION MONITORS



CMB 17/N

CMB 17/C

CONRAC CMB TELEVISION MONITORS 14″ - 17″ - 21″

The Conrac CMB type video monitor incorporates many features normally found only in master monitors. It is especially designed for use in television broadcast control rooms, tape and film editing rooms and other locations where high resolution and excellent stability are required.

Video response is flat to beyond 10 megacycles, assuring resolution in excess of 800 lines. The final stage of the video amplifier employs two power tubes in parallel, providing high output with extremely low distortion. Differential gain is below 5% at 75 volts kinescope drive for excellent gray scale characteristics. The deflection circuits are capable of producing both horizontal and vertical linearity within 1% of picture height.

All operating controls, including electrical centering and electrical focus, are available on the front panel.

Of special interest is the picture size control which changes the display from normal full scan to reduced scan, completely showing all four sides and corners. This is accomplished without change in brightness, contrast or linearity.

Conrac-developed gating circuit eliminates the bending or "hooking" of vertical lines at the top of the picture regardless of setting of the horizontal hold control.

The kinescope employed is a newly developed electrostatic focus type. The spot size and shape are considerably improved over kinescopes in general use. Smaller spot size gives markedly improved resolution over the entire screen, and its superiority is particularly noticeable when viewing the corners. A 70° deflection system is used in all models of the CMB monitor.

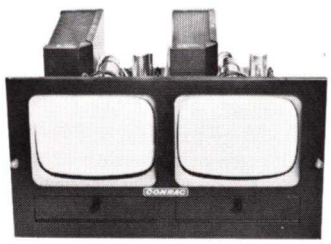
The Conrac CMB monitor has fully regulated ultor and B + voltages, and will satisfactorily operate in areas having extremely poor powerline regulation.

A switch to select either composite video or separate video and composite sync inputs is provided. Both video and sync inputs are equipped with parallel receptacles for loop-through operation. The video input is provided with a terminating resistor switch.

A switch is provided to permit selection of either 100% or zero DC restoration.

The CMB monitor has been conservatively designed for continuous operation. Minimum service will be required to maintain the equipment in a satisfactory operating condition.

Television Monitors, 14″ - 17″ - 21″ (Please specify)
Chassis only ..... **CMB/N**
Rack Mounted ..... **CMB/R**
Cabinet Model ..... **CMB/C**



CNA8/2R

CNA8/C

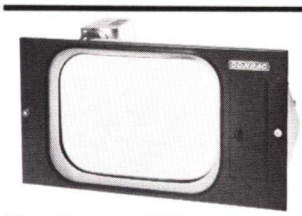
CONRAC CNA8 TELEVISION MONITOR 8″ ONLY

The Conrac CNA8 monitor is a full scale broadcast quality video presentation device in a very small package. It is designed for broadcast and industrial television applications. The CNA8 presents a clear bright picture in continuous duty operation. A minimum amount of service is required to maintain the unit in top operating condition.

Video response is flat to 8 megacycles assuring resolution in excess of 600 lines. Differential gain is below 5% at 50 volts kinescope drive for excellent gray scale characteristics. The deflection circuits produce both horizontal and vertical linearity within 2% of picture height.

In a portable case, with carrying handle, the CNA8/C measures only 9¼″ wide x 11⅛″ high x 18″ deep. The compact chassis size permits mounting two monitors side by side in a standard 19″ relay rack, and this assembly, Model CNA8/2R, requires only 10½″ of vertical rack space for two independent picture presentations.

8″ Television Monitor, in portable case **CNA8/C**
Chassis only **CNA8/N**
Rack Assembly **CNA8/2R**



CONRAC CLB TELEVISION MONITOR 14″ RACK MOUNT

The Conrac CLB is a general purpose video monitor. It is designed for broadcast and industrial television applications.

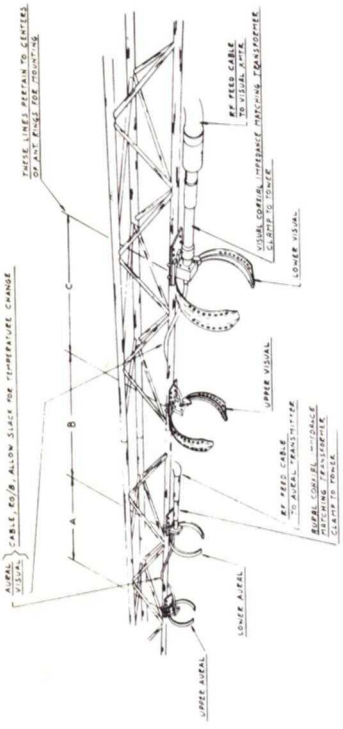
Video response is flat to 10 megacycles assuring resolution of 800 lines.

SIZE is 19″ wide, 10½″ high, 17½″ deep. NET WEIGHT 57 lbs.

14″ Monitor, Rack Mount Only ..... **Model CLB**

ANTENNAS FOR TV AND FM

MODEL TV-500



This antenna is designed specifically for low power TV. Consists of two sections of two rings each. One section is for visual and the other for aural. With this method, the diplexer is not required. As each ring has a power gain of 0.7, the two rings when stacked provide a power gain of 1.3. Thus, when used with normal transmission line lengths, unity power output is had, or a 100 watt transmitter will have an ERP of approximately 100 watts, or a 500 watt transmitter an ERP of approximately 500 watts.

Pattern is essentially omni-directional. Includes mounting mast with top plate for an obstruction light. Rings are provided with connecting coaxial cable and matching studs. Each antenna is tested prior to shipment. Impedance 50 ohms. Size of rings and spacing varies as to channel. Side mount antennas are also available.

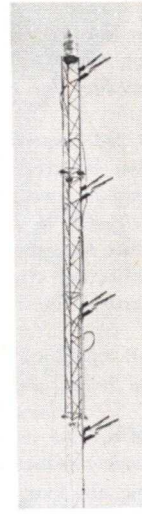
500 Watts, Channels 2-6 ..... TV-500L
500 Watts, Channels 7-13 ..... TV-500H

LOW POWER FM ANTENNA

An omni-directional antenna for the 88-108 mc FM band, having a power gain of 0.8. Primarily designed for FM educational band but may be used at powers up to 1 kw. Design is broad band, greatly reducing standing wave problems due to changing climatic conditions. State frequency when ordering.

Two ring antenna, power gain of 1.3 .. Type FM-22
Broad band antenna ..... Type FM-11

JAMPRO ANTENNAS

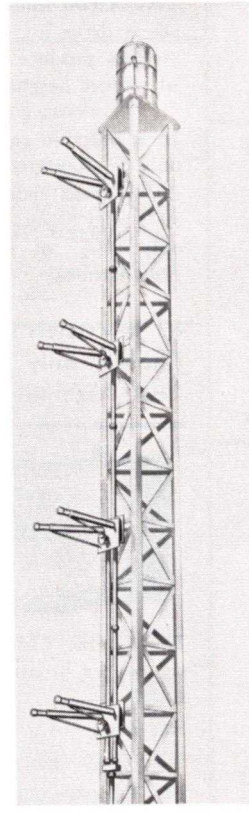


Designed for use with medium to high power FM transmitters in the U.S., Jampro offers currently four types of antennas: two, four, eight and twelve bay. Power input varies from 5 to 55 kilowatts. Special antennas are available for pole mast type construction.

Air dielectric 7/8" coaxial cable is used in the two, four, and eight bay model harnesses. The twelve bay model uses 3 1/8" co-ax to junction boxes 63 feet long, plus 7/8" box to element co-ax in order to cut down harness losses.

JAMBRO TYPE	JA-4	JA-8	JA-12
Gain over dipole in DM	5.7	8.6	10.8
Field intensity is MV/M (@ 1 mi/1 kw)	265	370	475
Vertical, aperture, in wave lengths	3	7	11
Power gain	3.7	7.25	12
Maximum power input	10 KW	20 KW	55 KW
Maximum VSWR @ 0.5 Mc bandwidth	1.2/1	1.2/1	1.2/1
Height in Feet	30'	70'	110'

MULTI-V ANTENNAS

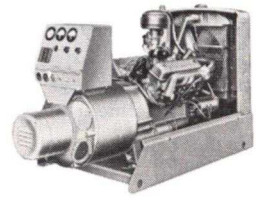


Omni-directional, this popular Andrew antenna for FM in the 88-108 Mc band is available in 2-bay, 4-bay, 6-bay, 8-bay, 12-bay, or 16-bay version. Mounts on side of tower and light weight allows use on nearly any type of tower. Power rating up to 10 kw. Standard design is for use with 1 5/8" coaxial cable. However, smaller cables may be used by purchasing a simple reducer. The Multi-V line has been field proven by many years of dependable service at hundreds of radio stations in the country.

2-bay, power gain 1.6 ..... Type 1302
4-bay, power gain 3.7 ..... Type 1304
6-bay, power gain 5.6 ..... Type 1306
8-bay, power gain 7.3 ..... Type 1308
12-bay, power gain 10.0 ... Type 1312
16-bay, power gain 14.1 .... Type 1316

ELECTRIC GENERATING PLANTS

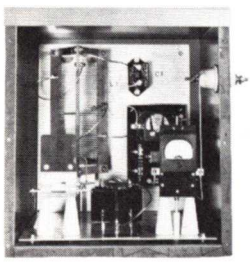
Electric and diesel generating plants are available in all powers from 1 KW to 500 KW. Pictured above is the popular Onan 25,000 generating plant. Ideal for use in providing complete power for radio and TV stations. Full information, prices, supplied upon receipt of customer's requirements.



ANTENNA COUPLING UNITS

ANTENNA COUPLER

1250 WATTS AND LOWER



A fully weatherproof coupler for series feed antennas to handle 1250 watts or less and at 100% modulation. Plug-in meter supplied, which may be inserted in either line or antenna circuit. Meter shorting switch is provided in antenna circuit to eliminate damage to meter during electrical disturbances. Antenna meter may be observed through glass porthole. Coil is silver plated, having generous inductance for arrangement in a full Tee network along with the fixed mica capacitors supplied. Extra room is provided in the cabinet for either diode or thermocouple type remote metering kits.

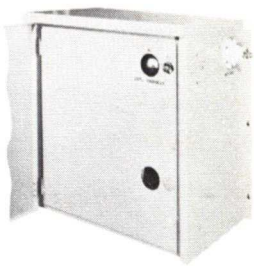
SPECIFICATIONS

CARRIER POWER: 1250 watts or less.
INPUT IMPEDANCE: 50 to 360 ohms concentric or open line.
ANTENNA RESISTANCE: 10 to 1000 ohms.
ANTENNA REACTANCE: Plus J 600 to minus J 300 ohms from 540 to 1000 kc.
Plus J 600 to minus J 500 ohms above 1000 kc.
CIRCUIT: Tee network.
LIGHTNING PROTECTION: Meter shorting switch.
METERING: Plug-in 3" meter normally located as antenna meter but may be used as line meter for tune-up. Plug-in shorting bar provided for unused meter jack.
REMOTE METERING: Provision for either thermocouple or diode type as ordered.
SHIPPING WEIGHT: 98 lbs.
SIZE: 20" high, 20¼" wide, 18¾" deep.

ORDERING INFORMATION

IMPORTANT: Kindly state transmission line impedance, frequency, tower height and tower measurements if known.
Antenna Coupler with antenna meter ..... Model 44

5-10 KW ANTENNA COUPLING UNITS



These two nearly identical models differ only in component size for 5 and 10KW power ratings. Housed in an aluminum cabinet with double front doors. Size: 38" high, 37" wide, and 21½" deep. Antenna meter may be observed and meter shorting switch operated with the inner door closed. Coils are silver plated. Capacitors have generous voltage and current safety factor. All ratings are 100% modulated. Tuning unit may be mounted by metal flanges at each back side. Usually two wooden poles, set in the ground, are used for mounting. A large lead in bowl is provided for antenna connection. The use of non-ferrous metal in the tuning house will prevent component heating under certain conditions.

SPECIFICATIONS

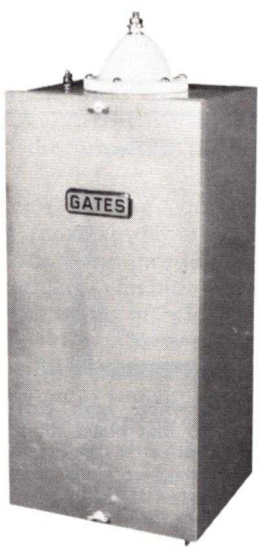
FREQUENCY RANGE: 540-1700 kc, as ordered.
INPUT IMPEDANCE: 45-360 ohms, as ordered.
ANTENNA RESISTANCE: 20-1000 ohms.
REACTANCE: +J500 to —J500.
WEIGHT: Packed, 315 lbs. (export); 200 lbs. (domestic).
Unpacked, 136 lbs. Cubage, 24.

ORDERING INFORMATION

IMPORTANT: When ordering, state carrier frequency, transmission line impedance, tower height and tower resistance measurements if known.

Coupling Unit for 5KW M-5309A
Coupling Unit for 10KW M-5309B

SERIES AND SHUNT FEED COUPLERS



Model M-5178: Series feed, provides all coil and capacitance to provide full Tee network. Constructed in non-weatherproof steel cabinet, front removable. Size: 21" high, 10" wide, 9" deep. Matches RF input of 50 or 70 ohms. Output 10-600 ohms. In this model metering is external to the coupler, often desirable in unattended operation. For all powers 100% modulated up to 1250 watts carrier.

Antenna
Coupler .... Model M-5178

Model M-5179: Shunt feed coupler of coil and capacitor combination to tune out the reactance in shunt fed antenna coupling. Same size as M-5178 above. Rating up to 1250 watts carrier 100% modulated.

Antenna Coupler ..... Model M-5179

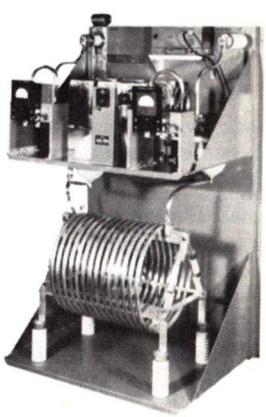
IMPORTANT: Please state frequency, tower height and tower measurements, if known.

HIGH POWER ANTENNA COUPLERS

(50KW and 100KW)

For custom designed couplers in the 50,000 and 100,000 watt range, Gates can call upon a great deal of experience and skill. With a substantial supply of components on hand at all times there is a minimum of delay when designing a particular coupler.

Illustrated is a typical 100,000 watt shelf-type unit as employed in Israel. All materials are of the highest possible quality and exact specifications are always met. Couplers are available in weatherproof cabinets if desired.



When ordering, please supply all available information such as (1) power (2) frequency, (3) tower height, (4) ground conductivity if known, (5) tower measurements if known, (6) transmission line impedance such as 50 ohms, 70 ohms, 250 ohms, etc., and whether coupler will be mounted in an out-building or if weatherproof type is desired.

Price of coupler can be quickly quoted with the above data supplied.

TOWER CHOKES — ISOLATION COILS — SAMPLING LOOP

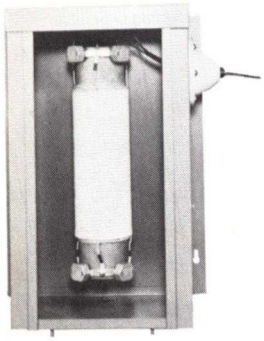


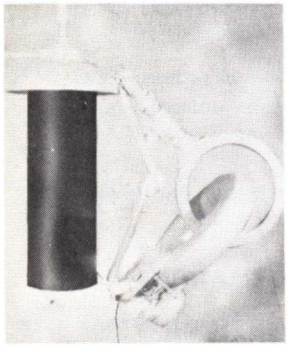
Fig. A

SOLENOID TOWER CHOKES

Most popular of all tower light isolation chokes. Available in 2 or 3 section and in open type, illustrated to right, or weatherproof type, illustrated to left. Wound on XX heavy bakelite tubing with mica by-pass condensers on each circuit end. Inductance 350 uh. 3″ stand-off insulators are part of coil. Size: choke only, 18½″ long, 5″ diameter, 7½″ from bottom of insulator to top of coil. Weatherproof type, 24″ high, 17¾″ wide, 10¼″ deep. Illustration to left shows front cover of weatherproof unit removed for photographing.

M-3937, 2-section, Fig. A
M-3938, 3-section, Fig. A
M-3935, 2-section, Fig. B
M-3936, 3-section, Fig. B

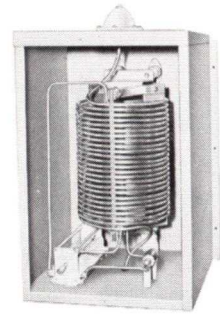
Fig. B



AUSTIN RING TYPE TOWER CHOKE

Ring type tower choke is a transformer with clear air space between primary and secondary and resultant zero RF leakage. Independent of frequency. All models are for 115/230 volt primary and 115 volt secondary. Base insulator in photo for illustration purposes only.

Type	Capacity KVA	Mfg. Style	Net Wt. Lbs.	Attachments
A-2100	1 — 1.75	Side Bracket	81	none
A-2101	1 — 1.75	Side Bracket	85	Lt. gap
A-2102	1 — 1.75	Pedestal	82	none
A-2103	1 — 1.75	Pedestal	86	Lt. gap
A-1970	2 — 3	Side Bracket	188	none
A-1971	2 — 3	Side Bracket	201	Lt. gap
A-1972	2 — 3	Pedestal	182	none
A-1973	2 — 3	Pedestal	200	Lt. gap



ISOLATION COIL

Inductance 85 uh. Made of Andrews type 83A coaxial cable, 50 ohms, mounted on heavy bakelite bars. Available in weatherproof model illustrated above (front cover removed) or coil only for mounting inside tuning house. Size (weatherproof model): 20″ wide, 32½″ high, 18½″ deep. State carrier frequency and power when ordering. Includes all necessary elements to match purchasers frequency.

Weatherproof isolation unit M-3073
Coil only, less cabinet M-4561-A
Weatherproof isolation unit with M-5573 coil (shown below) M-5634

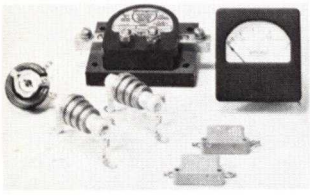


Fig. A

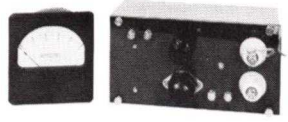


Fig. B

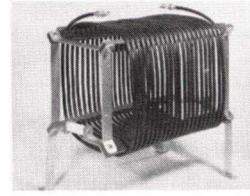
REMOTE METER KITS

Thermocouple Type: Fig. A above. Includes 3″ square case meter, thermocouple, adjusting rheostat, chokes and capacitors. May be used up to 1000 of 2C No. 18 or larger line for remote metering between tuning house and transmitter.

Complete (meter range 0-3 RFA) M-3383
Complete (meter range 0-5 RFA) M-3133
Complete (meter range 0-10 RFA) M-3386

Diode Type: Fig. B above. Inductively connects to antenna lead for excellent protection against electrical disturbances. Uses 6H6 tube. Operates from 115 volt tower light circuit. May be used with 2C line up to 5000 feet. Available with or without meter. Standard 1 MA meter is employed. Ratings are 100% modulated.

1KW or less, 0-3 RF scale M-3294
1KW or less, 0-5 RF scale M-3294B
1KW or less, 0-10 RF scale M-3294D
5/10KW, 0-5 RF scale M-5334
5/10KW, 0-10 RF scale M-5335
Diode less meter, 1KW or less M-3759
Diode less meter, 5/10KW M-2765B

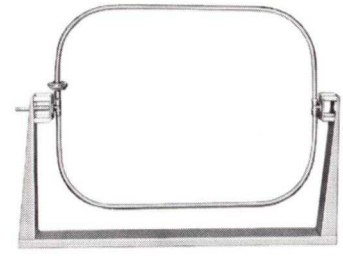


Coil only M-5573

M-5573 ISOLATION COIL

Used in the same manner as the M-3073 and M-4561 shown above. The coil is wound of RG-11/U solid dielectric cable with an inductance of approximately 100 uh. Where the consulting engineer wishes to resonate the coil, a separate capacitor is required.

PHASE SAMPLING LOOPS

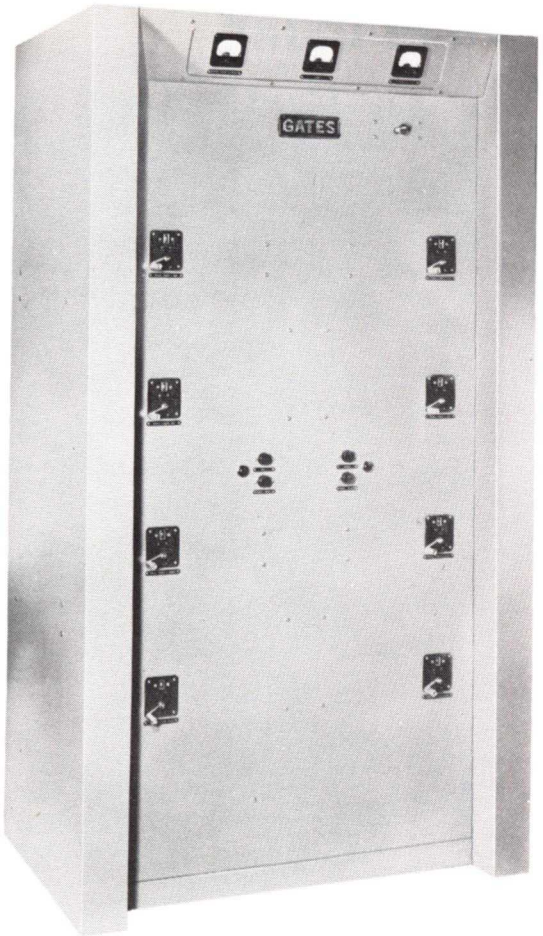


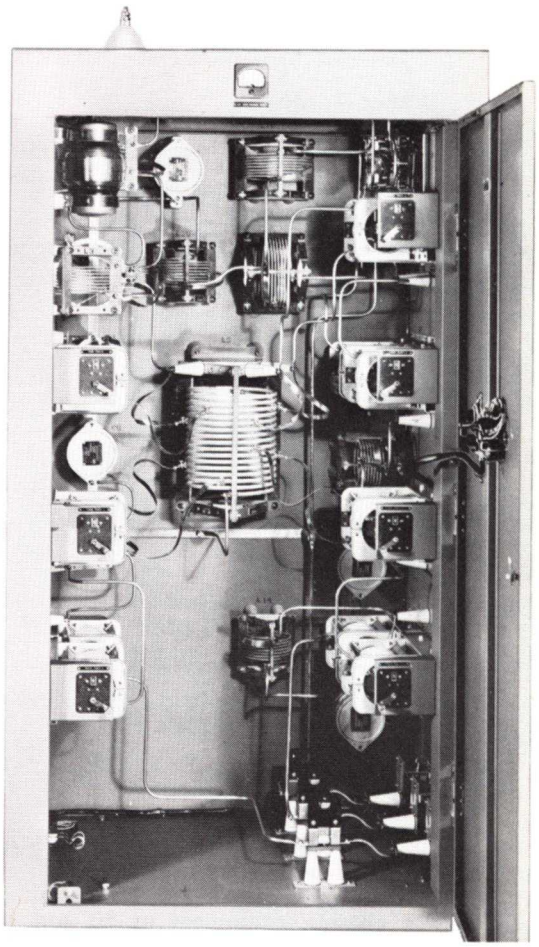
M-3283: This model **especially applicable where high** current ratios are to be sampled. May be rotated so that phase monitor amplitude values are nearly equal. Electrostatically shielded and insulated from tower. May be used with or without isolation coil at base of tower. Coil is single loop of ⅞″ coaxial cable, heavily insulated from base frame. Matches either 50 or 70 ohm line. Size: 45″ wide, 60″ high.

Sampling Loop M-3283

Ordering Sampling Loops: Unless for replacement purposes, it is always suggested that sampling loops be ordered on recommendation of the customer's consulting engineer. As the loop and its associated transmission line, and in some instances the isolation coil, are all part of the overall computations, the slight delay in checking with the consultant will often save time and expense.

DIRECTIONAL PHASING EQUIPMENT





The total power of all Gates phasing equipment manufactured in the past decade, including more than half of all phasing equipment in the U.S., comes to several million watts. This immense range of power is valid testimony to the ideal combination of Gates' precision manufacturing and creative engineering experience that is unequalled in the broadcast industry.

Gates phasing equipment has for years, been the choice of the majority of broadcasters and has held a fine reputation for meeting the exact specifications of consulting engineers. Stability of pattern and reliability of components, many of which are manufactured by Gates and all of which possess generous over-rating, are reasons for the definite preference for Gates phasing equipment. Also, minimum tuneup and maintenance time make Gates phasors less expensive in the long run, though nothing is spared in the design cost. Gates manufactures phasing equipment up to 100 KW in power and for any number of elements.

The outcome of this unexcelled background and a sincere desire to give broadcasters the finest possible phasing equipment has resulted in the following Gates exclusives:

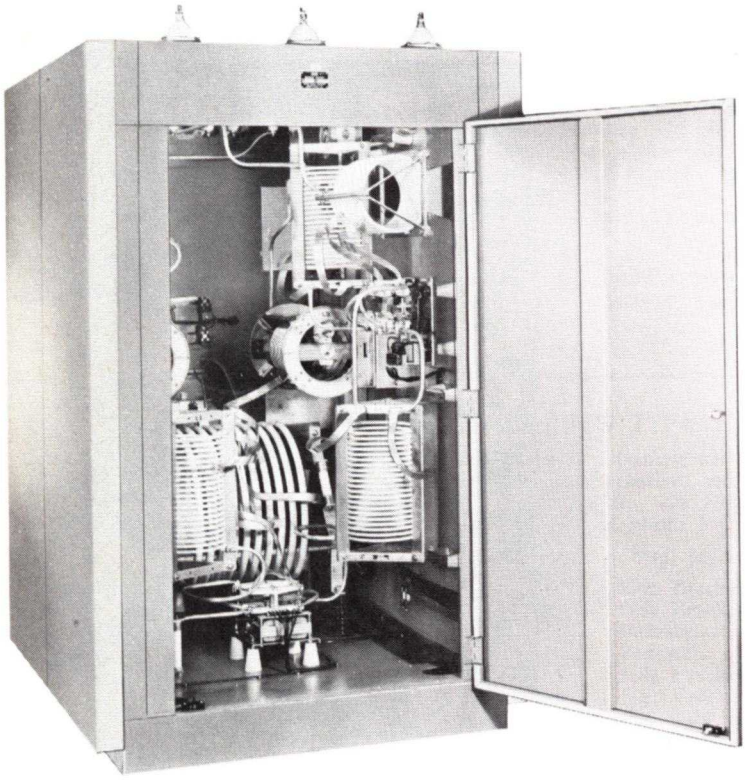
- The use of Gates manufactured silver plated coils for better conductivity, more stable operation and greater system efficiency.
- Easy accessibility to every part for adjustment and maintenance.
- The use of Gates "full grip" variable inductors providing a high degree of stability for all front panel controls.
- The use of "make-before-break" meter switches that have inductance loops opposite the meter. These switches provide complete compensation for the inherent meter inductance which otherwise would cause the phase to change when the meter is switched out of circuit. This is extremely important today because of increasingly tight directional patterns.

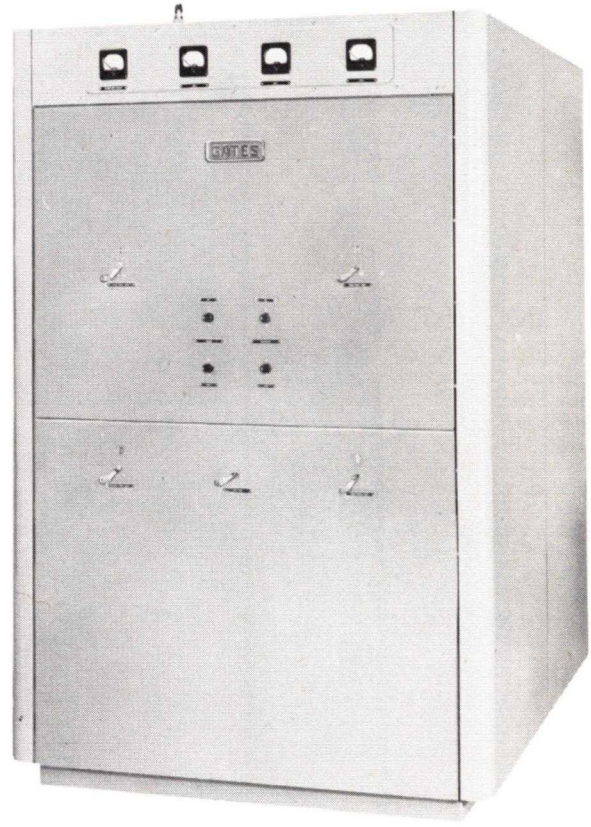
All directional phasing equipment is manufactured to the exact specifications of the customer's consultant and work is not initiated until the consultant approves the design. Upon completion, the consultant receives all details covering what the design was based on and over what ranges the networks may be tuned.

Gates can provide immediate price quotations on phasing equipment up to 10,000 watts and 6 towers. Other prices are quoted promptly upon receipt of consultants specifications.

(con't)

DIRECTIONAL PHASING EQUIPMENT





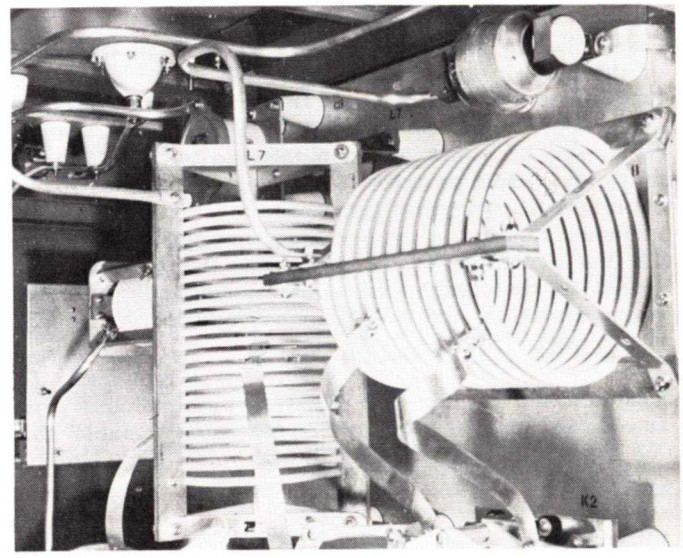
In high power phasing equipment of 50 and 100 kilowatts, Gates can call upon un-paralleled experience to custom build phasors covering the 4-30 mc short wave as well as the regular broadcast band.

All phasing equipment designs provide safety factors greater than 5.656 times the expected RMS voltages and at least twice the highest expected current in all portions of the system. Power dividing circuits are designed to provide power adjustment with a minimum of phase shift. Variable coils are replaced by variable vacuum capacitors to eliminate possible trouble with moving coil contacts. Operating efficiencies when properly adjusted are the highest attainable due to superior Q's of Gates coils. In all cases, a minimum of component types are used to reduce spare part inventories.

While Gates maintains a complete production department solely engaged in the construction of phasing equipment, all design and construction is under the supervision of the engineering department, from start to finish.

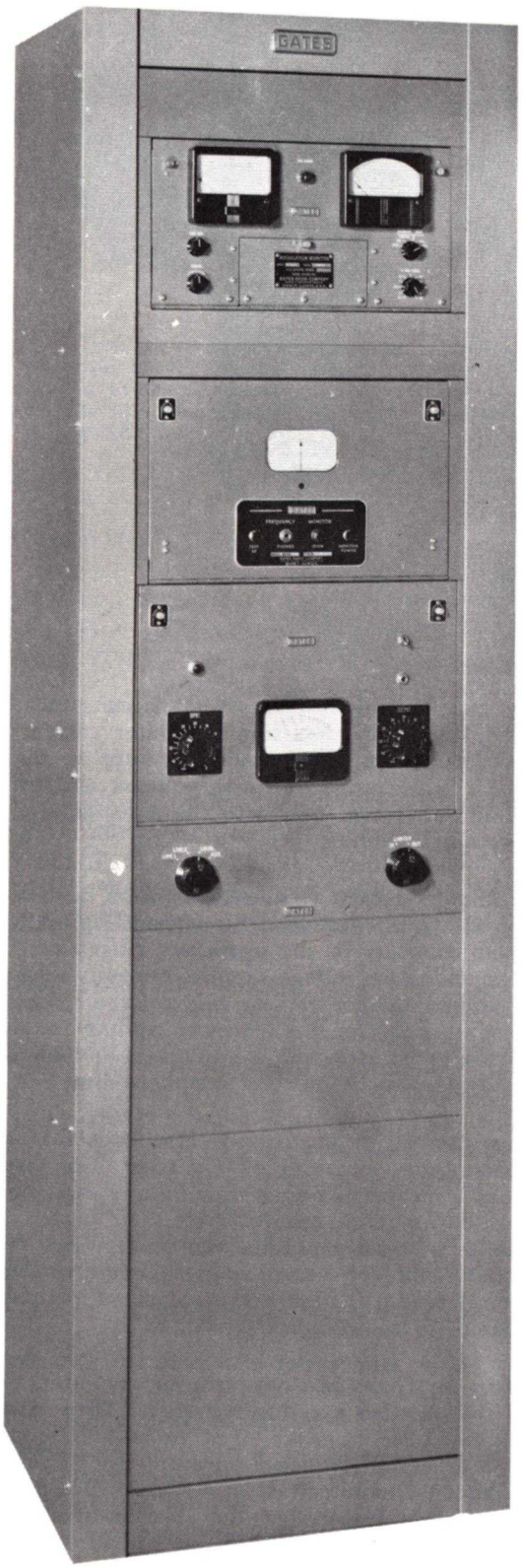
At this writing, some of the more recent users of Gates high power phasing equipment are as follows:

CKVL — Verdun, Quebec
XET — Monterrey, Mexico
WINQ — Tampa, Florida
Radio Free Europe
Radio Rumbos, Curacas, Venezuela
Dominican Republic
Government of Israel
Far East B/C Company, Okinawa



ACCESSORY CABINET FOR RADIO BROADCAST TRANSMITTERS

Model GY-60B



All the necessary accessories to meet FCC requirements will be found in this cabinet. — At the top is the Gates FCC approved M-5693 modulation monitor and under this is the FCC approved M-4990 frequency monitor. Next in line is the SA-39B limiting amplifier, followed by the input switching panel. The switching panel accommodates two telephone lines, a local and auxiliary input (four in all) at 600 ohms. A second switch allows bypassing the limiting amplifier for emergency tube change in the limiter, etc.

Ample blank panel space is provided in the lower section of the cabinet for remote control equipment or any other desired accessory. The GY-60B accessory cabinet is completely wired, including coaxial cables to terminate the frequency and modulation monitors.

SPECIFICATIONS GY-60B

MODULATION MONITOR: Gates Model MO-5693, fully FCC approved.*

FREQUENCY MONITOR: Gates Model M-4990, fully FCC approved.*

LIMITING AMPLIFIER: Gates Model SA-39B. Input and output impedances, 500/600 ohms.

SWITCHING PANEL: Four switch selected 500/600 ohm inputs, two for line input, one for local input such as microphone preamplifier, and one for auxiliary input such as turntable. Second switch is for bypassing limiting amplifier for on-air maintenance.

POWER INPUT: 115 volts, 50/60 cycles, approximately 390 watts.

FINISH: Two-tone gloss gray with escutcheons in anodized black.

SIZE: 78″ high, 23½″ wide, 19½″ deep. Rear door swing 20″.

WEIGHT: Net 290 lbs. Packed 405 lbs.

CUBAGE: 31.

*Fully described elsewhere in this catalog. Please refer to Index.

ORDERING INFORMATION

Complete accessory cabinet with one set of tubes.... GY-60B
100% spare tube kit for GY-60B TK-302

BROADCAST FREQUENCY MONITOR

Model M-4990

The M-4990 AM frequency monitor provides the progressive broadcaster with added accuracy, greater reliability, smaller size, plus many other features which result in a monitor that once installed, performs with laboratory precision and minimum maintenance. Again the stability of Gates solid process printed wiring, adds to the demanded stability of a frequency monitor. Each wire in the same place is why each production model has prototype performance. The absence of parts stacking and the absoluteness of soldering in the printed wiring process continues the quality emphasis in an instrument that demands quality all the way.

A vacuum type crystal unit, precise to broadcast transmitter standards without temperature control, is mounted with its oscillator stage components within a carefully designed temperature controlled chamber to result in ½ part per million frequency accuracy.

The M-4000 frequency monitor is fully FCC approved.

A precision oscillator operates 1000 cycles below the carrier frequency. The output from the oscillator is isolated and amplified and then mixed in a detector stage with the radio frequency signal from the transmitter. This signal may be direct connected or when used in remote control (unattended) operation, the M-5549 whip antenna kit may be purchased for direct air monitoring over distances of 20 miles or more, depending on the transmitter power. The beat note from the detector is amplified and then applied to a discriminator. The output is rectified and applied to a DC meter calibrated in 1-cycle steps from —30 to +30 cycles.

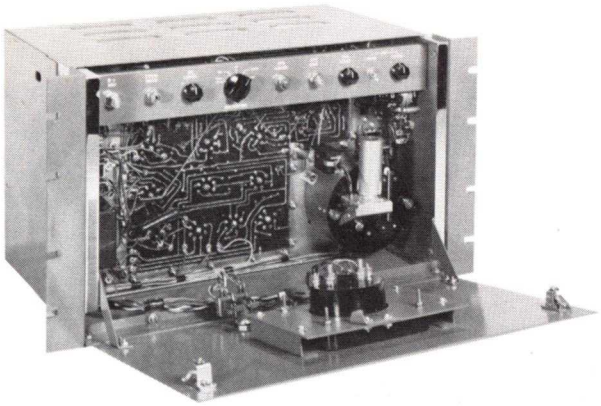
The meter may be switched to several circuits including carrier level, frequency deviation, oscillator current and local/remote functions. Outstanding feature is the accuracy over a wide range of input voltages and modest fading conditions, when used with the antenna, will not affect operational stability.

Servicing of the M-4990 frequency monitor has the excellence of all Gates products. Front panel hinge down brings all adjustments to the operator's fingertips. Both the filament and plate voltage supplies are fully regulated to add to accuracy under varying line voltage conditions. Connections are provided for a remote reading frequency meter which may be used with a line up to 2000 ohms resistance equivalent to 21 miles of telephone line.

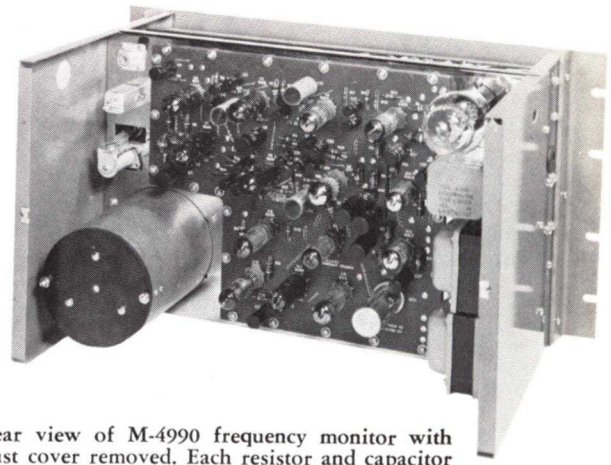
Temperature control of the crystal chamber is through a mercury thermostat operating with a relay. The thermostat employs a heater winding to minimize temperature fluctuations during each heating cycle. The heater itself is the blanket type for absolute even distribution. If the rarity of failure of the heater control circuit would occur, a thermal fuse will meet and no damage to components will result to assure quick repairs.

In designing the Gates M-4990 frequency monitor, Gates engineers have applied exacting standards. They have incorporated the basic requisite of a broadcast frequency monitor — accurate frequency measurement. Hundreds of Gates frequency monitors are in use today. The M-4990 takes the desirable features of these earlier models and adds advancement in tube, circuit and crystal designs to provide the most advanced monitor manufactured today.

M-4990 BROADCAST FREQUENCY MONITOR



Front panel hinges down to expose operating adjustments and the plug-in crystal unit. Here is exhibited the uniformity of printed wiring to produce uniformity in year-in and year-out service.



Rear view of M-4990 frequency monitor with dust cover removed. Each resistor and capacitor is firmly secured to the printed wiring chassis. Parts stacking is obviously absent.

SPECIFICATIONS

OSCILLATOR: Electron coupled 1000 cycles below assigned frequency, crystal control.

FREQUENCY RANGE: 540-1600 Kc as ordered.

DEVIATION RANGE: Meter reads — 30/0/+30 cycles.

INPUT VOLTAGE: Supplied with external fixed pad to handle wide range of input voltages from 5-50 volts direct connected and down to 5 Mv with whip antenna.

INPUT SIGNAL: Modulated or unmodulated.

INPUT IMPEDANCE: 50/70 ohms.

OVERALL STABILITY: ±2 parts in one million.

OSCILLATOR STABILITY: ±0.5 parts in one million.

LINE VOLTAGE: 105-125 volts, 50/60 cycles at 85 watts.

TUBES: 12BY7A oscillator, 6AU6 oscillator amplifier, 6AU6 input amplifier, 6C4 mixer, 6AU6 audio amplifier, 6AU6 limiter, 6AQ5 cathode follower, 12AT7 AVC, 6AL5 discriminator rectifier, 6AL5 VTVM rectifier, 6X4 high voltage rectifier, 6AQ5's Series regulators, 6AU6 voltage amplifier, OB2 voltage reference, 13-4 Ballast.

SIZE: 19″ wide, 10½″ high, 10⅝″ deep.

FINISH: Medium gloss gray.

WEIGHT: 32 lbs. net, 53 lbs. packed. Cubage 4.

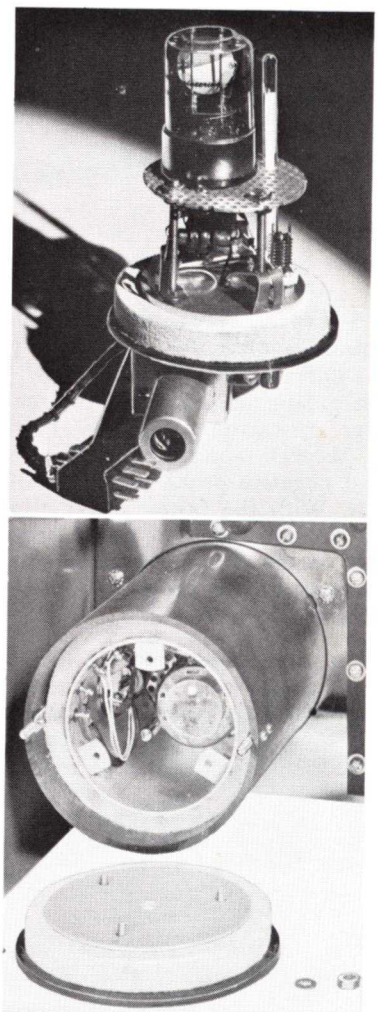
ORDERING INFORMATION

Frequency monitor with tubes and crystal, state frequency when ordering M-4990

100% spare tube complement TK-281

Remote frequency meter, reading —30 to +30 cycles, mounted on 5¼″ x 19″ rack panel finished in gray M-5631

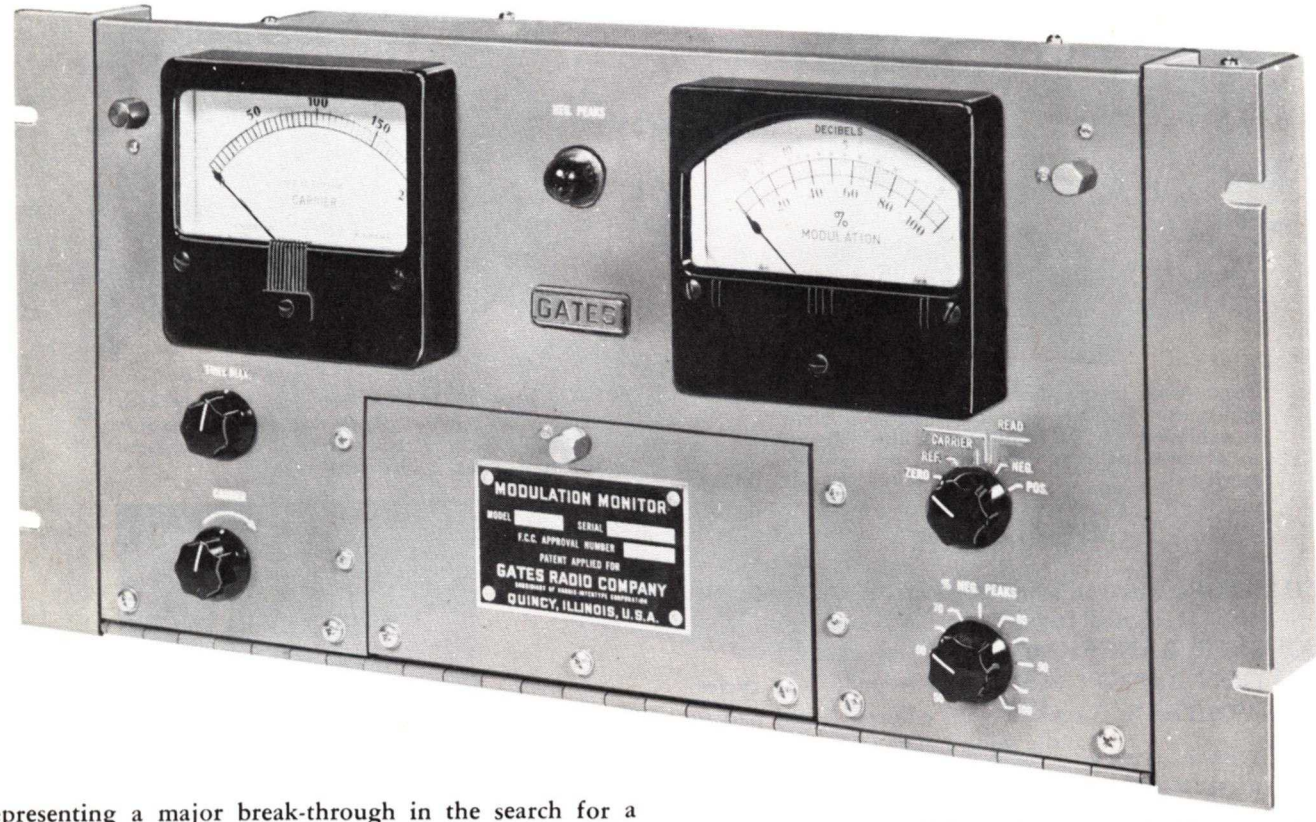
Whip antenna with coupler to match RG/59U cable and monitor M-5549



Above is the crystal oscillator unit, heart of the M-4990 frequency monitor. The open view illustrates the vacuum crystal, under which are the oscillator components, all temperature controlled. The oscillator tube, however, is external to the temperature chamber. The entire unit is plug-in and there are no variable air gaps for frequency adjustment at time of installation.

BROADCAST MODULATION MONITOR

Model M-5693



Representing a major break-through in the search for a better modulation monitor, the new Gates M-5693 modulation monitor operates on an entirely new principle. The result is much greater accuracy and the maximum use of the transmitter modulation capacity. Employing direct coupling, the M-5693 monitor will read the true values of positive and negative peaks regardless of the presence of carrier shift. With the fastest meter allowable, it will give correct peak indications on single program pulses as short as approximately 50 milliseconds and will measure the true peak amplitude of program or tone regardless of the wave forms encountered.

In the operation of this new monitor, the rectified carrier voltage with its audio, due to modulation, is compared with a stabilized internal reference voltage and, in the case of both postive and negative peak indication, the *difference* of these voltages operates the modulation percentage meter.

Older modulation monitors required the engineer to provide certain safety factors to prevent over modulation. The new M-5693 monitor with true peak indication regardless of the complex waveform in standard programming, assures accuracy to the point that often greater modulation of the transmitter is possible, resulting in valuable increased signal strength.

As noted, the new Gates modulation monitor uses the *difference* in the rectified carrier voltage and the reference voltage, and error from carrier shift decreases as the percentage modulation increases. The error is zero for 100% modulation. Indication of exact readings at high modulation is now possible and downward allowance for the error factor is no longer necessary. The flashing light of the M-5693 monitor, which reads only the negative peaks, uses the difference between the peak of the audio component and all, or a portion of the DC component of the rectified carrier, depending on where the negative peaks switch is placed. Very accurate indications are the result. This method also reduces error from carrier shift to a very low value.

The Gates M-5693 monitor can be calibrated in a few moments, and does not require a modulated carrier to do so.

To measure audio output, response and distortion, the self-calibrating feature and the accuracy of indication makes this new monitor ideal for the annual proof-of-performance measurements. No additional RF samples are required, such as a diode rectifier for operating the distortion meter. An oscilloscope is not necessary. The engineer will certainly welcome the M-5693 monitor after using it on one proof-of-performance run.

The new monitor can be located at the transmitter and operated by remote control, with compensating adjustments in the monitor for imperfect telephone lines. The optional M-5834 remote meter panel is available for remote control. Light and compact, the M-5693 monitor is extremely accessible for servicing — the smallest part can be easily reached in seconds. The popular drop down front panel permits nearly all servicing from the front.

BROADCAST MODULATION MONITOR

SPECIFICATIONS

FREQUENCY RANGE: 540-1600 Kc.

RF INPUT IMPEDANCE: Matches 50-75 ohm lines.

RF INPUT LEVEL: Approximately 10 volts. R.M.S.

MODULATION RANGE: Meter: 0% to 100% on negative peaks. 0% to 110% on positive peaks.

Flasher: 50% to 100% on negative peaks in steps of 5%.

RESPONSE: Meter: Within 0.2 db. 50-15,000 cycles.

Flasher: Within 0.6 db. 20-7500 cycles.

ACCURACY: Meter: 2% of full scale at 1000 cps. for any percentage of modulation.

Flasher: 2% of full scale dial calibration at 1000 cps.

RESPONSE TIME: Meter: Meter responds to 90% of correct reading with a 50 millisecond pulse of modulation. Needle returns to 10% of reading in 500-800 milliseconds after signal is removed.

RESPONSE TIME: Flasher: 15 milliseconds.

CIRCUITS: Meter: (1) Direct coupled amplifier responds correctly to non-symmetrical modulation waveform.
(2) High speed meter.
(3) Self-calibration.

Flasher: (1) Direct coupled flasher shows accurately negative peaks of modulation regardless of waveform.
(2) Self-calibration.
(3) The flasher also serves as a carrier-failure alarm.

DETECTOR LINEARITY: Negative peak clipping in the detector diode is negligible for frequencies up to 7500 cps. and 5% or less at 10,000 cycles.

MONITORING OUTPUT:

When feeding a 600 ohm unbalanced load:

Level: —20 dbm at 100% modulation.

Response: ±0.2 db from 50-15,000 cycles.

Distortion: Less than 0.25% from 20-15,000 cycles.

Noise: At least 65 db below maximum output of —20 dbm.

When feeding an open circuit (grid):

Level: 0.75 volts R.M.S. at 100% modulation.

Response: +0.2 db from 50-15,000 cycles.

Distortion: Less than 0.1% from 20-15,000 cycles.

Noise: At least 65 db below maximum output of 0.75 volts.

LOADING EFFECT: 1000 mmf (12 ft. of single conductor shielded cable rated at 85 mmfd per ft.) at 15,000 cycles is about 0.1 db.

OUTPUT MEASUREMENTS: *With a load of 100,000 ohms or more, shunted by a simulated cable capacity of 500 mmf capacitance or less:*

Response: ±0.5 db from 20-30,000 cps.

Distortion: Less than 0.5%.

Noise: 75 db below maximum output of 4.5 volts R.M.S.

POWER SUPPLY: 105 to 125 volts, 50/60 cycles.

POWER CONSUMPTION: 70 watts.

AUXILIARY OUTPUTS: Connections for remote percentage modulation meter.

TUBES: (2) 12B4A, (3) OA2, and (1) each — 6X4, 5879, OB2, OC2, 5687, 12AU7, 2D21, 8-4.

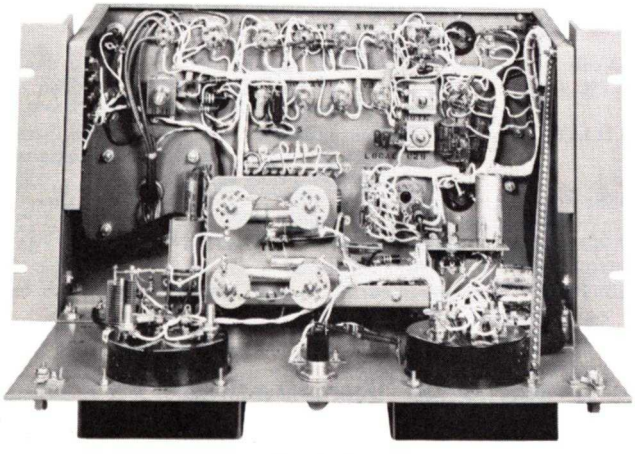
MOUNTING: Rack mounted 19" x 8¾" panel, 11½" depth behind panel.

WEIGHT: 25 lbs.

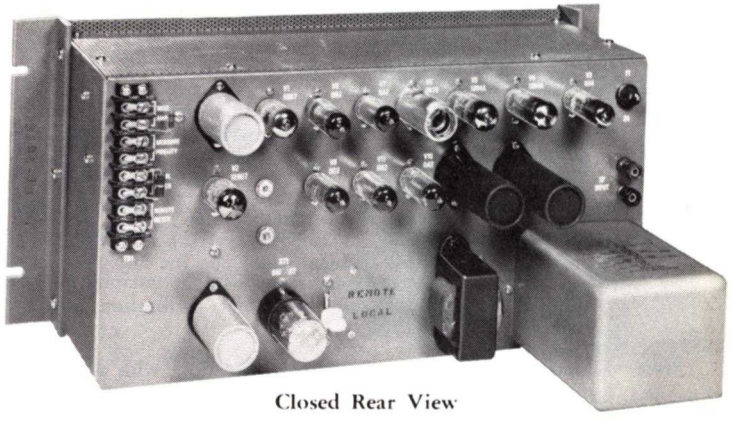
FCC APPROVAL NUMBER: 3-109.

ORDERING INFORMATION

Modulation monitor, complete with tubes M-5693
100% set of spare tubes TK-345
Remote meter panel M-5834



Front Panel Hinges
Down For Complete Accessibility

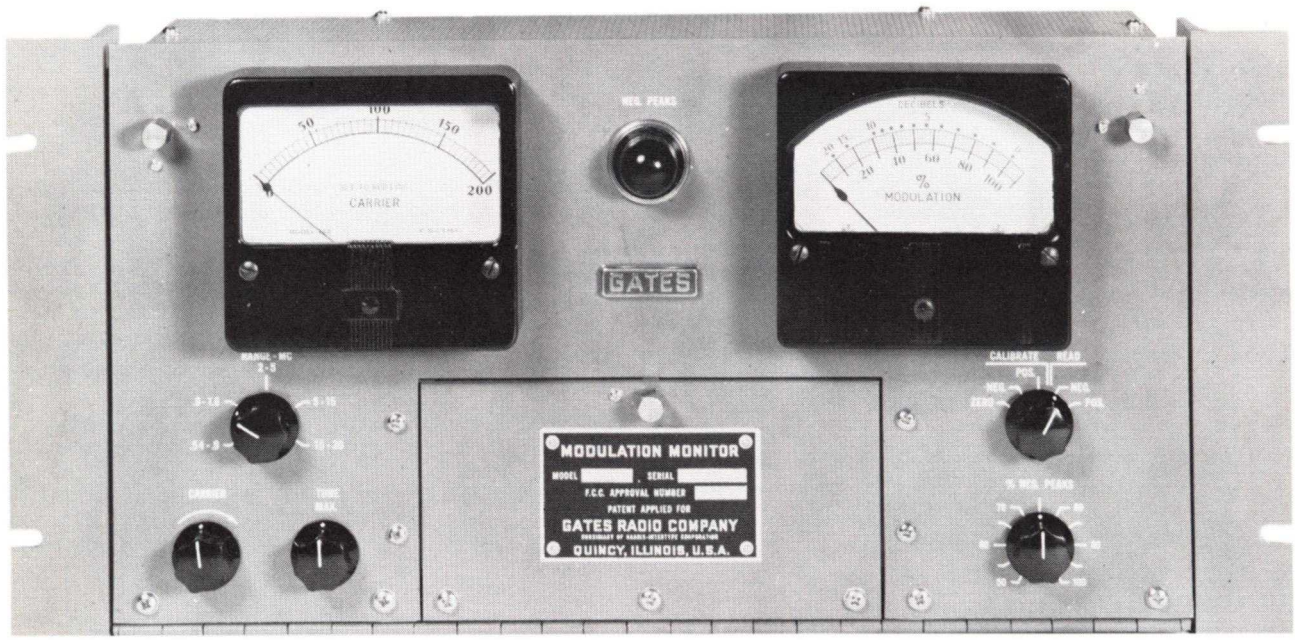


Closed Rear View

Patent is applied for.

SHORT WAVE MODULATION MONITOR

Model M-5774



The new Gates M-5774 short wave modulation monitor, operating on an entirely new principal, is designed to give the truest indication of modulation percentage of any present day type.

An extremely fast meter with a 20 second millisecond modulation pulse, responds correctly to very short peaks of modulation. The meter is self-calibrating which means it does not need the presence of an un-modulated carrier and the over-modulation lamp circuits may be calibrated easily without the use of an oscillascope. Employing direct coupling, this new monitor will read the true values of positive and negative peaks regardless of the presence of carrier shift — responds correctly to non-symmetrical waveform. The use of DC supply for the overmodulation lamp thyratron insures indication of short peaks which might be missed if AC were applied to the plate circuit of the thyratron.

SPECIFICATIONS

FREQUENCY RANGE: 540/1600 Kc, 2-30 Mc.
RF INPUT IMPEDANCE: Approximately 75 ohms.
RF INPUT LEVEL: Approximately 10 volts.
MODULATION RANGE: Meter — 0% to 100% on negative peaks. 0% to 110% on positive peaks.
Flasher — 50% to 100% on negative peaks in steps of 5%.
RESPONSE: Meter — Within 0.2 db 50-15,000 cycles.
Flasher — Within 0.6 db 20-7500 cycles.
ACCURACY: Meter — ±2% full scale at 1000 cps for any percentage of modulation.
Flasher — ±2% of full scale dial calibration at 1000 cps.
RESPONSE TIME:
Meter — Meter responds to 90% of correct reading with a 50 millisecond pulse of modulation. The meter overshoots 2 to 3% on a step function signal. Needle returns to 10% of reading in 500 to 800 milliseconds after signal is removed.
Flasher — Responds to a 15 ms. pulse of modulation and remains on for about 1/5 second.
CIRCUITS:
Meter — (1) Direct coupled amplifier responds correctly to non-symmetrical modulation wave form.
(2) High speed meter circuit.
(3) Self-calibration without external equipment.
Flasher — (1) Direct coupled flasher shows accurately negative peaks of modulation regardless of waveform.
(2) Flasher uses a D.C. plate supply, causing *all* over-modulation peaks to be indicated.
(3) Self-calibration.
DETECTOR LINEARITY: Negative peak clipping in the detector is negligible for frequencies up to 7500 cps and does not exceed 5% at 15 kc and 100% modulation.
MONITORING OUTPUT: When feeding a 600 ohm unbalanced line:
Level — 20 dbm at 100% modulation.
Response — ±0.2 db from 50 to 15,000 cycles with 100 cycle reference.
Distortion — Less than 0.25% from 20-15,000 cycles, (not including detector distortion).
Noise — At least 65 db below maximum output of 20 dbm.
POWER SUPPLY: 105 to 125 V. (or 115 to 135 V.) 50/60 cycles power consumption is 100 watts.
AUXILIARY OUTPUTS: Connections at the rear of the instrument for an external meter or external negative peaks lamp.
TUBES: (1) G234/5AR4 (type 5R4-G7 and 5V4G are directly interchangeable). (1) 6080, (1) 5879, (6) OA2, (2) CB2, (1) 2021, (1) OC2, (1) 12AX7, (1) 5687, (1) 12AU7, (1) 8.4.
MOUNTING: Rack mounted 19″ x 8¾″ panel, 11½″ depth behind panel.
WEIGHT: 27 lbs.

ORDERING INFORMATION

Modulation monitor, complete with tubes M-5774
100% set of spare tubes TK-346
Remote meter panel M-5836B

ACCESSORY EQUIPMENT

PHASE MONITOR

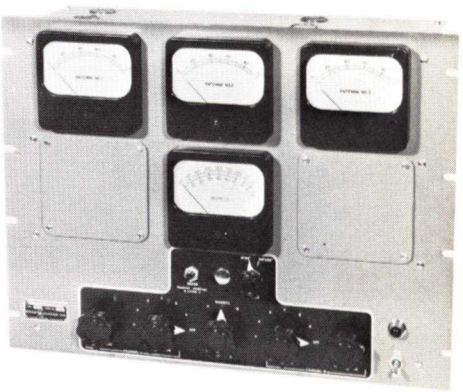
Recognized as the finest phase meter built today. Available in standard models up to 4 towers. Special designs above 4 towers readily available. The Clarke 108 phase meter comes with remote antenna current meters and is unaffected by modulation. Operation has been simplified. Two selector switches are set to elements to be compared and the outputs of the amplifiers are adjusted to a red line on the meters. By a flip of a switch, the phase difference is indicated.

SPECIFICATIONS

FREQUENCY RANGE: 100 Kc to 2000 Kc (as ordered).
PHASE ANGLE RANGE: 0-360 degrees.
MONITORING ACCURACY: 1 degree.
RESOLUTION: ½ degree.
RF INPUT IMPEDANCE: 50 or 70 ohms (as ordered).
RF VOLTAGE RANGE: 1-7 volts.
SIZE: 14″ high, 19″ wide, 7″ deep.
POWER: 115 volts, 50/60 cycles, 80 watts.
TUBES: (2) 6AU6, (2) OB3, (3) 6AL5, (1) 5Y3.

ORDERING DATA

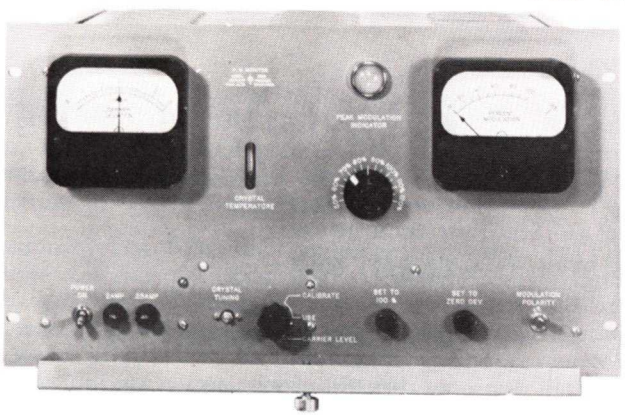
Two Towers ..... Model 108D
Three Towers ..... Model 108E
Four Towers ..... Model 108F



Model 108 (more than four towers) ..... on request

When Ordering: State carrier frequency, remote meter ranges, type of sampling line or impedance and carrier power.

FM MONITOR



Made by Hewlett-Packard and FCC approved for measuring frequency and modulation percentage of standard FM broadcasting stations with ±75 Kc swing. No adjustments necessary during operation and is not necessary to re-set carrier level or realign circuits. Electronic counter circuits are unusually stable—require no adjustment except at long intervals. Very popular and used in scores of laboratories. Be sure to state freguency when ordering. Panel size: 10½″ x 19″, for 115 volts, 50/60 cycles.

FM Monitor 335BR

FIELD INTENSITY METER

The Clarke 120D (formerly WX-2D) field meter is for measurement of radio signal intensity in the broadcast band between 540-1600 Kc. Sensitivity from 10 microvolts to 10 volts per meter, makes it equally effective for interference studies and close in measurements of high power directional arrays. — For measurements of any directional system or signal intensity, this test instrument is indispensable. — The 120D meter is battery operated, weighs only 12½ lbs. and is direct reading.

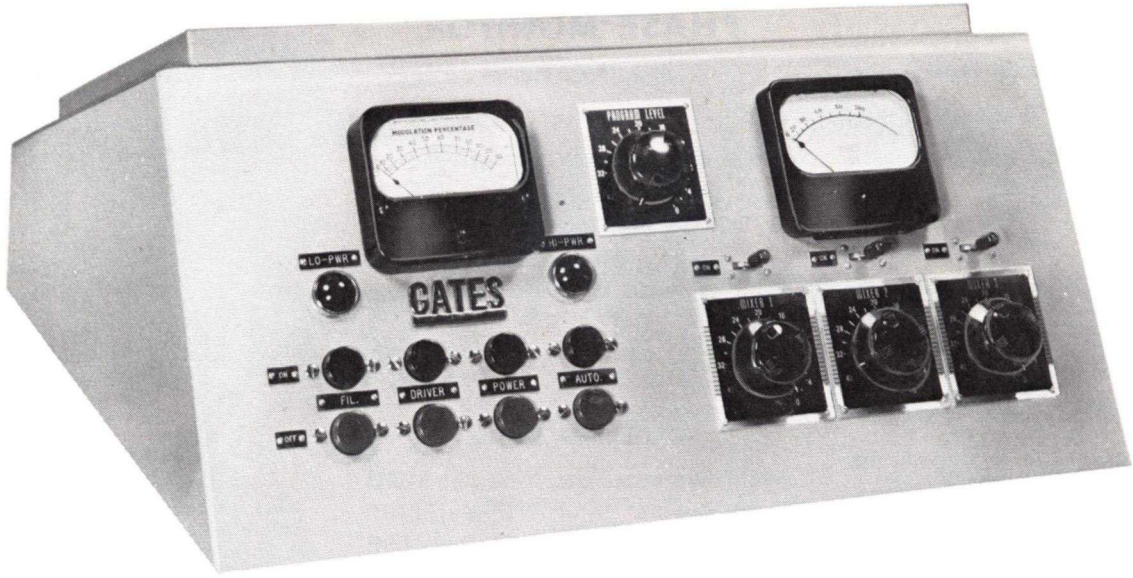
SPECIFICATIONS

FREQUENCY RANGE: 540-1600 Kc.
FIELD INTENSITY RANGE: 10 microvolts to 10 volts per meter.
ACCURACY OF ATTENUATORS: 2%.
OUTPUT INDICATORS: Panel meter, direct reading, with logarithmic scale graduated 1 to 10 and HAVING NO ZERO MARK (needle is OFF SCALE when meter is not energized). Provision for using recorder, and headphones.
ANTENNA: Shielded unbalanced loop.
BATTERIES: Five 1½ volt A. Two 67½ volt B.
BATTERY LIFE: Approximately 500 indications.
TUBES: (4) 1T4, (2) 1R5.
SIZE: 9″ high, 13″ wide, 5¾″ deep (closed).
WEIGHT: 12½ lbs.

Field Meter, less batteries ..... Model 120D

NOTE: As standard batteries are employed, it is recommended that batteries be procured locally as needed.

TRANSMITTER CONTROL CONSOLE



For use with any standard or short wave broadcast transmitter to provide several input circuits, extension audio indicating meters, remote start/stop functions and associated indicator lamps. Functional diagram at bottom of page outlines generous facilities available. Where desk is desired, see Index (Desks).

SPECIFICATIONS

INPUTS: Three provided with line isolation transformer for each circuit, 50/150/600 ohms ladder type controls, 20 steps, 2 db each.

OUTPUT: 600 ohms.

MASTER GAIN: Balanced 30 steps, 1.5 db per step.

VU METER: 4″ square case with range control + 4 to + 40 VU in two VU steps for bridging 600 ohm line. Scale illuminated.

MODULATION METER: 4″ square case illuminated.

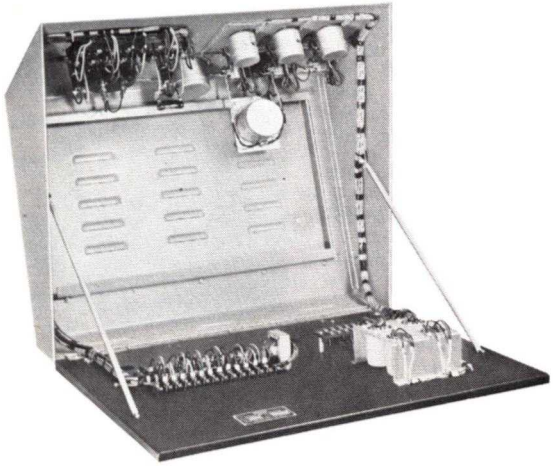
PUSH BUTTONS: Four pairs provided (black start-red stop) to cover all possible combinations including automatic reset as featured in many Gates models.

PILOT LIGHTS: Provided to indicate filament and plate on.

FINISH: Medium hand rubbed gloss gray with escutcheons in black.

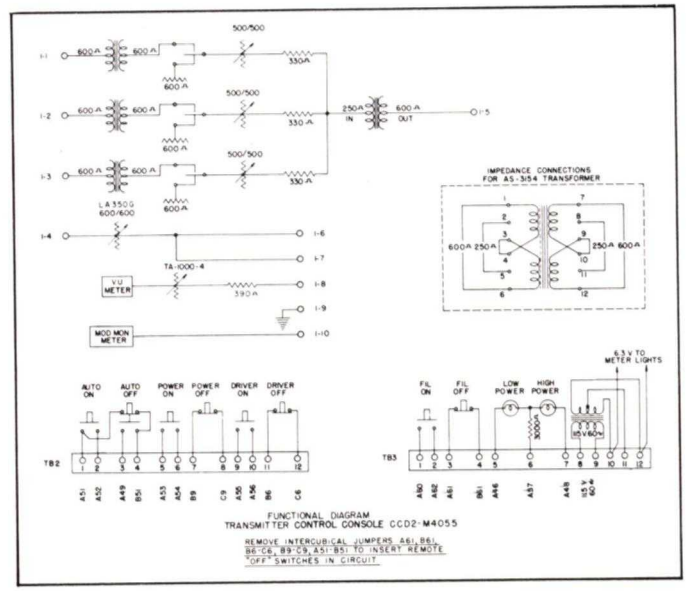
SIZE: 24″ wide, 10″ high, 21½″ deep. Cabinet swings up from base for servicing. See illustration below.

SHIPPING WEIGHT: 60 lbs.



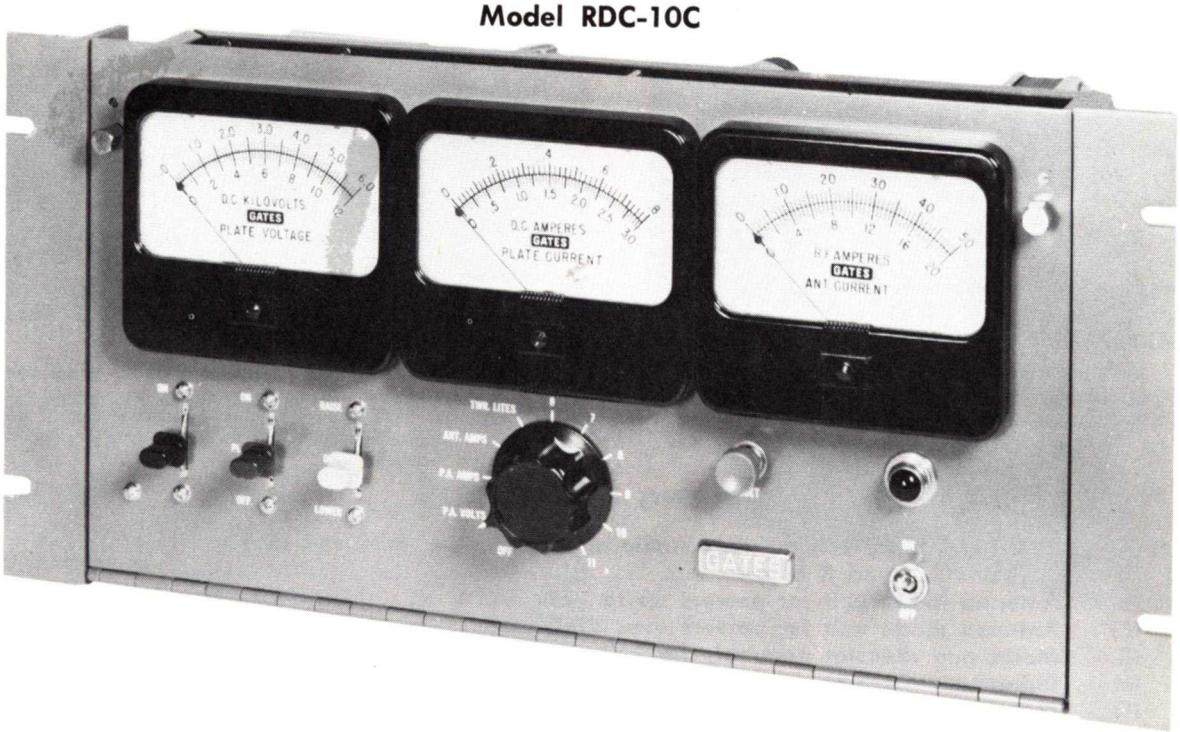
ORDERING INFORMATION

Model CCD2, Speech Input Console ready to install M4055



REMOTE CONTROL SYSTEM

Model RDC-10C



Metering: Three 4" large scale meters calibrated in; (a) DC plate volts, (b) DC plate current, and (c) RF amperes. Plate voltage and plate current sampling units for transmitter installation, are supplied (see Ordering Information for list of items supplied).

Functions: The RDC-10C equipment provides; (a) 10 possible metering positions, (b) 23 possible control functions, (c) relay switching of both filament and plate and meets full Conelrad requirements, (d) constant voltage source is provided for line checking, and (e) metering positions are rotary switch selected, requiring no dialing. Fail-safe protection is provided on the filament control circuit. Up to 18 added switching functions may be handled by the choice of many accessories listed in this catalog, gladly supplied on request.

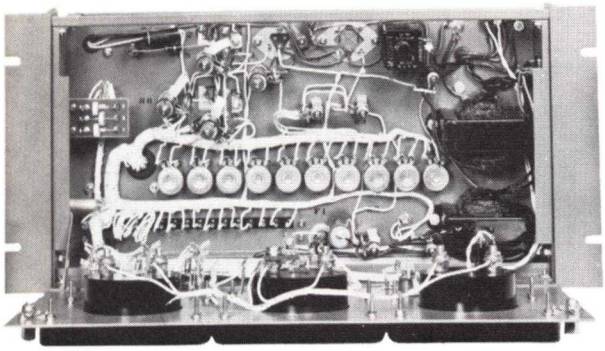
Installation: To install the RDC-10C equipment usually requires an evening's work. In some transmitters, perhaps a little longer. The studio unit may be rack, desk or wall mounted. The panel size is 8¾" x 19" and power supply is self-contained. The transmitter unit is also 8¾" x 19" and is usually mounted in the rack cabinet associated with the transmitter. At the transmitter, the plate current and plate voltage extension units for remoting these FCC required meters are connected in the meter circuit with a pair from each extension unit, returned to the RDC-10C transmitter unit. In transmitters of 1000 watts power or less, the motor tuned plate rheostat is installed in the transmitter in series with existing rheostat in the transmitter and also connected to the RDC-10C transmitter unit. For remote antenna current reading, a diode rectifier is used and supplied with some models (see Ordering Information). The tower light indicator is a small current transformer and remotes back to one of the meters at the studio unit, indicating On-Off and pulses in beacon flashing, as well as the steady current of the obstruction lights. Two telephone lines are used between studios and transmitter. However, one of these lines may be used for order telephone service also.

Remote Monitoring: Several Gates accessories are available for remote monitoring. These are either extension meters for the frequency and modulation monitors or a radio frequency amplifier for air pickup of the monitors which would then be installed at the studios. These accessories are all listed in the catalog. Gates will gladly assist in the selection of proper accessories by your advising us of the type monitors.

General Engineering Information: The RDC-10C system is a DC system and does not employ tubes or transistors. Solid state rectifiers are used for DC circuits. Design is based on a maximum telephone line loop resistance of 3000 ohms, or based on 96 ohms resistance (maximum) per mile, the RDC-10C system may be used on good lines up to 30 miles. However, where the entire length of the telephone line is in cable, i.e., many lines in one cable, wherein capacity would increase, the maximum length is about 20 miles. As the usual line from studio to transmitter is much shorter, this is unimportant. The stepping relay, heart of the system, is a well-known telephone type used in dial systems and has gold plated contacts for trouble-free operation. The hinged down front panels for servicing of both transmitter and studio units will be appreciated by the engineer. Power source is 115 volts, 50/60 cycles. The RDC-10C system is FCC approved.

Directional Operation: For directional operation, the RDC-10C system will serve equally well. For the complex directional system, Gates has a Model RDC-200A.

RDC-10C REMOTE CONTROL SYSTEM



Studio unit has drop-down front panel so all parts can be reached from front of rack. Panel size of 8¾" x 19" conserves badly needed rack panel space.

The transmitter unit is absent of front panel controls, has drop-down front panel to service and only requires 8¾" x 19" panel space. Small size even allows mounting in some transmitters where room prevails.

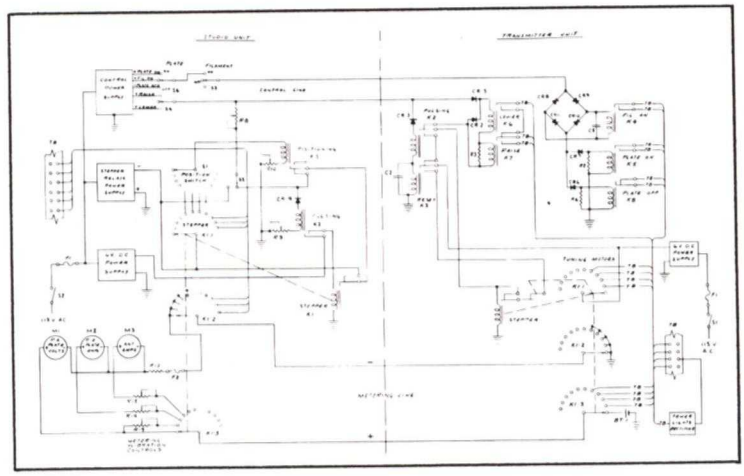
ORDERING INFORMATION

(A)	RDC-10AC basic unit includes studio and transmitter units and also Items I, J and K below	M-5862
(B)	Antenna diode unit for powers up to 1250 watts	M-3759
(C)	Antenna diode unit for powers over 1250 watts	M-2765B
(D)	Motor and rheostat assembly for 250 watt transmitter	M-4703A
(E)	Motor and rheostat assembly for 500 watt transmitter	M-4703B
(F)	Motor and rheostat assembly for 1000 watt transmitter	M-4703C
(G)	Motor assembly for tuning variable connector or coil for power adjustment of 5KW or 10KW transmitters in output coupling circuit (must be used with H below)	M-5066
(H)	Relay assembly to control M-5066 motor	M-4806
(I)	Plate current unit, extends plate current reading	M-4720A
(J)	Plate voltage unit, extends plate current reading	M-4719A
(K)	Tower light indicator	M-5254

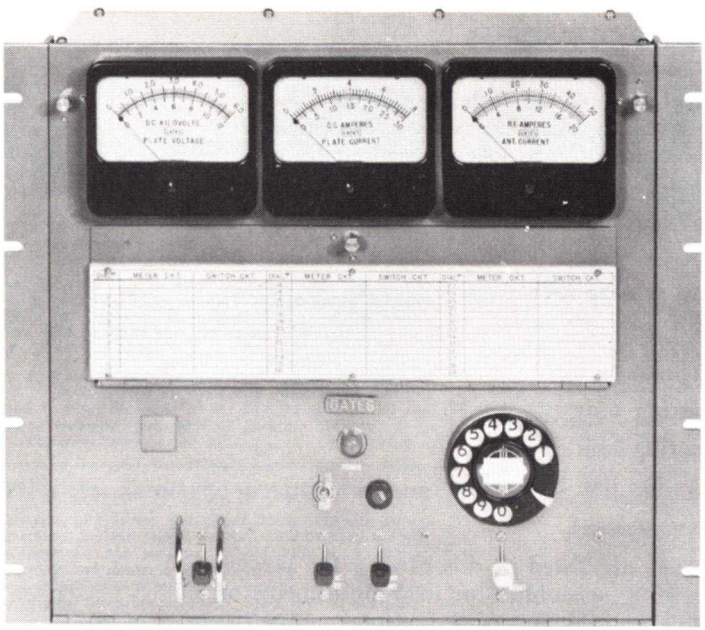
COMPLETE PACKAGES:

RDC-10C complete system for 250 watts includes A, B and D above	M-5876
RDC-10C complete system for 500 watts includes A, B and E above	M-5877
RDC-10C complete system for 1000 watts includes A, B and F above	M-5878

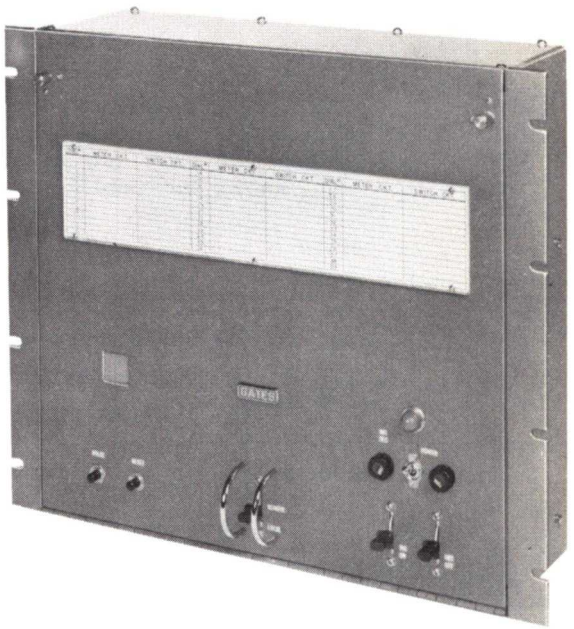
WHEN ORDERING: Please give as much detail as possible such as make of transmitter, size of present plate rheostat in ohms and watts and any helpful peculiar information. For higher powers, order by item and not packages. See catalog index for other accessories fo both AM and FM.



RDC-200A DELUXE REMOTE CONTROL SYSTEM



Studio Unit



Transmitter Unit

This system will handle the complicated directional system of several transmitters or the utmost in dependability for any transmitter power up to 50,000 watts.

Model RDC-200A is an advanced design of a DC operating system. Simplex, phantom or natural ground returns are eliminated in favor of a straight wire return. Two wire pairs are the maximum requirement for any requirement of one or several transmitters, directional operation and tower light indication. With this system, wire lengths of as much as 60 miles provide no problem.

Highest current drain of any switching function in 6 MA, making the system almost impervious to line resistance change. These additional features will be of interest:

1. A total of 39 metering positions — 9 for internal metering (calibrated), plus calibrate position, 9 more for external metering (calibrated) and 19 external meters (not calibrated) for "off-on" indications. (These may be calibrated with internal or external potentiometers.) 1 meter for power light indication is also provided.
2. As wired, provides 78 switching circuits.
3. All DC control circuits. Operates through maximum loop resistance of 5000 ohms. Based on resistance of smallest underground cable, would equal 52 miles.
4. All necessary equipment for one transmitter is standard equipment. Includes: (a) plate current metering unit, (b) plate voltage metering unit, (c) plate voltage on-off relays, and (d) tower light indicator with current transformer. Diode unit for antenna current should be ordered separately.

STUDIO UNIT

5. Three 4" wide scale meters calibrated in plate volts, plate current and RF amperes. Pick the meter with the most appropriate scale for any other readings. 100 microampere meters used throughout.
6. 100% front panel accessibility via drop-down front panel. Panel size: 19" x 15¾".
7. Function dialed indicated by illuminated number on front panel. Chart on front panel permits instant number to function observation for checking.

TRANSMITTER UNIT

8. Same light indication on transmitter unit, with chart as in Par. 8 above.
9. Through a combination of sensitive relays, polarizing diodes and biasing, positive control is insured at low current drain. Husky slave relays provide the necessary contact rating for external switching circuits.
10. Pulse, reset and all switching functions can be controlled from transmitter for local operation.
11. Complete front of rack accessibility through drop-down-to-service feature. Panel size: 19" x 15¾".

All of the standard demands of complete remote control equipment will be found in the Gates RDC-200A meeting FCC requirements including fail safe. Transmitter and studio units have self-contained power supplies and are independent operating units.

RDC-200A DELUXE REMOTE CONTROL SYSTEM

REMOTE CONTROL ACCESSORIES

With RDC-200A the only special applications would be with the type and amount of accessory equipment. Where an extra special application is required, Gates will be happy to place into action the manufacture of this special need in its model shop, known for speed.

What is Supplied:

As standard equipment, the following is supplied:

(a) Studio remote control unit

(b) Transmitter remote control unit

(c) M-4719A plate voltage metering unit

(d) M-4720A plate current metering unit

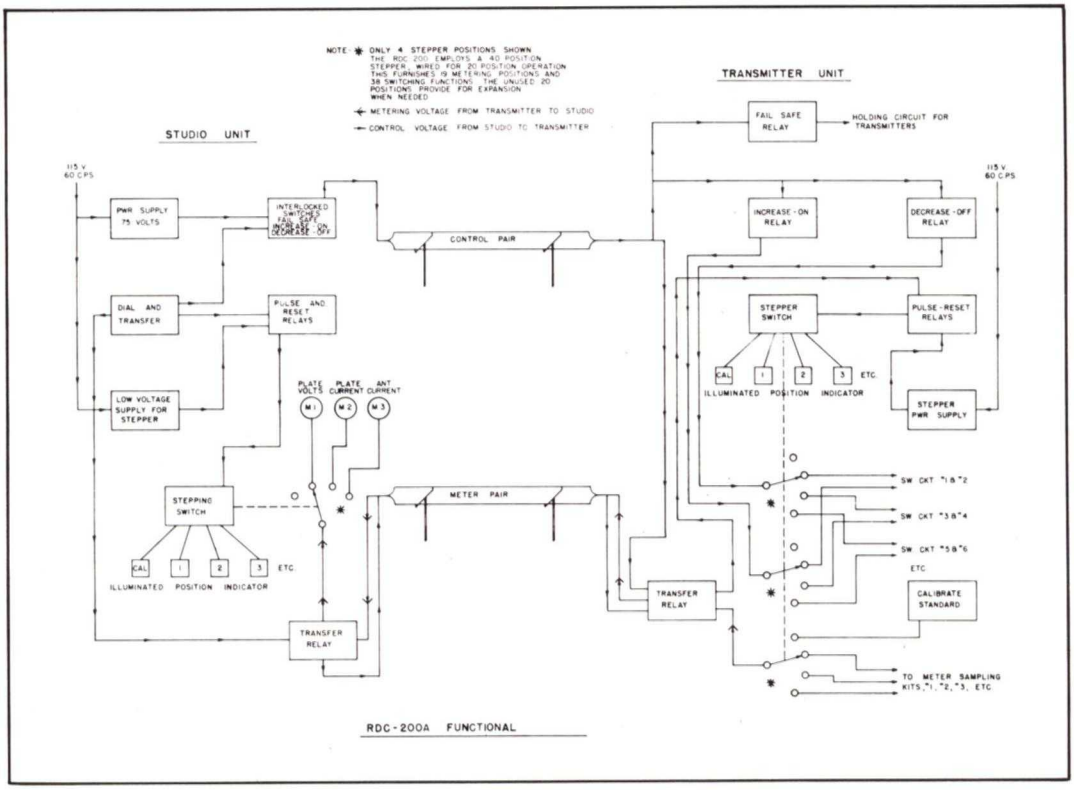
(e) Inbuilt plate start-stop relays for one transmitter

(f) Tower light indicator

NOTE: Motor tuned plate voltage rheostats are listed in this catalog for powers up to 1 KW along with motor tuning assemblies for load adjustments of higher power transmitters. There are optional accessories for your particular need and should be ordered for the complete system. Where more than one transmitter is to be remote controlled, the M-5249 momentary control or M-5248 latching (hold type) control is employed.

ORDERING INFORMATION

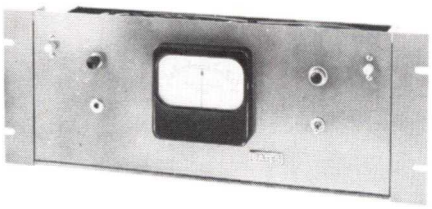
Complete deluxe remote control system RDC-200A
Extra tower light indicators (for multiple towers) M-5145



RDC-200A FUNCTIONAL

ACCESSORIES FOR REMOTE CONTROL

FREQUENCY MONITOR EXTENSION METERS



Used for extending Gates M-2890 monitors. Has 4″ frequency indicating meter reading 30-0-30 cycles. Includes resistor pad for sampling voltage. Tubes: 6AW6, 6AQ5, 6AL5, 6X4 and OA2. For 115 volts, 50/60 cycles.
Size: 7″x19″x7″ deep.

Frequency monitor extension unit M-5270
FOR M-4990 FREQUENCY MONITOR
Meter is exact duplicate of the M-4990 monitor for extending frequency indication to studios.
Extension meter M-5631

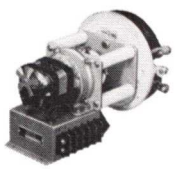
NEW M-5936 AUTOMATIC SEQUENCE SWITCHER

This new unit is for use where station changes power, directional antenna pattern or both. One press of the button performs one function — removing plate voltage, switching, and restoring plate voltage on "off" or "lower" pulse from remote control unit. Another press will restore the original operating condition. These two functions can't be accomplished by continuous pressure on button and, therefore, foolproof switching is assured. Each complete cycle requires exactly one second. Switching cycle is positive since an opposite pulse is necessary to cause the second, or reverse, sequence.
VOLTAGE: 15 A.C. amps at 125, 250, 460 volts.
SIZE: Approximatly 12″ wide, 5″ deep, 7″ high.
WEIGHT: Approximately 10 lbs.
Automatic Sequence Switcher M-5936

RF AMPLIFIER M-5144A

Preferred method is to have frequency and modulation monitors at the studios. This unit picks up the off air signal, furnishes both modulated and unmodulated signal to Gates, GR or RCA frequency and modulation monitors. Includes audio output and carrier failure relay to operate external alarm. Power supply is self-contained. Supplied with complete antenna kit.

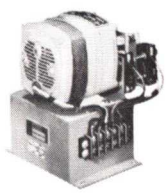
TUBES: (3) 6AU6, (2) 6BA6, (1) 1614, (1) 5V4G, (1) 6080, (1) OD3.
POWER: 115 volts, 50/60 cycles, 95 watts.
SIZE: 8¾″x19″x8″ deep. Finish: Gray.
RF Amplifier with tubes M-5144A



MOTOR OPERATED RHEOSTAT

Recommended for regulating the plate voltage in transmitters of 1 KW and less. Available in three sizes for 250, 500 and 1000 watt transmitters. Motor is one RPM and operates from 115 volts, 60 cycles.

Motor Rheostat for 250 watts M-4703A
Motor Rheostat for 500 watts M-4703B
Motor Rheostat for 1 kw M-4703C



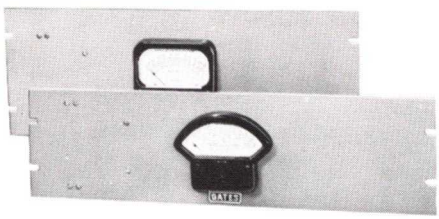
TUNING MOTOR

This unit for tuning variable inductor, capacitor or other controls, has inbuilt limit switches. Five wire reversible motor 1 RPM. Requires M-5806 relay assembly for control. 115 volts, 50/60 cycles.
Tuning Motor M-5066

TOWER LIGHT UNIT

This unit is used to provide a DC voltage for indication of proper tower light operation. Includes current transformer.
Tower Light Metering Kit M-5145

MONITOR EXTENSION METERS

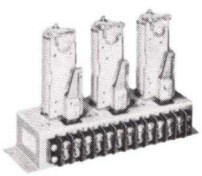


Several types available as listed below for extending both frequency and modulation monitors. Mounted on standard 19″ rack panel 5¼″ high.
Remote meter and panel for Gates M-4990 frequency monitor M-5631
Remote meter for extending Gates M-5693 modulation monitor M-5837
For extending Gates MO-2639 modulation monitor M-5210
For GR1931A or RCA WM43A monitors M-5206
For GR1181A or RCA WF48A monitors M-5208
For RCA 66 Series monitors M-5207
For RCA 311A monitor M-5209

ANTENNA DIODE UNIT

The antenna diode unit is designed to provide remote metering of antenna current. A DC voltage proportional to the antenna current is returned to the studio unit via the metering line and measured on the directly calibrated antenna current meter. The unit pictured is the M-3759 for use with powers of 1 kw and under. A similar unit, the M-2765B is available for powers in excess of 1 kw. Tube: one type 6H6. Power requirements: 115 volts, 60 cycles.
Diode 1 kw or less M-3759
Diode 5 kw or more M-2765B

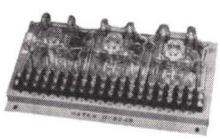
RELAY ASSEMBLY



For controlling motors. Usually used where transmitters already incorporate tuning motors. Used with M-5066 tuning motor. As listed below, designed for control of one 3-wire motor or one 5-wire motor.

For 1 3-wire motor M-4801
For 1 5-wire motor M-4806

AUXILIARY RELAY ASSEMBLY



Auxiliary relay assembly to provide one on-off holding switching facility. These relays provide two sets of double throw double contacts rated at 8 amperes.

Auxiliary relay assembly M-5249
Same as above but latching (holding) type with 5 ampere contacts M-5248

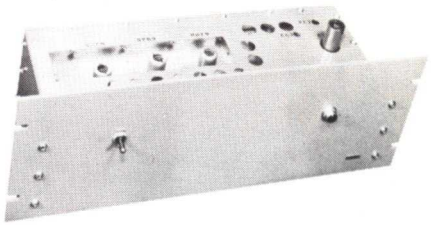
PLATE VOLTAGE UNIT

Supplied with all Gates Remote Control Systems. One unit is used with voltages up to and including 6000 volts. For higher voltages, additional units may be connected in series. Also available as an accessory item for metering additional stages or transmitters.
Plate Voltage Unit M-4719A

OUTPUT LOADING CONTROL KIT

Complete kit to control output loading of Gates BC-5P2 5 kw transmitter. It includes M-5066 and M-4806 relay and all necessary mounting hardware.
Output Loading Control Kit M-4848A

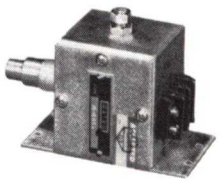
RF FM AMPLIFIER M-4791



Operates with any approved FM frequency/modulation monitor where the signal is taken off the air and monitor is at studio. Amplifier supplied fixed tuned to your frequency. Power supply is not supplied. Requires 300 volts DC at 100 MA and 6.3 volts AC at 3 amperes.

SIZE: 7″x19″x8″ deep.
TUBES: 6AK5, 6BA6, 6AH6, 2E26, OA2.
RF FM Amplifier with tubes M-4791

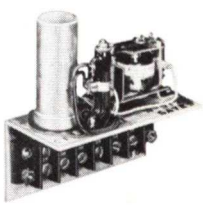
FM OUTPUT INDICATOR



Designed to sample the 51.5 ohm transmission line of an FM transmitter for measuring transmitter output as required by FCC. Provides a DC voltage which is measured on the studio unit metering system.

FM Output Indicator M-4845

OVERLOAD RELAY



Replaces circuit breakers in current or older models as circuit breakers are usually undependable for remote control. Tripping current adjustable. Inserted in cathode circuit of RF power amplifier. Some engineers prefer an additional unit in modulator circuit.
Overload Relay....M-5129

AC RECTIFIER

Rectifies the AC voltage, either line or filament, at the transmitter and feeds back DC to studio unit for measuring AC by remote control.
AC Voltage Unit M-4825

PLATE CURRENT UNIT

Included with the Gates Remote Control System. Furnishes a sample of plate current which is returned to the studio unit and measured on the directly calibrated plate current meter. The unit is provided with a high voltage fuse for personnel and line protection, and can be used for current ranges of .8 ampere and 3 amperes. Can be used with unit furnished with equipment when extended range is necessary.
Plate Current Unit M-4720A

TUNING MOTOR ASSEMBLY

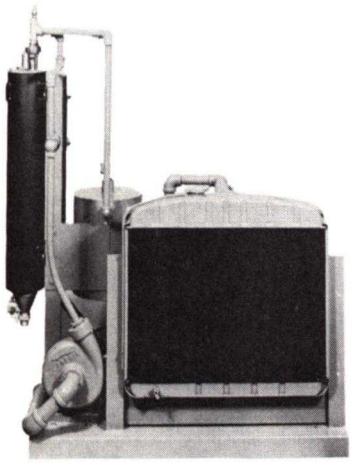
For operating rheostat, variable condenser, or any variable control. Three wire reversible motor 1 RPM. Torque 15 lb. inches. 115 volts, 50/60 cycles.
Tuning Motor M-4800

SPECIAL EQUIPMENT FOR REMOTE CONTROL

Gates has made every effort to provide a complete line of equipment for unattended operation. It is recognized that unusual situations may demand special accessories. Gates engineers will happily work with our customers on any special application.

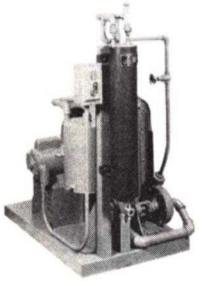
DUMMY ANTENNAS

VHF 5KW DUMMY ANTENNA
(heat exchanger)



Self-contained, water cooled 5KW antenna to operate up to 5KW power and up to 500 Mc. Impedance 51 ohms. Consists of 1 HP electric motor driven pump and fan which cools water circulating through radiator to dummy antenna. Overflow reservoir provided. For testing high frequency transmitter in VHF and UHF bands. Has direct reading power indicating watt meter.

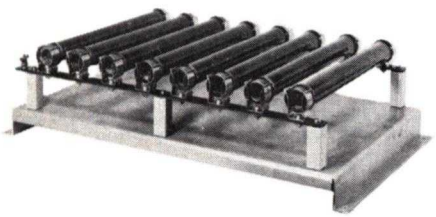
SIZE: 25″ wide, 39½″ deep, 36″ high.
POWER: 5KW continuous at 500 Mc (half rating if AM modulated).
RADIATOR: 18 quarts water or approved anti-freeze.
COOLING: 900 BTU.



VHF Dummy Antenna M-5508

NOTE: Other higher power rating heat exchangers are available on special order. Prompt quotations on receipt of (a) power rating, (b) impedance, and (c) frequency of operation.

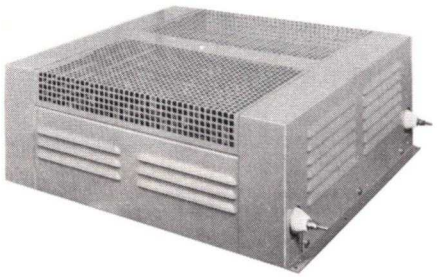
AIR COOLED 1KW DUMMY ANTENNA



This unit may be used for any transmitter between 200 Kc and 6 Mc at a maximum power rating of 1KW, 100% modulated. Consists of non-inductive resistors heavily banded together to arrive at correct load resistance. Size 20¼″ x 12⅝″ x 5″ high.

Dummy Antenna, 51 ohms DU-151
Dummy Antenna, 70 ohms DU-170

AIR COOLED 5KW DUMMY ANTENNA



Though designed primarily as a dummy antenna for testing 5KW broadcast transmitters, this unit may be used between 200 Kc and 6 Mc with excellent results. Includes series of wire-wound non-inductive resistance elements. Power rating based on 100% modulation at 5KW. Fully housed as illustrated. Size: 27½″ x 26″ x 10¼″ high.

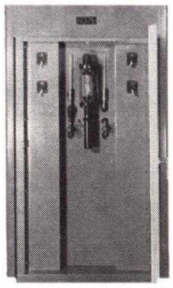
Dummy Antenna, 51 ohms DU-551
Dummy Antenna, 70 ohms DU-570

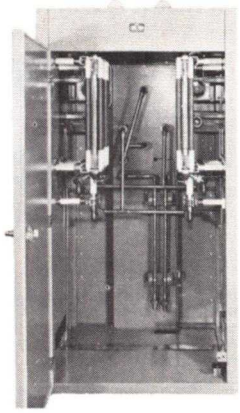
50KW AIR COOLED DUMMY ANTENNA

To eliminate water cooling at higher powers, Gates has developed this new air cooled unit for use between 540 and 2000 Kc. As dummy antennas are required in various resistances and loading requirements, this product is carried as a custom item. Gates will quote promptly on receipt of (a) resistance or impedance, (b) distance of dummy antenna from transmitter output, (c) frequency of operation, and (d) cooling facilities, if any. Unit pictured above illustrates the grouping of resistance elements and an aluminum frame. This frame is then installed in a forced air chamber, usually a metal duct with proper size blower attached at one end. In 50KW transmitters with external blower, such as the Gates BC-50B transmitter, the dummy may be mounted in the air duct itself.

A power rating of 75KW permits 100% modulation of 50KW transmitters under proper cooling conditions.

WATER COOLED DUMMY ANTENNAS





Available in 25KW and 50KW designs for broadcast and high frequency service. Ratings are at 100% amplitude modulation and 50% may be added where unmodulated. — High frequency models are provided with variable coil and variable capacitor elements for tuning out reactance. Medium frequency models are straight resistance elements.

Paralleled wire resistance elements are precision supported in a water-tight glass enclosure around which filtered water is evenly distributed. Dual thermometers measure water temperature in and out and the differential is measured in power.

SPECIFICATIONS

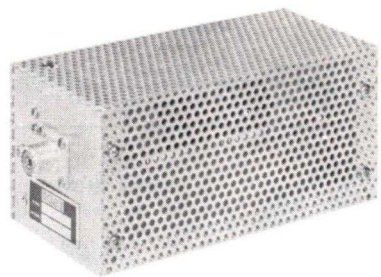
WATER FLOW: (50KW) 15 gal. per min.
(25KW) 12 gal. per min.
LOAD RESISTANCE: Available in 50, 70, 150, 300 and 600 ohms, as ordered. High frequency models available 300 and 600 ohms only.
SIZE: 78″ high, 42″ wide, 48½″ deep.

ORDERING INFORMATION

25KW model, 540-1600 Kc M-4750A
25KW model, 2-25 Mc M-4750
50KW model, 540-1600 Kc M-5497
50KW model, 2-25 Mc M-5497A

Above models built to order. Be sure and state power rating and frequency when ordering.

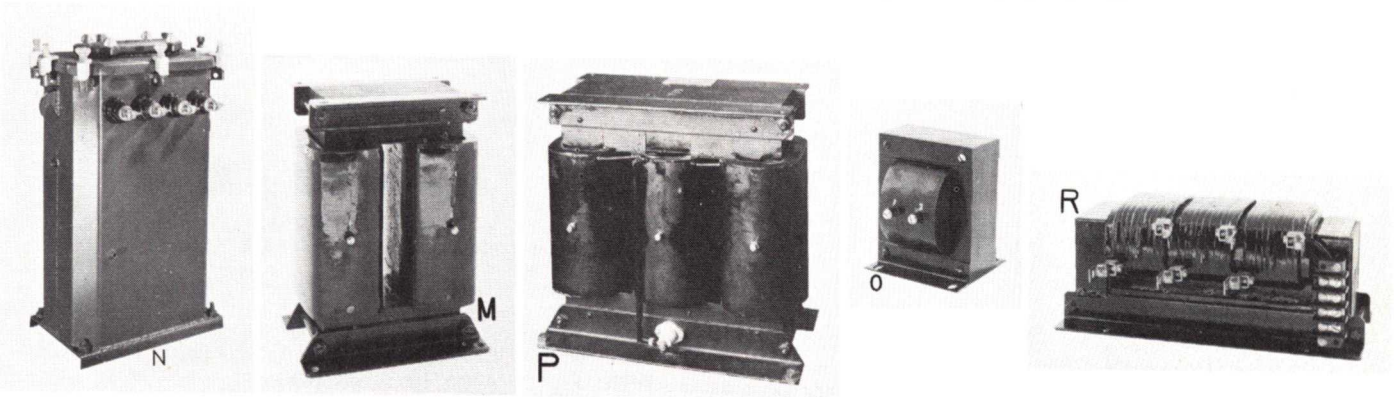
VHF 10-WATT DUMMY



Designed for measuring BF-E-10B transmitter, listed on Page 56. Power rating 10 watts at 50-250 Mc. Has Type N connector for attaching RG-8U cable. Ideal for measuring low powered VHF transmitters including many types of police transmitters, etc. Impedance 50 ohms.

VHF Dummy Antenna M-5645

TRANSFORMERS FOR BROADCASTING



These quality transformers are for radio broadcasting, communications and in many instances, television transmitters are regularly carried in stock and are of such specialized design they will not be found elsewhere. If you are modernizing, building your own or need a replacement transformer, you need not wait for it to be specially built as the Gates stock is in most cases immediately available.

Transformers for 250 Watts

MODULATION TRANSFORMER: Primary for PP Class B, 810 tubes. Secondary 4000 ohms no current in Sec. Response 30-10,000 cycles ±1 db. Fully cased. 7¼" high, 6⅛" wide, 5¼" deep BM-1

MODULATION REACTOR: For use with modulation, transformer BM-1 above. Inductance 65 hy. Current 250 MA ±1 db, 30-10,000 cycle response. Fully cased. Size matches BM-1. .... BR-1

DRIVER TRANSFORMER: Primary PP 6L6, 1622, etc. Secondary Class B, 810 tube grids. Chassis mounting, fully cased. Response ±1 db, 30-10,000 cycles. BD-1

POWER TRANSFORMER: Primary 215/230/245 volts, 50/60 cycles. Secondary 1700-0-1700 volts at .6 amperes continuous duty 3% regulation under Class B modulation. Case Style M. AP-7235

SWINGING CHOKE: 5-25 hy. at 500 MA. 52 ohms resistance. 7000V insulation. Round case, base terminals. CG-109

SMOOTHING CHOKE: 25 hy. at 300 MA. 90 ohms resistance. 5000V insulation. Round case, base terminals. CG-105

Transformers for 500 Watts

MODULATION TRANSFORMER: Primary for PP Class B, 833A tubes. Secondary 6400 ohms no current in Sec. Response ±1 db, 30-10,000 cycles. Case Style M. AM-30613

MODULATION REACTOR: For use with above modulation transformer. 50 hy. at 350 MA. 225 ohms resistance. ±1 db, 30-10,000 cycles. Case Style M. AC-10650

DRIVER TRANSFORMER: For PP 845 tubes or similar Class A to PP 833A Class B grids. ±1 db, 30-10,000 cycles. Chassis mount. AS-3172C

POWER TRANSFORMER: Primary 230 volts, 50/60 cycles. Secondary 2335-0-2335 volts at 0.46 amperes continuous duty to deliver 2000 volts at 650 MA choke input.
Case Style M. AP-12001E

SWINGING CHOKE: 5-25 hy. at 500 MA. 52 ohms resistance. 7000V insulation. Round case, base terminals. CG-109

SMOOTHING CHOKE: 25 hy. at 300 MA. 90 ohms resistance. 5000V insulation. Round case, base terminals. CG-105

Transformers for 1000 Watts

MODULATION TRANSFORMER: Primary for PP 833A in Class B. Secondary 4750 ohms no current in Sec. Also has a second tapped secondary to provide 2, 4 or 8 watts at 3000 ohms for modulating the RF driver stage, if desired. ±1 db, 30-10,000 cycles. Case Style M. AM-30469

MODULATION REACTOR: For use with AM30469 modulation transformer. Inductance 40 hy. Resistance 170 ohms. Current 600 MA. Response ±1 db. 30-10,000 cycles. Case Style M. AC-10465

DRIVER TRANSFORMER: For PP 845 tubes or similar in Class A to PP 833A tubes Class B. ±1 db, 30-10,000 cycles. Chassis mount. AS-3172C

POWER TRANSFORMER: Primary 230 volts, 50/60 cycles. Secondary 3100-0-3100 volts at 0.71 amperes to produce 2600 volts DC at 1 ampere when used with choke input filter. Case Style M. AP-10459E

SWINGING CHOKE: High inductance, high current type, 5-16 hy. at 1.5 amperes. Resistance 30 ohms. 10,000V insulation. Case Style M. AC-10458

SMOOTHING CHOKE: 2½ hy. at 700 MA. 20 ohms resistance. 10,000V insulation. Case Style O. AC-10457

Transformers for 5000 Watts

MODULATION TRANSFORMER: Primary for PP Class B 3X2500A3 or 3X2500F3 tubes. Secondary 3600 ohms. ±1 db, 30-10,000 cycles. Dry type. Case Style M. AM-7718E

MODULATION TRANSFORMER: Same specifications as AM-7718E above, only oil filled indoor or outdoor type in steel tank. Case Style N. AM-7718M

MODULATION REACTOR: 30 hy. at 1.4 amperes. Response ±1 db, 30-10,000 cycles. Insulation 15,000V. Dry type. Case Style M. Companion to modulation transformer AM-7718E. .. AC-7719E

MODULATION REACTOR: Oil filled type in steel tank for indoor or outdoor mounting. 52 hy. at 1.4 amperes. Case Style N. Companion to modulation transformer AM-7718M. AC-7719M

POWER TRANSFORMER: Primary 205/215/230 volts, 50/60 cycles, 3 phase delta. Secondary 2160 volts per leg Y connected. Supplies 5000 volts DC at 2.3 amperes when used with six 8008 or 872A rectifier tubes. Dry type. Case Style M. Companion to AM-7718E and AC-7719E. AP-8000E

POWER TRANSFORMER: Primary 230 volts, 50/60 cycles, 3 phase delta. Secondary 2160 volts per leg Y connected to deliver 5000 volts DC at 2.3 amperes when used with six 8008 or 872A rectifiers. Oil filled type in steel tank for indoor or outdoor mounting. Case Style N. Companion to AM-7718M and AC-7719M. AP-8000M

INPUT OR SMOOTHING CHOKE: 4 hy. at 1.5 amperes. 17 ohms resistance. 8000V insulation RMS. Case Style M.....AC-3143E

DRIVER TRANSFORMER: For PP parallel 845 tubes or similar Class A to PP 3X2500A3 or 3X2500F3 grids Class B. ±1 db, 30-10,000 cycles. Chassis mount. Balance windings for individual biasing of 3X2500 grids. AS-3172C

Tranformers for 10,000 Watts

MODULATION TRANSFORMER: Primary for PP 3X2500A3 or 3X2500F3 tubes Class B. Secondary 1780 ohms. ±1 db, 30-10,000 cycles. Dry type. Case Style M. AM-30643E

MODULATION TRANSFORMER: Same specifications as AM-30643E, only oil filled in steel tank for indoor or outdoor mounting. Case Style N. AM-32886

MODULATION REACTOR: 26 hy. at 2.8 amperes ±1 db, 30-10,000 cycles. Dry type. Case Style M. Companion to AM-30643E. AC-3168E

TRANSFORMERS FOR BROADCASTING

TRANSFORMERS (continued)

MODULATION REACTOR: Same as AC-3168E, only oil filled in steel tank for indoor or outdoor service. Case Style N. Companion to modulation transformer AM-3167M. AC-32887
DRIVER TRANSFORMER: For PP parallel 845 tubes or similar Class A to PP 3X2500A3 or 3X2500F3 grids Class B. ±1 db, 30-10,000 cycles. Chassis mount. Balanced windings for individual bias of 3X2500 tubes. AS-3172C
POWER TRANSFORMER: Primary 230 volts, 50/60 cycles, 3 phase delta. Secondary tapped to deliver 5000, 5250 or 5500 volts DC at 4.5 amperes when used with six 673 tubes Y connected. Dry type. Case Style P. Companion to AM-3167E and AC-3168E. AP-3090E
POWER TRANSFORMER: Same as above, only oil filled in steel tank for indoor and outdoor mounting. Case Style N. Companion for AM-3167M and AC-3168M. AP-3090M
INPUT OR SMOOTHING CHOKE: 2 hy. at 3 amperes. 6.4 ohms resistance. 18,000 volt insulation. Case Style M. in 10KW broadcast, 2 chokes are used as input chokes for RF and modulators. AC-3147E

Transformers for 20KW

MODULATION TRANSFORMER: Primary for four 3X3000A1 or 3X3000F1 tubes in PP parallel, impedance 5000 ohms plate to plate. Secondary 935 ohms to match Class C amplifier of four 3X2500A3 or 3X2500F3 tubes. ±1 db, 30-10,000 cycles. Oil filled indoor or outdoor type. Case Style N. Use with modulation reactor AC-8675M and driver transformer AS-8672E listed below. AM-8674M
MODULATION REACTOR: 14 hy. at 5.25 amperes. ±1 db, 30-10,000 cycles. Oil filled indoor or outdoor type. Case Style N. Use with AM-8674M modulation transformer and 8 mfd. coupling capacitor. AC-8675M
DRIVER TRANSFORMER: Primary two 845 tubes or similar in Class A. Secondary two windings for Class B grids of four 3X3000A1 or 3X3000F1 tubes in PP parallel. ±1 db, 30-10,000 cycles. Chassis mount. AS-8672E
POWER TRANSFORMER: Suggest separate power supplies for modulators and RF, using two Type AP-3090M power transformers as listed above under 10KW transformers.
FILTER REACTOR: 2 hy. at 5.3 amperes. Oil filled indoor or outdoor mounting. For 20KW two used for dual power supplies as suggested above under "Power Transformer." Case Style N. AC-8673M

Transformers for 50KW

MODULATION TRANSFORMER: Primary 3300 ohms plate to plate for two 5891 tubes, Class B, with 10.7 KV on plates. Secondary 1700 ohms. Oil filled in steel tank for indoor or outdoor service. ±2 db, 30-10,000 cycles. Case Style A. Size: 33″ wide, 42″ deep, 58″ high. AM-11788
MODULATION REACTOR: For use with AM-11788 above. 25 hy. at 6.5 amperes. 7600 volts RAS at 30 cycles. ±2 db, 30-10,000 cycles. Oil filled in steel case for indoor or outdoor mounting. Size: 40″ diameter. 56″ high. Case Style O. AC-11787
DRIVER TRANSFORMER: A cathode follower circuit is recommended for this service employing four type 833A driver tubes. Circuit information will be supplied to purchasers of AM-11788 and AC-11787 units where requested.
POWER TRANSFORMER: Primary 460 volts single phase, 50/60 cycles. 3 required for 3 phase delta primary and secondary. Primary has 2½% taps above and below 460V and tap for low power. Secondary 8300-4150 volts. When used with 3 phase full wave bridge rectifier, filter reactor AC-11786 below and six type 857B rectifier tube will deliver. 10,700 volts DC at 13 amperes. Case Style C. Oil filled indoor or outdoor mounting. Size: 27″ diameter, 56″ high. AP-11785M
FILTER REACTOR: 1 hy. at 13 amperes, 34,000 volt test insulation. Oil filled in steel tank for indoor or outdoor mounting. Case Style D. AC-11786

Filament Transformers

FOR SINGLE 3X2500A3 or 3X2500F3. Primary 215/230/245 volts, 50/60 cycles. Secondary 7.8 VCT 51 ampere. Case Style R. AF-7782E
FOR THREE 3X2500A3 or 3X2500F3. Primary 215/230/245 volts, 50/60 cycles. Three separate 7.8 VCT 51 ampere secondaries. Case Style R. AF-10434E
FOR 5891 TUBE IN 50KW SERVICE. Three required for 3 phase. Primary 230 volts, single phase, 50/60 cycles with ±2½% taps. Secondary 11 volts at 95 amperes. Primaries are delta connected and secondaries Y connected. Size: 6¼″ wide, 9⅝″ high, 7⅝″ deep. AF-11856E
FOR FOUR 833A OR SIMILAR TUBES. Primary 230 volts, 50/60 cycles. Secondary No. 1, 10 VCT at 10 amperes. Secondary No. 2, 10 VCT at 10 amperes. Secondary No. 3, 10 VCT at 20 amperes. Has heavy wire leads for direct connection to tube sockets. Case Style R. AF-30099E
RECTIFIER FILAMENT TRANSFORMER. Has 6 secondary windings 5 VCT at 10 amperes for 8008, 872A or 673 rectifier tubes. Primary 215/230/245 volts single phase, 50/60 cycles. Used as rectifier filament transformer in 5, 10 and 20KW transmitters. Insulation 15,000 volts. Case Style R. AF-10432E
RECTIFIER FILAMENT TRANSFORMER. Primary 230 volts, 50/60 cycles. Secondary 5.1 VCT at 15 amperes for two 8008 or 872A rectifier tubes. Insulation 10,000 volts. AF-10456K
RECTIFIER FILAMENT TRANSFORMER. For 857B rectifier filament as used in 50KW service. Primary 230 volts, 50/60 cycles with ±2½% taps. Secondary 5 volts at 33 amperes. Insulation all points 25,000 volts. Size: 6″ wide, 3⅞″ deep, 8″ high. AF-11857E

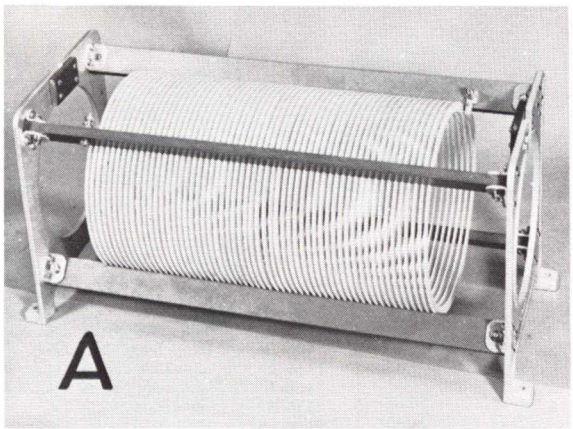
Audio Transformers

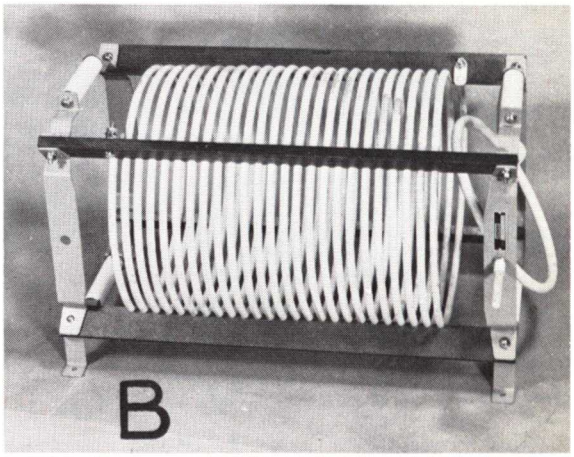
INPUT TRANSFORMERS: For transmitter input to low level audio stages. Handles +20 db input or less at low distortion. Quadruple shielding. Round case chassis mount. ±1 db, 30-15,000 cycles. Primary 125/250 or 500/600 ohms. Secondary for PP or single grid 120,000 ohms. AI-3002U
INPUT TRANSFORMER: Specifically designed for high quality preamplifier input. Triple shielding. Round case. Primary 50/150/250 ohms. Secondary to single 60,000 ohm grid. 1¾″ diameter and 1 5/16″ high. Maximum input level 0 db, ±½ db, 30-15,000 cycles. AI-10379T
INPUT TRANSFORMER: Identical to AI-10379T above, only primary 600 ohms. AI-10386T
OUTPUT TRANSFORMER: Preamplifier output transformer to match AI-10379T or AI-10386T input transformers. Primary 15,000 ohms, no DC in winding. Secondary 150/250 and 600 ohms. Excellent shielding. Size: 1″ diameter and 1 3/16″ high. ±½ db, 30-15,000 cycles. AO-10427T
OUTPUT TRANSFORMER: For program or remote amplifiers. Primary 10,000 ohms with up to 15 MA in winding. Secondary 150/250 and 600 ohms. Excellent shielding. Size: 2″ wide, 1¾″ deep, 2¾″ high. ±1 db, 30-15,000 cycles. AO-10864T
REPEATER TRANSFORMER: Line to line. Primary and secondary 50/125/250/500 and 600 ohms. Maximum level +16 db. Response 20-20,000 cycles ±1 db. Fully cased top or chassis mounting 114A

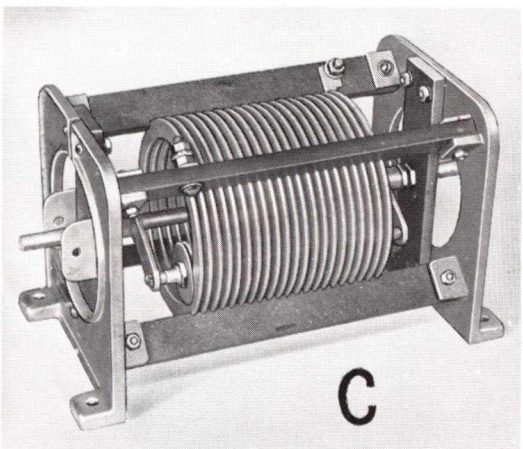
50,000 TRANSFORMERS

Listed on these pages is only a fraction of the huge transformer stock in the Gates stock rooms. If you have a breakdown, call the Gates service department first. If you need a special, it is likely Gates will have it. From the smallest ounce weight unit to 50 KW, be it audio, filter, power, equalizer, autoformer or filament transformers, the 50,000 transformer stock is the largest in the world geared to broadcaster and communications needs.

INDUCTORS, VARIABLE AND FIXED







Used in both Gates and many other makes of transmitters and phasing equipment. Variable coils have cast aluminum end bells with double gripping bearing wheels. All types are micalex insulated and silver plated and have the highest possible "Q's".

LEGEND:

FA— Fixed 1/4" edgewise, 10 amp. rating, Fig. A
FB— Fixed 3/8" edgewise, 15 amp. rating, Fig. A
FC— Fixed 1/2" edgewise, 20 amp. rating, Fig. A
FBT— Fixed 3/8" copper tubing, 30 amp. rating, Fig. B
FCT— Fixed 1/2" copper tubing, 40 amp. rating, Fig. B
VB— Variable 3/8" edgewise, 15 amp. rating, Fig. C
VC— Variable 1/2" edgewise, 20 amp. rating, Fig. C

Ind. uh	Length	Diam.	Cat. No.	Ind. uh	Length	Diam.	Cat. No.
87	12 1/16"	4"	87FA4634	17	8 3/4"	4"	17FC1654
6	5 15/16"	4"	6FBO854	24	8 3/4"	5"	24FC1655
10	5 15/16"	5"	10FBO855	32	8 3/4"	6"	32FC1656
13	5 15/16"	6"	13FBO856	42	12 5/8"	6"	42FC2266
18	8 3/4"	4"	18FB1754	67	13 1/16"	6"	67FC2856
26	8 3/4"	5"	26FB1755	78	16"	8"	78FC2568
35	8 3/4"	6"	35FB1756	10	12 1/2"	6"	10FBT1066
58	10 3/8"	5"	58FB2845	32	15"	8"	32FBT1658
78	10 3/8"	6"	78FB2846	45	18 1/2"	8"	45FBT2158
128	12 1/8"	5"	128FB4635	65	24 1/2"	9"	65FBT2559-C
6	6 1/4"	4"	6FC0854	17	14"	8"	17FCT1178
10	6 1/4"	5"	10FC0855	35	24 1/2"	9"	35FCT1779-C
13	6 1/4"	6"	13FC0856				

VARIABLE COILS

Ind. uh	Length	Diam.	Cat. No.	Ind. uh	Length	Diam.	Cat. No.
6	8"	4"	6VC0854	16	9 1/8"	4"	16VB1544
15	10 3/4"	4"	15VC1444	30	11 1/8"	4"	30VB2344
26	10 3/4"	4"	26VC2144	105	12 1/2"	5"	105VB3735

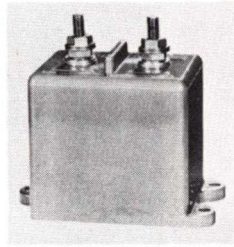
CLIPS

LC4	For 1/4" edgewise FA coils
LC6	For 3/8" edgewise FB coils
LC8	For 1/2" edgewise FC coils
RC6	For 3/8" tubing FBT coils
RC8	For 1/2" tubing FCT coils

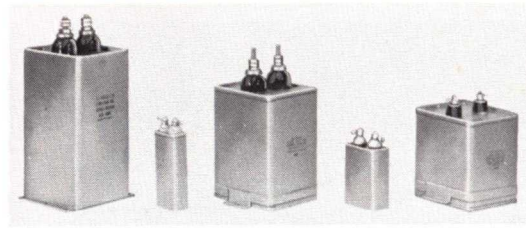
DIAL FOR VARIABLE COIL

M3401F	Veeder counter geared type, reads to 1/10 turn. 1/4" diam. shaft. Fig. D.
M5521	Veeder counter geared type, reads to 1/10" turn. 3/8" diam. shaft.

MICA AND FILTER CAPACITORS



TYPE F



Type G1

Catalog Number	Capacity Mfd.	Peak Wkg. Volts
G1-641	.00001	6000
G1-645	.00005	6000
G1-631	.0001	6000
G1-632	.0002	6000
G1-634	.0004	6000
G1-635	.0005	6000
G1-621	.001	6000
G1-6215	.0015	6000
G1-622	.002	6000
G1-623	.003	6000
G1-624	.004	6000
G1-625	.005	6000
G1-526	.006	5000
G1-511	.01	5000
G1-4115	.015	4000
G1-312	.02	3000

Type G2

G2-1031	.0001	10000
G2-10315	.00015	10000
G2-1032	.0002	10000
G2-10325	.00025	10000
G2-1035	.0005	10000
G2-1021	.001	10000
G2-10212	.0012	10000
G2-10215	.0015	10000
G2-1022	.002	10000
G2-823	.003	8000
G2-824	.004	8000
G2-525	.005	5000
G2-526	.006	5000
G2-511	.01	5000
G2-4115	.015	4000
G2-312	.02	3000

Type G3

G3-2045	.00005	20000
G3-2031	.0001	20000
G3-2032	.0002	20000
G3-20325	.00025	20000
G3-2033	.0003	20000
G3-2035	.0005	20000
G3-2038	.0008	20000
G3-2021	.001	20000
G3-15215	.0015	15000
G3-1522	.002	15000
G3-1523	.003	15000
G3-1524	.004	15000
G3-1025	.005	10000
G3-1026	.006	10000
G3-1028	.008	10000
G3-1011	.01	10000
G3-512	.02	5000
G3-313	.03	3000

Catalog Number	Capacity Mfd.	Peak Wkg. Volts

Type G4

G4-3043	.00003	30000
G4-3045	.00005	30000
G4-3031	.0001	30000
G4-30315	.00015	30000
G4-30325	.00025	30000
G4-3035	.0005	30000
G4-3038	.0008	30000
G4-3021	.001	30000
G4-25215	.0015	25000
G4-2022	.002	20000
G4-2023	.003	20000
G4-2024	.004	20000
G4-1525	.005	15000
G4-1526	.006	15000
G4-1228	.008	12000
G4-1011	.01	10000
G4-612	.02	6000
G4-514	.04	5000

Type G5

G5-5045	.00005	50000
G5-3531	.0001	35000
G5-35325	.00025	35000
G5-3534	.0004	35000
G5-3535	.0005	35000
G5-3521	.001	35000
G5-3022	.002	30000
G5-30225	.0025	30000
G5-3023	.003	30000
G5-2525	.005	25000
G5-2026	.006	20000
G5-1511	.01	15000

Type F1 Mica Capacitors

F1-341	.00001	3000
F1-345	.00005	3000
F1-331	.0001	3000
F1-3315	.00015	3000
F1-332	.0002	3000
F1-3325	.00025	3000
F1-333	.0003	3000
F1-334	.0004	3000
F1-335	.0005	3000
F1-336	.0006	3000
F1-3375	.00075	3000
F1-338	.0008	3000
F1-321	.001	3000
F1-3215	.0015	3000
F1-322	.002	3000
F1-3225	.0025	3000
F1-223	.003	3000
F1-224	.004	2000
F1-225	.005	2000
F1-226	.006	2000
F1-1528	.008	1500
F1-111	.01	1000
F1-112	.02	1000
F1-10215	.05	250
F1-0201	.1	250

Type F2 Mica Capacitors

F2-545	.00005	5000
F2-531	.0001	5000
F2-5315	.00015	5000
F2-532	.0002	5000
F2-5325	.00025	5000
F2-533	.0003	5000
F2-534	.0004	5000
F2-535	.0005	5000
F2-536	.0006	5000
F2-5375	.00075	5000
F2-538	.0008	5000
F2-521	.001	5000
F2-5215	.0015	5000
F2-522	.002	5000
F2-5225	.0025	5000
F2-523	.003	5000
F2-424	.004	4000
F2-325	.005	3000
F2-326	.006	3000
F2-328	.008	3000
F2-211	.01	2000
F2-2115	.015	2000
F2-212	.02	2000
F2-213	.03	2000
F2-1514	.04	1500
F2-1515	.05	1500
F2-0501	.1	500
F2-0202	.2	250
F2-02025	.25	250

Type F3 Mica Capacitors

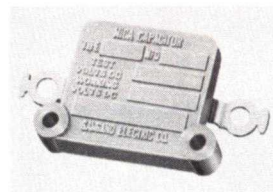
F3-8325	.00025	8000
F3-835	.0005	8000
F3-821	.001	8000
F3-822	.002	8000
F3-825	.005	8000
F3-811	.01	8000
F3-415	.05	4000
F3-201	.1	2000
F3-06025	.25	600
F3-0605	.5	600
F3-0610	1.0	600

Type E

Catalog Number	Capacity Mfd.	Test Volts D.C.
E-1245	.00005	12500
E-1231	.0001	12500
E-12325	.00025	12500
E-1235	.0005	12500
E-1221	.001	12500
E-12215	.0015	12500
E-1222	.002	12500
E-1023	.003	10000
E-1024	.004	10000
E-1025	.005	10000
E-721	.001	7000
E-722	.002	7000
E-723	.003	7000
E-711	.01	7000
E-3524	.004	3500
E-3525	.005	3500
E-3511	.01	3500
E-3512	.02	3500
E-3515	.05	3500
E-215	.05	2000
E-201	.1	2000

Type	Capacity
7106-2	2— 600 volts DC
7106-4	4— 600 volts DC
7106-8	8— 600 volts DC
7106-10	10— 600 volts DC
7110-2	2—1000 volts DC
7110-4	4—1000 volts DC
7110-8	8—1000 volts DC
7110-10	10—1000 volts DC
7120-2	2—2000 volts DC
7120-4	4—2000 volts DC
7120-8	8—2000 volts DC
7120-10	10—2000 volts DC
7130-2	2—3000 volts DC
7130-4	4—3000 volts DC
7130-8	8—3000 volts DC
7140-2	2—4000 volts DC
7140-4	4—4000 volts DC
7140-6	6—4000 volts DC
7150-2	2—5000 volts DC
7150-4	4—5000 volts DC
7160-1	1—6000 volts DC
7160-2	2—6000 volts DC
7175-1	1—7000 volts DC
7175-2	2—7000 volts DC
TK70040	4—7000 volts DC

TYPE E

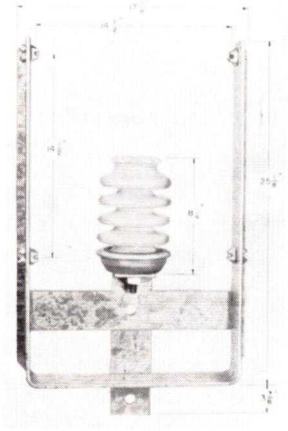


TYPE H
MICA CAPACITORS

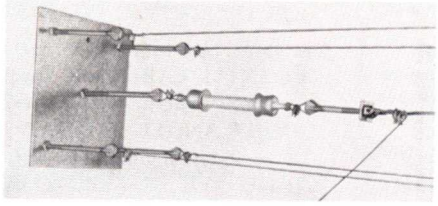
1200 W.V.D.C.

H-T2450	.00005	$0.96
H-T2310	.0001	.96
H-T2320	.0002	.96
H-T2325	.00025	.96
H-T2330	.0003	.96
H-T2340	.0004	.96
H-T2350	.0005	.96
H-T2210	.001	1.08
H-T2215	.0015	1.38
H-T2220	.002	1.44
H-T2225	.0025	1.68
H-T2230	.003	1.83
H-K2240	.004	1.83
H-K2250	.005	1.98
H-K2260	.006	1.98
H-K2280	.008	2.31
H-K2110	.01	3.06

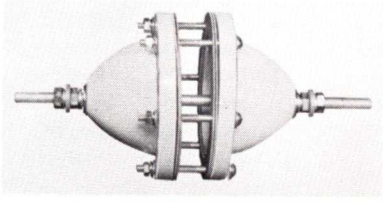
OPEN WIRE TRANSMISSION LINE



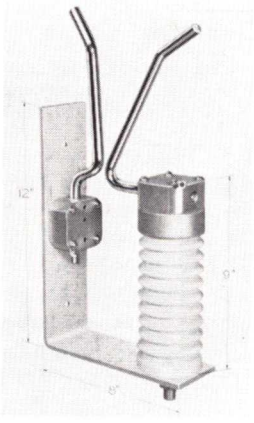
M-3327 Bracket



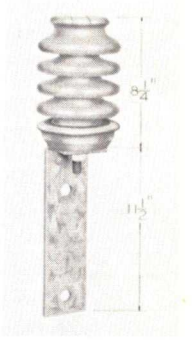
M-3328 End Plate



M-2870D Feed-Thru Bowl



M-3322 Horn Gap



M-3864 Center Post

Transmission Line Bracket

For 5 or 6 wire transmission line. Rating up to 150KW modulated. Made of ¼″ steel 3″ wide with welded L section on each side to fully prevent twisting under ice or wind load. Supplied with 8¼″ ribbed insulator, wire guides and all hardware. Galvanized throughout.

Line Bracket M-3327

Line End Plate

To terminate the open wire line at each end. Plate is ¼″ thick, 20″ square. Fully galvanized. Includes turnbuckles, 25½″ strain insulator and all hardware. Rating up to 150KW modulated.

End Plate M-3328

Feed-Thru Bowls

A large feed-thru bowl with 50KW modulated rating. Available in single and double units and with solid or hollow studs as listed below. Bowls are Alsimag. Hardware heavy brass. Velutex seals are provided for weather-tight installation.

Solid stud, 2 bowls, for walls to 10½″ thick M-2870D
Same as above but hollow stud M-3254
Solid stud, single bowl, for walls 1″ thick M-5280
Same as above but hollow stud M-5281

Horn Gap

A very desirable item where higher power is employed. Connects to hot side of line and ground to drain off lightning and heavy static discharges. Usually one is employed for each 200′ of line. Insulator for 150KW arc gaps heavy chrome plate. Galvanized throughout.

Horn Gap M-3322

Center Post Assembly

Has variety of uses such as end or corner angling of transmission line, support insulator for two wire line or rhombic antennas, and a guide insulator such as end of building or coupling unit. Rating 150KW galvanized throughout.

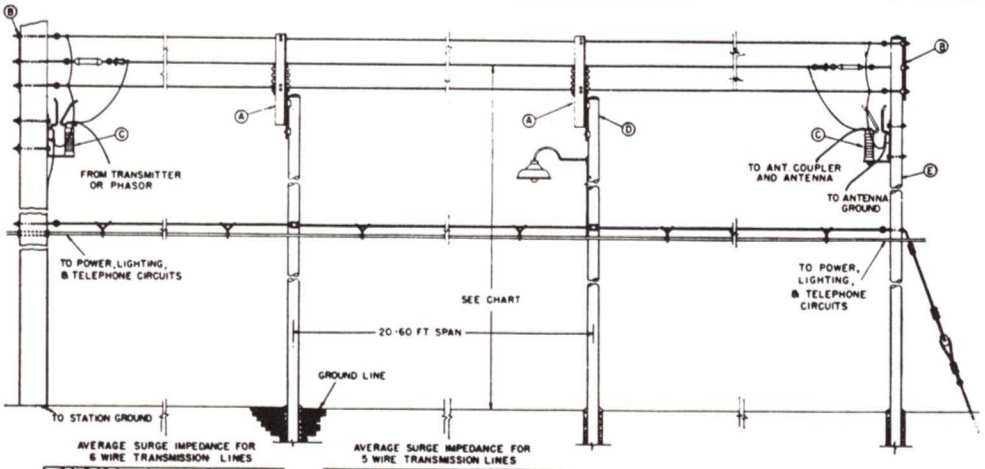
Center Post Insulator M-3864

Hard Drawn Wire

If desired, when ordering transmission line components, Gates will gladly supply No. 6, 8 or 10 hard drawn copper wire of current market prices. State length in feet desired, remembering to multiply the length of line by the number of wires in line, either 5 or 6.

Special Open Wire Lines

Gates engineers have designed many special open wire lines for both short and long distances. Most celebrated was a 30-mile line supplies for use in the Arctic Circle. Upon receipt of a sketch or word description of the requirements, Gates engineers will gladly submit layout and quotation.



AVERAGE SURGE IMPEDANCE FOR 6 WIRE TRANSMISSION LINES

HEIGHT OF CENTER WIRE	WIRE SIZE 6	8	10
9′	232Λ	246Λ	250Λ
10′	234Λ	250Λ	256Λ
12′	240Λ	252Λ	260Λ

AVERAGE SURGE IMPEDANCE FOR 5 WIRE TRANSMISSION LINES

HEIGHT OF CENTER WIRE	WIRE SIZE 6	8	10
9′	330Λ	346Λ	364Λ
10′	333Λ	350Λ	365Λ
12′	332Λ	348Λ	363Λ

Open Wire Design and Impedance Chart

Chart to the left illustrates typical five or six wire open type transmission line. Table is provided to show impedances with various wire sizes at certain heights above ground. Transmission line brackets are M-3327, end plate M-3328. Horn gap is M-3322. The power, lighting and telephone circuits shown are optional, according to requirements of installation. Open wire line will average about the same per foot cost as ⅞″ coaxial copper cable.

COAXIAL CABLE, TOWER LIGHTS AND ACCESSORIES

Solid Dielectric Cable

Low loss, flexible, polyethylene inner jacket covered by copper shield with vinyl outer jacket overall, impervious to exposure, acids, alkalis, oils and gasoline. Excellent AM transmission line.

Item	Cat. No.
SINGLE CONDUCTOR OD .285, impedance 51 ohms	RG-8U
SINGLE CONDUCTOR OD .285, impedance 75 ohms	RG-11U
SINGLE CONDUCTOR OD .680, impedance 51 ohms	RG-17U
SINGLE CONDUCTOR OD .910, impedance 51 ohms	RG-19U
TWO CONDUCTOR OD .285, impedance 95 ohms	RG-22U

RG cable should be ordered to length desired. Where continuous unbroken lengths are required in long sections, a refundable reel charge of $50.00 per reel will be made and fully credited with reel returned transportation prepaid.

Heliax 50 Ohm Coaxial Cable

A new type of cable combining high efficiency, ease of handling and low standing wave ratio. High efficiency due to spiral insulation of low loss polyethylene permitting high percentage of air in space between inner and outer conductors. The inside of the outer conductor is clad with heavy conductivity copper. Fully weatherproof and flexible, requiring no elbows, junction boxes etc., for making bends.

COAXIAL CABLE 7/8" diam. Length to order. Specify end fittings desired as listed below and attached at no extra charge H-0

COAXIAL CABLE 1 5/8" diam. Length to order. Specify end fittings desired as listed below and attached at no extra charge H-1

END TERMINAL for 7/8" Heliax line 20-T

FLANGE END TERMINAL for 1 5/8" Heliax line 21-F

Air Dielectric Coaxial Cable

Andrew air dielectric coaxial cable has solid copper outer conductor with inner conductor supported by steatite beads.

COAXIAL CABLE 3/8" semi-flexible, impedance 70 ohms 83

END TERMINAL FOR 3/8" LINE with gas inlet and pressure gauge 1701-GV

END TERMINAL FOR 3/8" LINE with removable exhaust plug 1701-P

END TERMINAL FOR 3/8" LINE with needle valve for gas release 1701-R

COAXIAL CABLE 7/8" semi-flexible, impedance 50 ohms, power rating for AM broadcast 3.2KW S-450

END TERMINAL FOR S-450 CABLE with gauge and valve 1703-AGV

END TERMINAL FOR S-450 CABLE with gas release plug 1703-AP

END TERMINAL FOR S-450 CABLE with release valve 1703-AR

When ordering S-450 cable, specify end fittings desired as above and these will be attached at the factory and complete assembly shipped under pressure. No charge will be made for this service other than in large lengths, reel will be billed but refunded when returned transportation prepaid.

COAXIAL CABLE 1 5/8" OD, impedance 51.5 ohms, rated 10 KW for AM broadcast, supplied in 20' lengths, includes flanges and fittings for each end 451

AIR DIELECTRIC COAXIAL CABLE (continued)

Item	Cat. No.
COAXIAL CABLE, any special length of 451 (state length when ordering)	12211
RIGHT ANGLE MITERED ELBOW FOR 451 CABLE, includes flanges and fittings	1051-M
45-DEGREE MITERED ELBOW with flanges and fittings for 451 cable	1151-M
GAS INLET COUPLING FOR 451 CABLE	1351
CLAMP CONNECTOR for providing a pressure type flange on cut end of 451 cable	T-1551
END TERMINAL having Type N jack on one end, standard flange for Type 451 cable on order end, incorporates gas barrier and removable gas vent plug	13942

Ground Materials

No. 10 SOFT DRAWN COPPER GROUND WIRE, packed in 100-pound coils, approximately 3100 feet in 100 pounds GR-10

COPPER GROUND STRAP 2" WIDE, packed in 100' rolls GR-2ST

COPPER GROUND STRAP 4" WIDE, packed in 50' rolls GR-4ST

GROUND ROD, Copperweld heavy ground rod 8' long GR-8R

GROUND SCREEN, heavy copper, 3/4" mesh in sheets 8'x24' GR-24SC

The above materials are carried in Quincy and all branches. Prices shown in price list vary as to variance of copper market.

Pumps, Dehydrators

DRY AIR PUMP comes complete with 8' hose and silica gel fill 878

AUTOMATIC DEHYDRATOR used with all sizes air dielectric lines for dehydrating as much as 40,000 feet of 7/8" line, 10,000 feet of 1 5/8" line, etc., wall mount 1910

GAS DISTRIBUTION MANIFOLD, includes pressure gauges, needle valves, 15' of 1 1/4" copper tubing for any number of coaxial cables. State number of outlets desired 6600

Tower Lights

SINGLE OBSTRUCTION LIGHT, bottom entrance conduit fitting furnished with lamp receptacle to accommodate either a 100 or 111 watt, 115V medium screw base lamp, or lumen medium pre-focus series lamp OB-20

SINGLE OBSTRUCTION LIGHT, same as Model OB-20 above but side entrance conduit fitting OB-21

DOUBLE OBSTRUCTION LIGHT, provided with two lamp receptacles, each accommodating either 100 or 111 watts, medium screw base lamp, or lumen medium pre-focus lamp. Bottom entrance fitting type for 1" conduit.

FOR MEDIUM SCREW BASE OB-22-4

FOR PRE-FOCUS BASE OB-22P-4

(continued next page)

COAXIAL CABLE, TOWER LIGHTS AND ACCESSORIES

TOWER LIGHTS (continued)

CODE BEACON 300 MM, standard fully approved FCC and CAA model supplied with two red filters.
FOR ¾" CONDUIT KG-114-3
FOR 1" CONDUIT KG-114-1

REPLACEMENT LAMP, 100 WATT OBSTRUCTION 100A21-TS

REPLACEMENT LAMP, 111 WATT OBSTRUCTION 111A21-TS

BEACON LAMP, 500 WATT 500PS-40

BEACON LAMP, 620 WATT 620PS-40

Complete Tower Light Kits

The following kits are complete, meeting the requirements of FCC Form 715, FCC Rules Part 17, and CAA standards for marking and lighting obstructions to air navigation, November 1, 1953. The FCC construction permit in all cases will specify the required lighting for each installation, which should tie to the specifications of lighting kits as shown below.

TOWER LIGHTING KIT FOR TOWERS TO 150'. FCC Spec. No. 2, CAA Spec. No. 1, includes one double obstruction light A-1

TOWER LIGHTING KIT FOR TOWERS 151' to 300'. FCC Spec. Nos. 3, 11, 21 and CAA Spec. A-2, includes one code beacon, two obstruction lights, beacon flasher and photo-electric control A-2

TOWER LIGHTING KIT FOR TOWERS 301' to 450'. FCC Spec. Nos. 3, 12, 21 and CAA Spec. A-3, includes code beacon, four obstruction lights, beacon flasher and photo-electric control A-3

TOWER LIGHTING KIT FOR TOWERS 451' to 600'. FCC Spec. Nos. 3, 4, 13, 21 and CAA Spec. A-4, includes two code beacons, six obstruction lights, beacon flasher and photo-electric control A-4

For towers higher than 600' please write for prices. Equipment for tower lighting normally carried in stock at all times.

Flashers and Photo Cell Units

SINGLE UNIT, indoor housing, lighting control unit with outdoor remote weather photo tube, includes complete code flasher for flashing of three towers and photo-electric cell control for automatic turning on and off 115/230 V, 50/60 cycle, 3 conductors to each tower LC-2077

SINGLE UNIT, indoor housing, same as LC-2077 above but for 4 towers instead of 3 ..... LC-2076

BEACON FLASHER, electro-mechanical device for outdoor mounting, meets FCC and CAA regulations, single pole mercury tilt switch and synchronous motor, Model BF-32 has fail-safe provision for 117 V, single circuit type.
BEACON FLASHER BF-31
BEACON FLASHER with fail-safe BF-32

Gates is a national distributor for Andrew, Hughey & Phillips, Fischer-Pierce and other leading manufacturers of approved tower lighting equipment. Generous stocks are carried at the factory and branch.

For open wire transmission line, see Page 105.

FLASHERS AND PHOTO CELL UNITS (continued)

PHOTO-CELL AND BEACON FLASHER, a combination unit in weatherproof housing. Photo-cell may be rotated to north regardless of mounting position on tower. Turns on at 35-foot candles and off at 58-foot candles. Fully approved.
FOR 1 POLE 30 AMPERES, flashes one circuit LC-2074
FOR 1 POLE 30 AMPERES, flashes two circuits LC-2072

FISCHER-PIERCE PHOTO-CELL UNIT, unit completely weatherproof, fully approved for turning on and off tower lights, has time delay of 5-7 seconds to prevent operating lights by chance exposure such as walking in front of unit.
PHOTO-CELL UNIT for 105-130 volts, 3000 watt rating, SPST, double break 63305C
PHOTO-CELL UNIT, same as above but for 210-250 volts 63306C

Rhombic Antenna Equipment

RHOMBIC TRANSMITTING ANTENNA, frequency range 4-22 Mcs., power 30 KW. A 3-wire curtain. Kit consists of 3-strand No. 12 Copperweld wire with maximum side lengths of 375'. Strain and spreader insulators with necessary hardware included for tower or pole attachment. Downlead is supplied with transmission line kit (see RTL-300 below). Shipping weight: 500 lbs.
RHOMBIC TRANSMISSION ANTENNA RTA-300

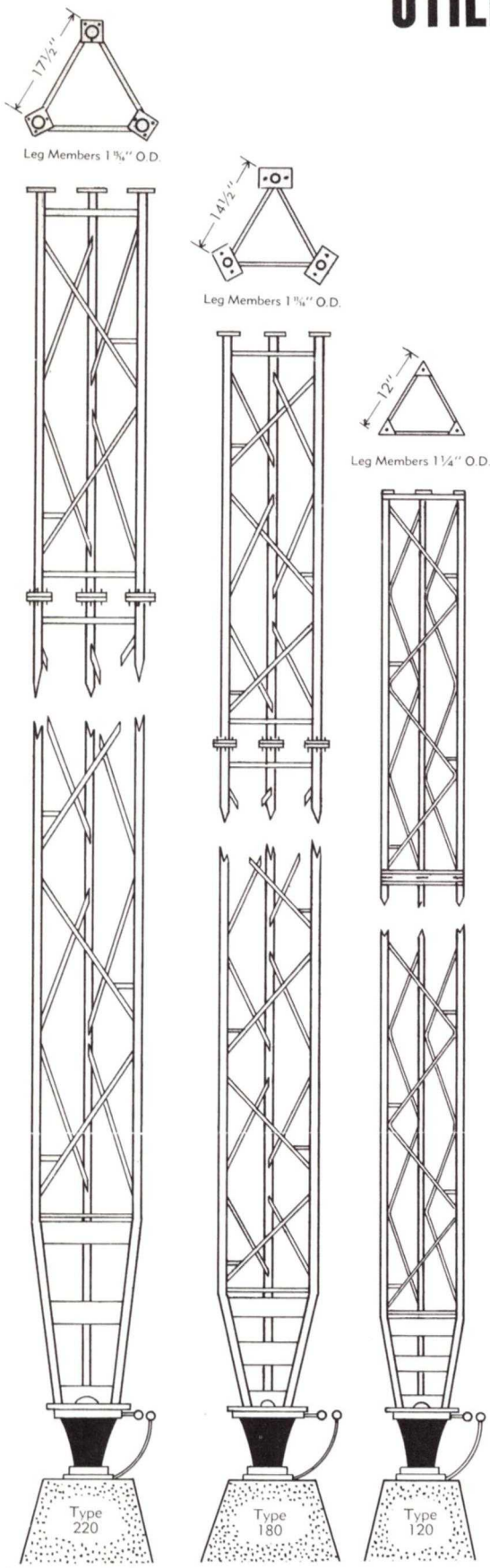
TRANSMISSION LINE FOR RHOMBIC ANTENNA, a 500' 2-wire open-wire line having a nominal impedance of 600 ohms, with 3-strand No. 12 Copperweld wire spaced 12" apart, includes downlead for rhombic transmitting antenna (RTA-330 above), strain insulators, line support insulators for single pole mounting, horn gap insulators, with grounding wire and rods, improved entrance bowls, wooden crossarms (2) for dead ending, guys and anchors for one dead end and three line-turn poles, all with necessary hardware. Shipping weight: 400 lbs.
TRANSMISSION LINE FOR RHOMBIC ANTENNA RTL-300

DISSIPATION LINE FOR RHOMBIC TRANSMITTING ANTENNA, includes 1500' of No. 14 stainless steel wire, strain spreader and spacer insulators, line tension and equalization sheaves, ground wire and rod, one cross-arm with pole guy and anchor for dead ending below antenna, and all necessary hardware. Shipping weight: 125 lbs.
DISSIPATION LINE TDL-340

DOUBLET TRANSMITTING ANTENNA, frequency range 2-15 Mcs., power 30 KW, consists of 7-strand No. 12 Copperweld wire, includes strain insulators and hardware for Attaching to towers or poles. Downlead included in kit listed below. Shipping weight: 90 lbs.
DOUBLET ANTENNA DTA-430

TRANSMISSION LINE FOR DOUBLET TRANSMITTING ANTENNA, 500' long, 2-wire, 600 ohm, open-wire line consists of 3-strand No. 12 Copperweld for downlead (delta match type) and line, dead end cross-arms, strain line support and improved entrance bowl insulators, horn gap insulators with ground wire and rod, pole guys and anchors for dead end poles and line-turn poles, and necessary hardware. Shipping weight: 360 lbs.
TRANSMISSION LINE FOR DOUBLET ANTENNA DTL-400

UTILITY TOWERS



Utility Towers are available in six basic designs, three of which are shown here. All have superior Utility engineering and workmanship and always meet or exceed RETMA specifications. In the five standard models, round members are welded together in 20-foot sections except for top section which is to your measurement. You have choice of hot dip galvanized or rush-inhibitive primer finish.

RIGID ANCHOR BEAMS: Anchors are individually designed to meet the requirements of each tower installation. Utility uses the I-beam with its proven structural rigidity. This beam is imbedded in concrete slab re-inforced with steel rods and with earth fill on top.

SOLID BASE INSULATORS: Insulated vertical radiators are equipped with the latest Utility 3401 or Utility 2201 pivot base insulators for positive insulation between base and ground. Utility base insulators have much higher compression rating than hollow insulators of similar size. Resilient. Shatter-proof. Each insulator is proof tested for a load approximately eight times greater than ever carried in normal broadcast service.

EASY TUNING: You save money on initial engineering costs because Utility Towers are easier to tune. One reason for this is the fact they are built to your exact requirements.

SMALLER CONCRETE PIER: Diversified tower support makes massive concrete bases or piers unnecessary — thus doing the job for you at less cost.

EASY MAINTENANCE: Round members and welded construction provide smooth surfaces for easy painting and servicing. Steps are built into bracing to eliminate need for scaffolding and to make entire height of tower easy for maintenance men to reach.

SPECIFICATIONS

TOWER TYPE	MAXIMUM RECOMMENDED HEIGHT	TOWER WIDTH	WEIGHT PER FOOT*	TYPE OF BASE INSULATION
480	480 FT.	33 IN.	28 LBS.	LOCKE OR LAPP
340	350 FT.	19-7/8 IN.	17 LBS.	UTILITY 3401
220	250 FT.	19-7/16 IN.	12.5 LBS.	UTILITY 3401
180	200 FT.	16-3/16 IN.	10 LBS.	UTILITY 2201
120	200 FT.	13-1/4 IN.	8 LBS.	UTILITY 2201
170KD	320 FT.	18 IN.	17 LBS.	UTILITY 3401