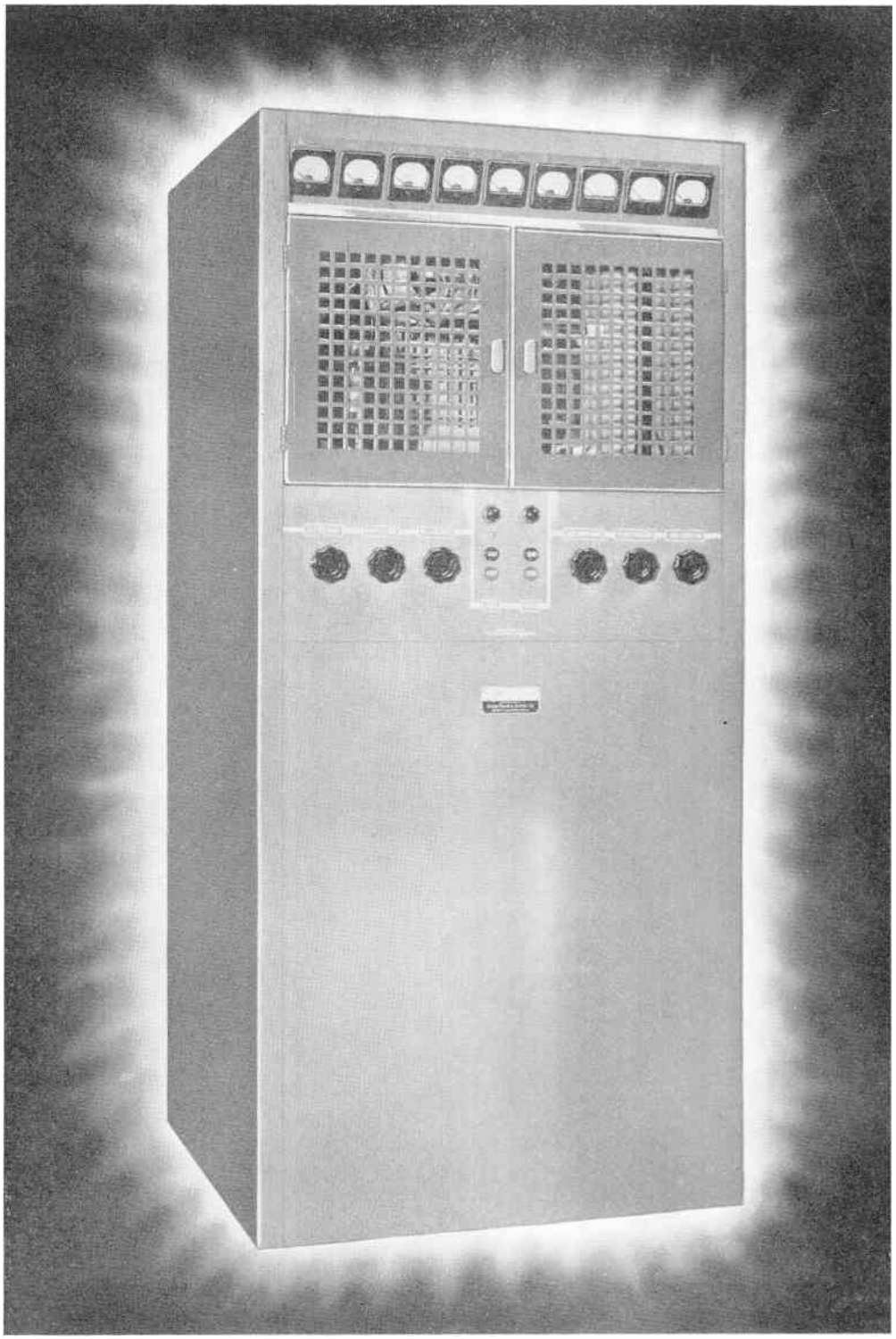
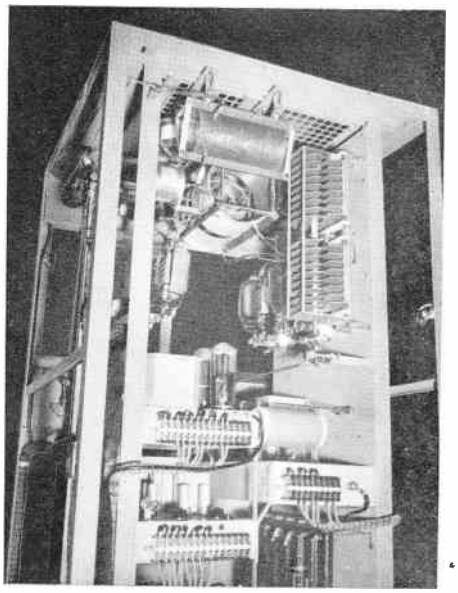
GATES 1D—One Killowatt Broadcast Transmitter . . . .



FRONT VIEW

Gates 1D Detail

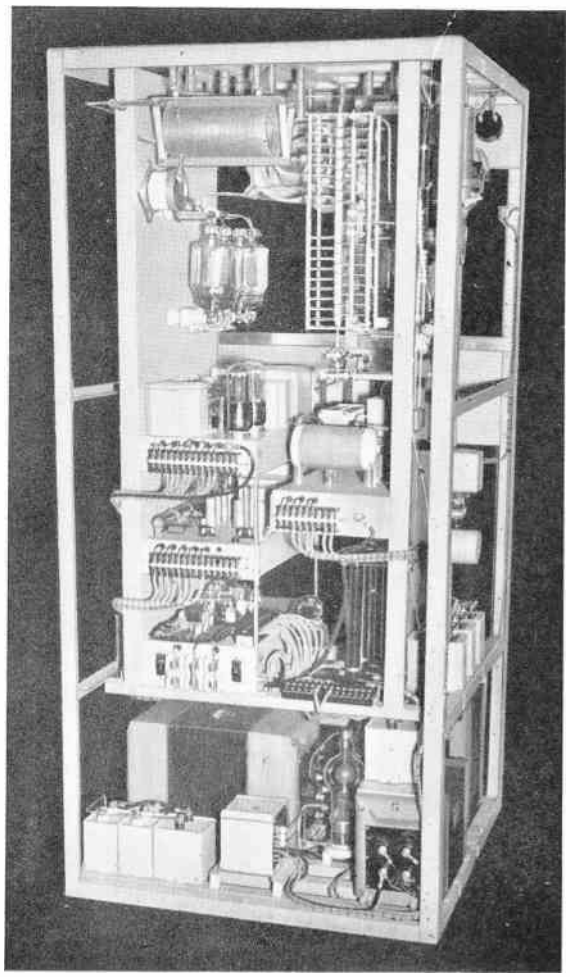
The Model 1D 1000 watt radio broadcast transmitter has been designed for the commercial radio broadcasting station as a moderate priced first quality transmitting equipment that will meet all government requirements and more important the exacting demands of the most critical radio engineer. It has been designed to offer that type of eye value that appeals to the sales department and the type of on the air ear value that commands listeners.



TOP REAR

The Gates Model 1D includes the main transmitter cabinet, one complete operating set of tubes, the Gates 25-A frequency control unit and one oven with crystal ground to customers frequency. As provision is made in all Gates equipments for two ovens and crystals the second oven assembly is available if desired at only small cost.

The standard design of the 1D transmitter is in line with what might be termed the engineers utmost desires, namely access of every part regardless of its nature. By consulting the rear illustration it will be noted that this view is open, that is, all sides are removed. This is so that not only parts in the front or rear are accessible but likewise on the sides. Sides may be removed by simply removing a few screws while the back door may be taken off by removing the hinges, a simple procedure. Front panels remove by loosening the panel screws thus making the transmitter a frame work for servicing and cleaning requirements. The meters are accessible by reaching up from the front doors or in from the back. Each of the sub assemblies may be removed from the vertical cabinet mounting by removing a few screws the same as would be done to remove a rack panel commonly used with speech equipment, monitors, etc.

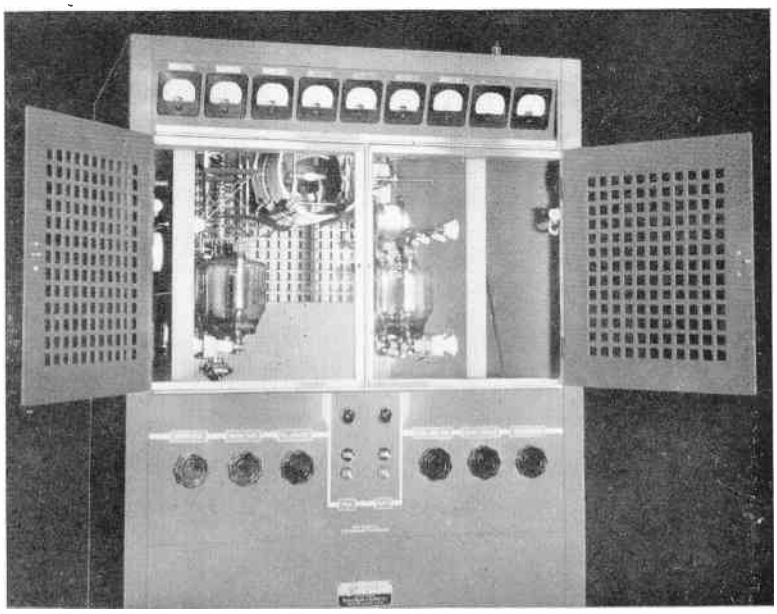


REAR VIEW OPEN

The frequency control apparatus which is the well known Gates 25-A equipment now used in hundreds of broadcasting stations is supplied as a separate unit usually mounted on the same rack cabinet as the frequency and modulation monitors but of course may be mounted at any point desired. The use of the 25-A frequency control unit adds greatly to the stable operation of the 1D transmitter as this equipment consists of an oscillator stage, a class A isolation amplifier and a second buffer stage and with a self contained power supply making the 25A unit actually a seven watt self contained transmitter. This unit link couples to the third buffer stage which is in the main 1D transmitter cabinet. Attention should be called to the fact that 3 buffer stages exist between the oscillator and final amplifier which any engineer will agree represents the finest in transmitter design and eliminates any reasonable possibility of carrier shift sometimes caused by insufficient buffer stages.

The main 1D cabinet is 72″ high, 30″ wide and 28″ deep. It is built of welded steel angles and channels around which is fitted the sides, front panels and rear door. Arrangement is such that the completed cabinet with all enclosures mounted thereon reflects the appearance of the highest type of cabinet design and finish. The front panels are of 3/16 colled rolled strecher level steel finished in gloss, waxed, medium gray. The control panel is artistically lettered in stream line effect

through silk screen application of the lettering. Front doors are heavy perforated pieces carefully hung and finished in a second tone of dark gray offering a transmitter of striking appearance. All doors are interlocked for operator protection. A fan provided in the rear door and ample perforation provides a complete circulation of air for cool reliable performance in the hottest summer weather. All parts are of such design that sea shore operation is equally reliable to inland operation.

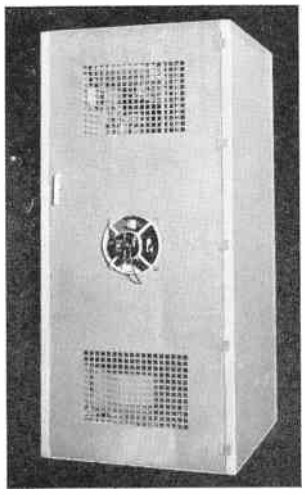


FRONT TOP, DOORS OPEN

Technical Detail

The engineering design of any transmitter is of the most importance as regardless of fine appearance it is the "on the air" results that pay dividends. The 25A frequency control unit, previously described, feeds a third 813 buffer stage which is tuned both grid and plate from the front panel and likewise both grid and plate metering is provided on the front for this stage. The 813 buffer stage drives the final push pull class C amplifier with excess of grid drive assuring high efficiency. The final amplifier consists of two 833A tubes which are inductively coupled to the transmission line which is of the unbalanced type designed to match any type of line up to 250 ohms impedance thus offering an impedance match for 73 ohm coaxial and commonly used 2, 4 and 5 wire lines. Metering consists of grid drive, plate current, filament voltage and plate voltage for this stage meeting all F.C.C. requirements.

The audio compliment consists of three stages first of which is a push pull 6A5G stage which feeds a push pull 845 stage and which in turn feeds the class B modulator stage of two type 833A tubes. Metering consists of 845 driver plate current and modulator plate current. Note should be made that the modulator and power amplifier tubes are interchangeable for economy in operation. The audio frequency section has been designed for extreme high quality of operation and flat response with low noise and distortion (see specifications). Note should be made of the 3 audio stages self contained in the transmitter thus requiring only a moderate size line amplifier ahead of the 1D transmitter such as the Gates 27C0 limiting amplifier or any amplifier that will supply approximately one watt of audio power.



REAR — CLOSED

Specifications:

Carrier output — 1000 watts (provision may be made for reducing LS power if required).

Frequency range — 550 to 1700 Kc. as specified when ordering.

Power Supply — 220 volt single phase 50-60 cycles.

Power consumption — Approximately 5500 watts.

Radio frequency stability — plus or minus 10 cycles.

Radio frequency harmonics — below .05 percent.

Modulation — Class B full 100% at conservative tube rating.

Audio input — 500-600 ohms at plus 10 decibels (.006 watts reference).

Average program level — plus 7 Db.

SPECIFICATIONS — Continued

Audio response — Flat within plus or minus 1½ Db. from 30 to 10,000 cycles.

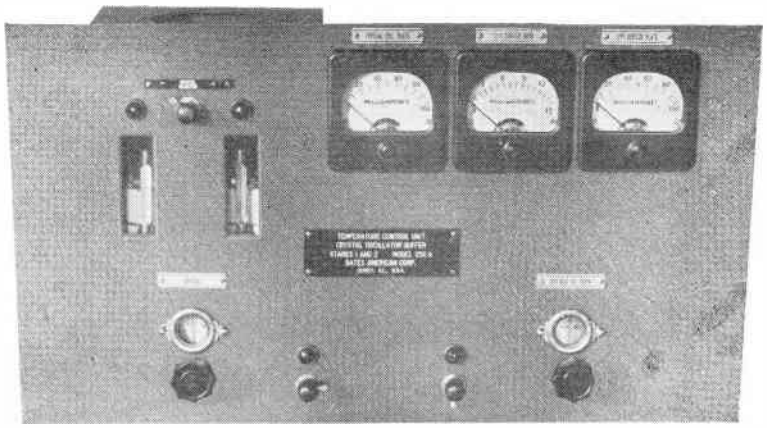
Distortion content — 75% modulation 2% or less. 100% modulation 3% or less.

Noise level — 55 Db. below program level.

Tube compliment — Two 802, one 45, one 5Z3, one 813, two 575A rectifiers, four 833A, two 845 and two 6A5G.

Bias supply — Selenium type using no tubes.

Protective compliment — Full relay control with push button start and stop, overload relays and thermo-breakers and interlock relays.



25A FREQUENCY CONTROL UNIT

Operating cost — Based on 2 cents per KWH estimated at approx. 25 cents per hour.

Price — on application.

The Gates 1D transmitter is designed as a commercial broadcast transmitting equipment. It may be had on special order, however, for high frequency operation up to 20 megacycles. Also odd line voltages and frequencies may be provided for on special order.

Colors — Though all Gates transmitters are manufactured in colors that have been determined as durable and conservative they can be had on special order in other colors to match installation requirements. Where such is desired a sample color card should be sent with the order as nearly every shade except black has various tones and even black is available in many different glosses which are difficult to state in writing. We suggest for new installations the use of standard Gates colors where possible and designing the transmitter rooms to so match these finishes.

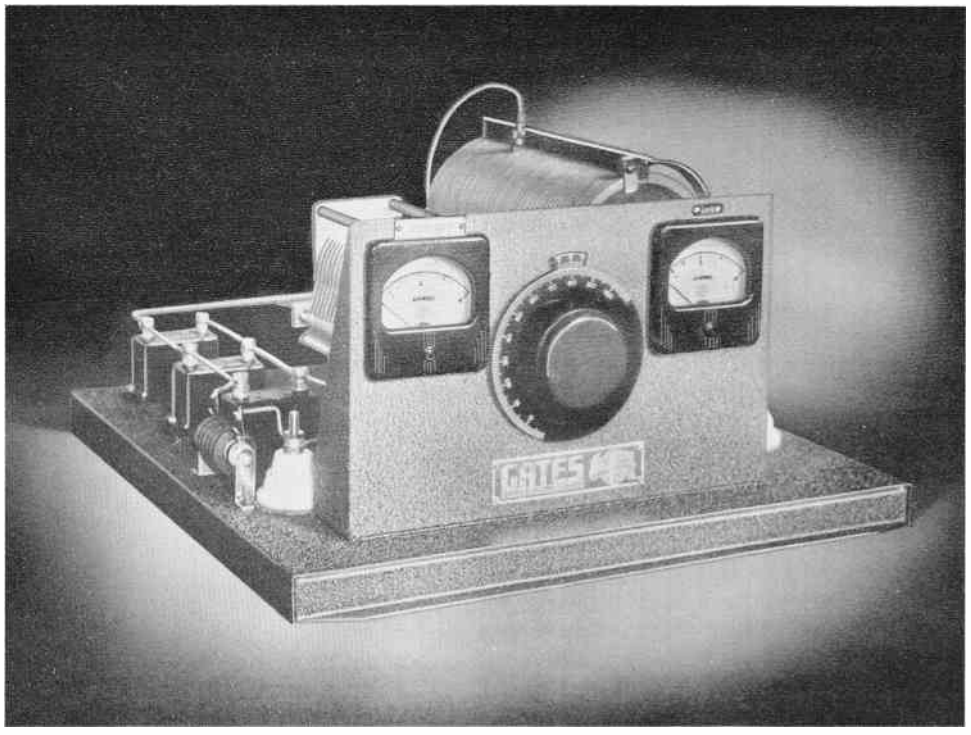
Phasing Equipment — Gates has designed many types of directional phasers and a bulletin is available illustrating several types that have been manufactured. As each phaser is a custom built equipment it is impossible to quote without full engineering detail in the hands of the Gates engineering department. The same applys to antenna tuning equipment which may be had in several standard types or special types as may be required.

Speech Equipment — A large and complete line of speech equipment may be found in the Gates catalog or any special speech input design may be had for the broadcasting station requiring facilities not covered by standard Gates units. Coordinated transmitter installations assure the finest overal performance and Gates Engineers will gladly discuss any type of coordinated installation to fit budget requirements.

Gates 21 and 22 Series
Antenna Tuning Units

and

A New Tower Lighting Choke Cabinet

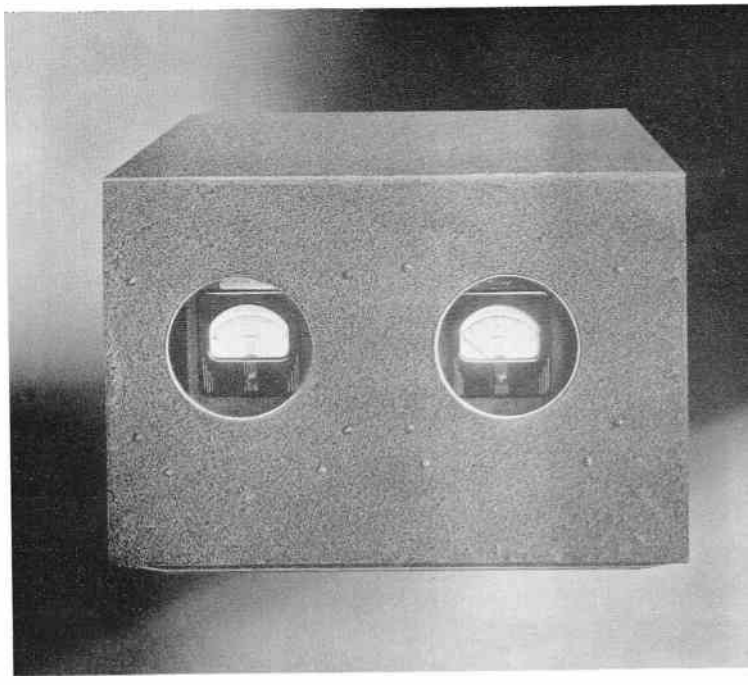


High Efficiency

Weatherproof

Low Harmonic Emission

A complete new antenna tuning equipment offered in models for series or shunt fed radiators.



full detail on next page

GATES RADIO COMPANY
QUINCY, ILLINOIS, U.S.A.
AMERICAN CORPORATION

GATES 21 SERIES ANTENNA TUNING EQUIPMENT

In the realm of modern radio broadcasting one of the most important items in the entire broadcasting plant is the antenna tuning equipment, as it is at that point that energy may be either conserved or destroyed. Likewise improper antenna tuning equipment will often act as a harmonic generator which not only is contrary to good engineering practice but likewise reduces the strength of the fundamental signal.

In the 21 Series antenna tuning units are offered two models for series feed and two models for shunt feed, both being the last word in engineering design and electrical construction.

GENERAL DESIGN: The illustrations indicate quite clearly the general idea followed in design and construction. All equipment is mounted on a cold rolled steel base plate finished in baked hard enamel to withstand varied temperatures without cracking or pealing. Over the top of this slips the cover or housing which is 11″ high, 19″ wide and 20″ deep overall and which is resistance and seam welded with window openings for meter observations well protected by glass puttied around all edges for complete waterproofing of the entire assembly. Cover likewise is finished inside and out with a heavy coat of baked enamel. Coaxial or open line transmission systems terminate at stand off bushings feeding through the bottom of the cabinet or if desired plenty of room is provided to insert any type of coaxial cable coupling that might be used.

TYPES 21A and 21B—These units are the same other than the 21A is for a maximum power of 350 watts while the 21B is for a maximum power of 1250 watts. Larger powered units are available with prices on request. The 21A and 21B are designed to coupled from a 73 ohm coaxial cable, a 2 wire open line or a four wire transmission line direct to a series fed or commonly known as an insulated vertical radiator. They are available for any frequency from 550 to 7600 Kc. with the broadcast model able to tune any frequency from 550 to 1600 Kc. This is done by a series of fixed capacities and one variable capacity which may be strapped into a number of combinations for proper frequency which is given in a chart sent with the instructions. Antenna coil proper is of heavy edgewise wound copper strip cadmium plated. Clips are provided for varied coil adjustments. Antenna tuning is aided by the supply of two 3″ meters fully F.C.C. approved that read line current and antenna current proper. The general design produces a configuration of a low pass filter providing unusual low harmonic emission when used with a properly designed transmission line and of course correctly tuned. Bleeding choke is provided for static drain.

TYPES 21-C and 21-D—These antenna equipments are for shunt fed antennas or the non-insulated type. They vary widely in construction to that of the series fed units, but are of course equally efficient for the shunt fed type of radiator. Fundamental construction consists of an oversized tuning condenser in series with the feed line and antenna meters supplied. Size and general appearance is the same as the 21-A and 21-B. Model 21-C is for a maximum power of 350 watts shunt fed and 21-D is for a maximum power of 1250 watts shunt fed.

INFORMATION REQUIRED WHEN ORDERING:—If possible state antenna tower resistance and of course operating power (maximum). If resistance of tower is not known then state height. Regardless of system now employed advise present antenna current (maximum) and line current of line if used. New stations should specify frequency and height of tower also.

Prices

Model 21-A —Series feed tuning unit for maximum power of 350 watts. Complete and ready to install **$97.50**
Code Word (YUHUX)

Model 21-B —Same as above, only for maximum power of 1250 watts **$147.50**
Code Word (YUHWO)

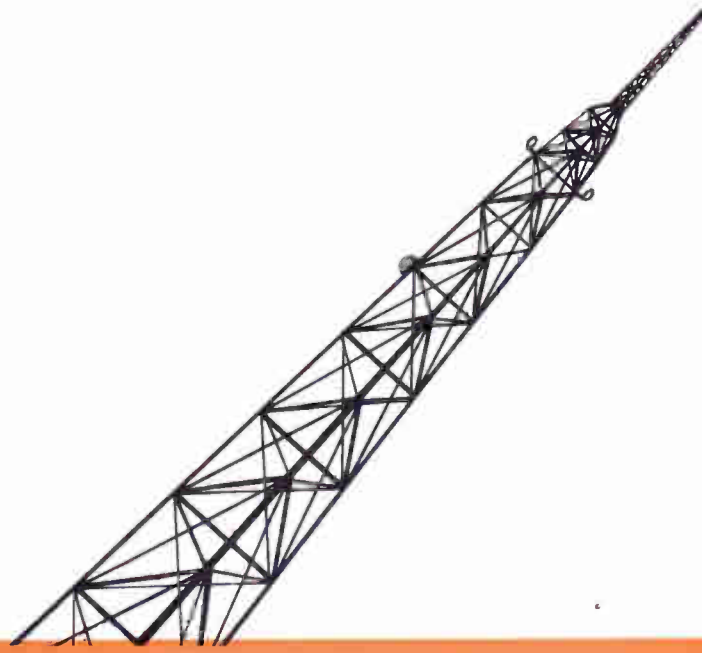
Model 21-C —Complete shunt feed antenna tuning unit for maximum power of 350 watts. Ready to install **$82.50**
Code Word (YUHZY)

Model 21-D —Same as 21-C, only for maximum power of 1250 watts **$132.50**
Code Word (YUIFS)

TOWER LIGHTING CHOKE UNIT

For series feed antennas a weather proof choke assembly is required in the 110 volt lighting line to insulate the R. F. in the tower from the light line. This is available in a unit to match the tuning equipment and built to attach to the tower. Stands 22 inches high, 6 inches wide and 6 inches deep. Consists of a double wound choke coil on a 3x18 inch tubing to withstand 2000 watts current without heating. Mica by-passing condensers are provided on the input side of the equipment and input and output feeds are through insulated weather proof bushings at the bottom of the cabinet. Entire unit is of cold rolled steel, finished in baked hard enamel.

Model 22-A —Tower Lighting Choke Cabinet. Ready to install **$27.50**
Code Word (YUIGT)

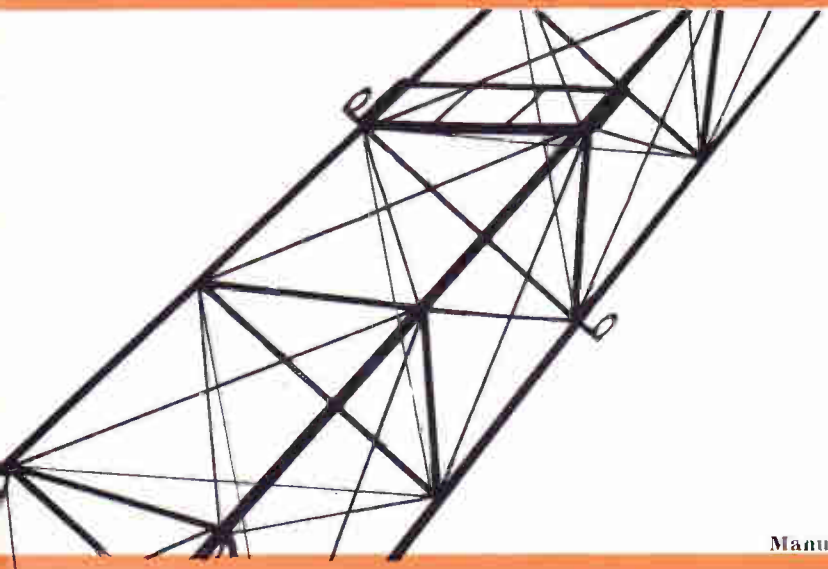


The Gates—

100-A

250-A

Transmitters

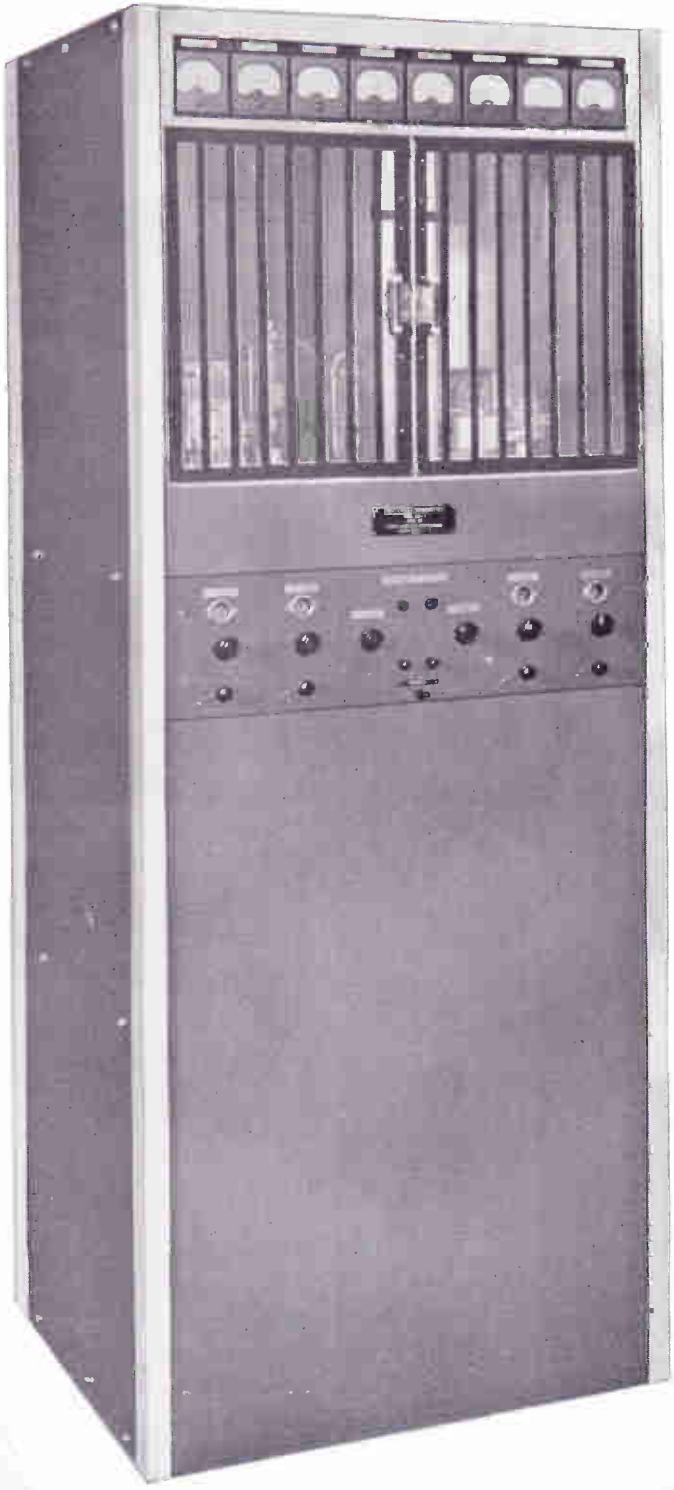


Manufactured by

GATES

QUINCY, ILLINOIS, U.S.A.

AMERICAN CORPORATION



The 100-A for 100 Watts
The 250-A for 100-250 Watts
(Construction and Appearance Identical)

The 250-A TRANSMITTER

This latest in transmitters has feature added to feature, places all performance records on the shelf and hangs up a new one that gives a new meaning to high fidelity, low operating cost and beauty of appearance.

- The 250-A is the only broadcast transmitter having as standard equipment a peak limiting speech amplifier equipment.
- Low Power Consumption: 1700 watts at 250 watts carrier.
  1300 watts at 100 watts carrier.
- Complete metering without switches. Eleven full size meters.
- Primary circuit breaker and secondary overload relay protection. No fuses.
- Dual temperature controlled crystal ovens with maximum of 3 cycle variation.
- High efficiency circuit—low cost tube complement for economical replacement—only one neutralized R. F. stage.
- Complete ceramic insulation in R. F. stages.
- Higher fidelity transmission. A new era in added low and high frequency response.
- Power change on 100-250 watt model all by one key automatically controlling carrier power, audio power and modulation monitor excitation through relays.
- Complete automatic starting, relay protection in bias circuits, time delay, door interlock . . . . all by relays.
- First quality parts throughout. Linear standard audio components, no electrolytic condensers, low temperature rise power supply.
- Extremely low hum level (—60 Db). Low harmonic content. Unusually fine power regulation (3% or better).
- High efficiency (72% or greater). Untuned oscillator for stability. Three buffer stages. 100% modulation can be obtained at 250 watts carrier with only 66% modulator capacity.

This is the Gates DeLuxe line of 100-250 watt equipment fully F. C. C. approved. The complete transmitter with what others consider as extra, part equipment with 100-A, 250-A.

250-A DESCRIPTION

The 250-A Transmitter is divided into three sections, all of which go to make the one complete transmitting equipment. Both the 100-A and the 250-A Transmitters are the same in construction and appearance. For sake of convenience both models will hereafter be referred to as the 250-A. The 100-A Transmitter differs from the 250-A in tube complement only and the 100-A, which is for 100 watts operation, may be converted to 250 watts by simply changing the tube complement in the final radio frequency and modulator stages. The power supply and all other component parts are the same size in either model.

Description will be made under three headings covering the main transmitter equipment, the frequency control equipment and the audio compressor or peak limiting amplifier equipment. A fourth heading giving technical detail covers the entire transmitter.

Frequency Control Unit

The frequency control panel for the 250-A Transmitter contains the oscillator. first and second buffer stages, power supply and dual crystal ovens. This panel is 10½ inches by 19 inches in size with vertical rear chassis construction. This allows use of the frequency control unit either in a rack cabinet or as a desk mount instrument, the latter being very popular as it places the one control, namely, the oscillator frequency adjustment. that must be checked at specified intervals for the log, at the operator's finger tips without leaving his control desk position. The output of the frequency control panel is link coupled to the main transmitter cabinet.

The crystal oven employed is of the Bliley BC46T design guaranteed accurate within 3 cycles when used with AT cut crystals which are supplied as standard with the 250-A equipment. The use of dual ovens provides complete protection in absolute frequency control with not just a spare crystal but a spare oven if needed.

The oscillator stage is of the untuned type which along with the balance of the circuit design makes it almost an impossibility to go out of oscillation or become unstable regardless of conditions in the succeeding radio frequency stages. A type RK25 tube is employed which is directly interchangeable with a type 802 tube.

The first buffer stage employs a type 45 tube completely untuned in both grid and plate circuits. This stage acts primarily as an isolation stage between the oscillator and the balance of the transmitter adding tremendously to the frequency stability.

The second buffer stage employs a type RK25 tube which is directly interchangeable with a type 802 tube if desired. This stage has a tuned plate circuit and this feeds to a link which couples to the main transmitter. The power supply delivers all filament and plate voltage, provides a completely filtered direct current to the above mentioned stages and employs the highest quality parts throughout such as absence of electrolytic filter condensers and low temperature rise transformers. Heater transformer for the crystal ovens is separate and can be turned off only by a rear switch. Connections are made to a numbered terminal strip located at the rear of the chassis.

What is supplied as standard equipment with Gates De Luxe Line Transmitters

Complete Transmitter

Spare Tubes

Antenna Tuning Unit

Peak Limiting Amplifier

Two Crystals and Ovens

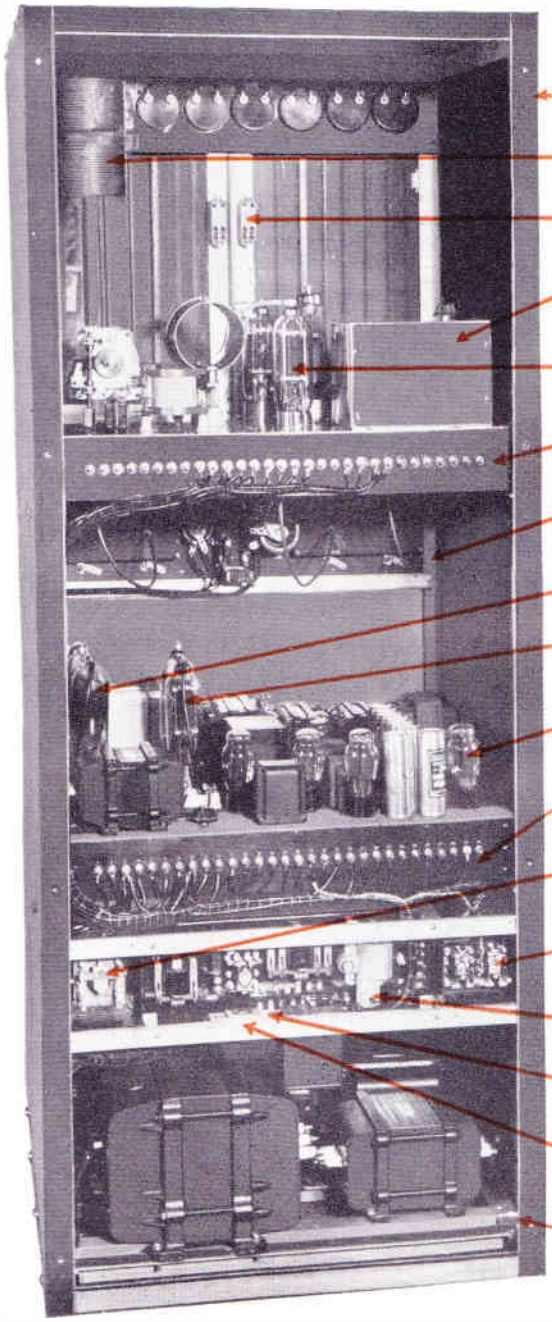
Extra Rack Cabinet

THE COMPLETE TRANSMITTER
"No Extras To Buy"

Metering provided covers the oscillator plate current, second buffer grid and second buffer plate. All meters are full 3-inch type and no midget type meters are employed.

The 25-A frequency control unit is featured by complete absence of neutralizing, complete shielding, ability of quick access to all parts when required and unusual frequency stability. Tuning range may be had for any frequency from 1600 to 550 Kc. with other frequencies either higher or lower available on special order. Radio frequency output is 12 watts.

Finish is in steel gray ripple enamel with trimmings in burnished silver.

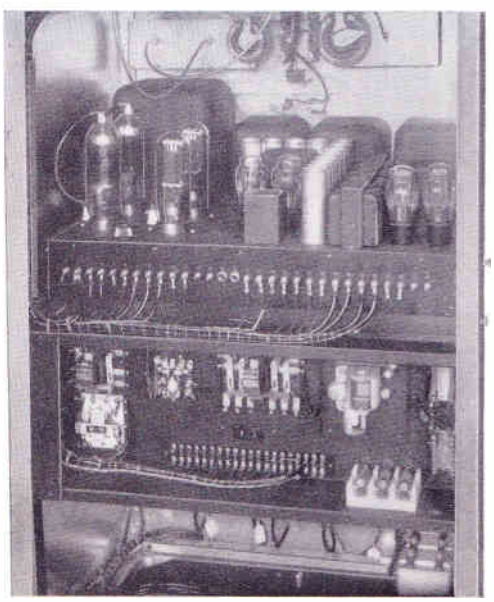


Rear view 8 gang meter panel
Antenna coil
Door switches
Third buffer stage
Tubes accessible, front or rear
All connections to numbered terminal strip
Dead front control panel
Main rectifier tubes
Modulators
Driver amplifier. bias supplies and filament transformers
All connections to numbered terminal strip
Power change and modulation monitor relay
Bias relay and audio level relay
Overload relay
Time delay relay
Primary circuit breaker
Power supply, modulation transformer, reactor and filter chokes.

Rear View

Suction fan in rear door not shown

It has often been said that neat well balanced design of any instrument indicates care in assembly and manufacture as well as much thought in original planning. In this rear view of the Gates 250-A Transmitter is illustrated how completely attractive the inner construction can be made both from an appearance and convenience standpoint. Note that every part can be quickly reached for servicing if required. There is ample space for full ventilation and maintenance, yet no wasted space.

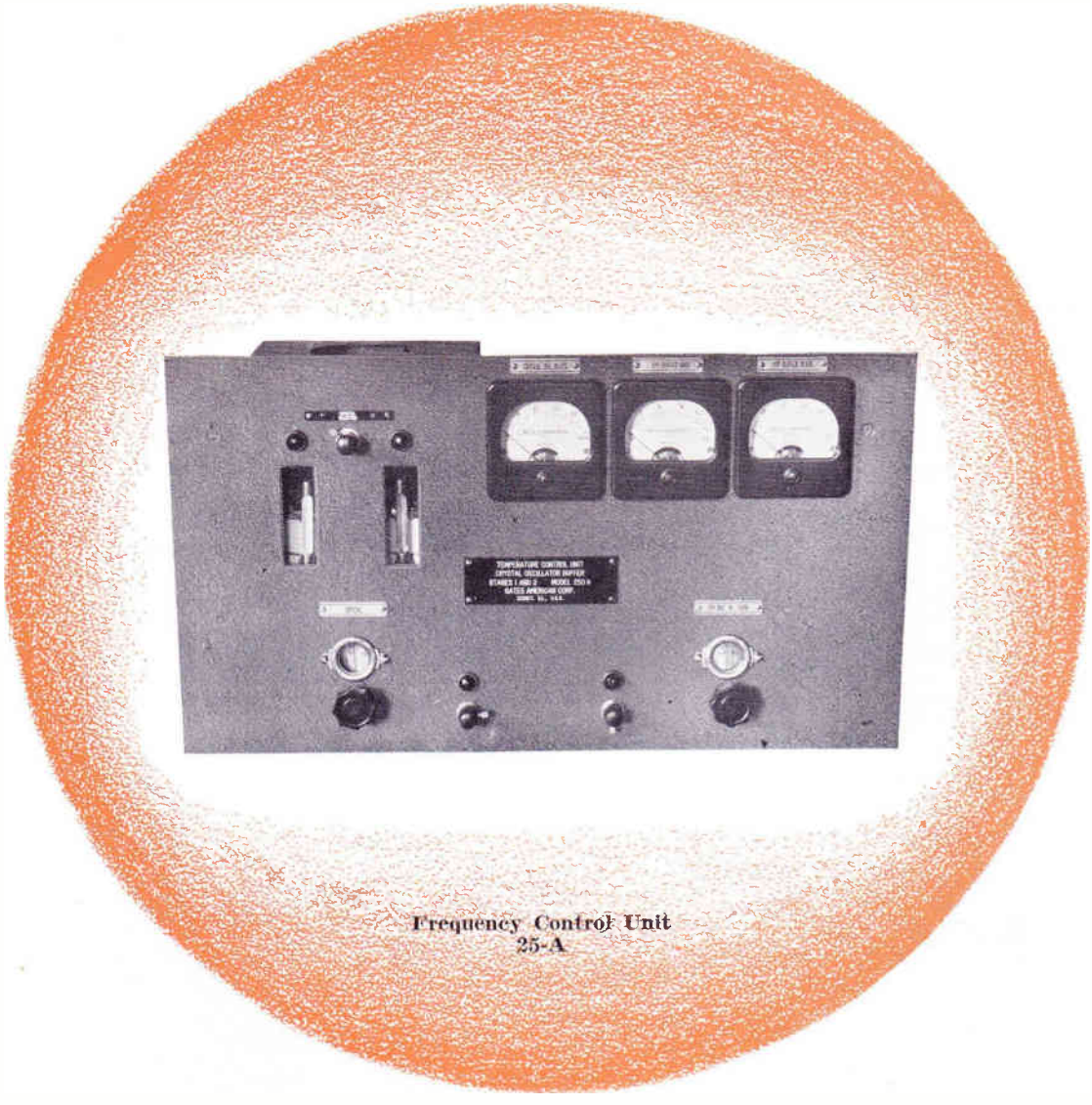


Sectional Rear View Showing Center Chassis and Relay Chassis

MAIN 250-A TRANSMITTER

The main transmitter cabinet contains virtually all of the remaining transmitting equipment with exception of the peak limiting amplifier. This cabinet contains the third and final buffer stage, the radio frequency power amplifier, the modulator, the driver amplifier, bias supplies, main power supply, complete relay control equipment, control panel, metering equipment and other required components.

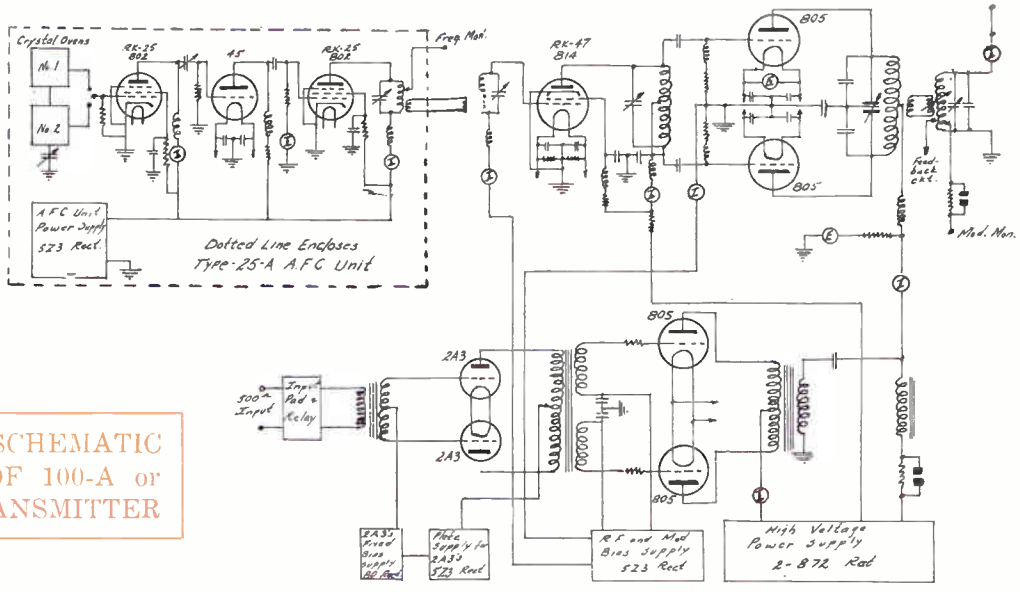
The third buffer stage employs a type RK47 tube which is directly interchangeable with a type 814 tube if desired. This stage is provided with both grid and plate meters as well as grid and plate tuning. Excitation to this stage is obtained from the 25-A frequency control panel. The grid coil is contained in a monel case mounted on the top chassis and is tuned from this point at time of installation. Plate tuning is from the control panel. No neutralization is required for this stage.



Frequency Control Unit
25-A

The final radio frequency stage or the power amplifier contains two type 805 tubes for 100-250 watt operation or two type 838 tubes for 100 watt operation only. This stage operates in push pull. Tuning of this stage is controlled from the main control panel as well as neutralization. The design of the main transmitter layout is such that all tuned devices are in the exact electrical circuit rather than in the exact mechanical circuit. This is derived by use of geared flexible shafts for tuning from the control panel. As a result an efficiency of 72% minimum may be expected from the 250-A equipment which is among the highest ever obtained from a radio broadcast transmitter.

Harmonics are suppressed by the combination balanced push pull R. F. amplifier and the provision of an isolated antenna tuning equipment which is link coupled to the tank coil in the power amplifier stage. Both units are mounted in the main transmitter cabinet in most cases. Transmitter is provided ready to couple either to a direct coupled antenna or transmission line.



GENERAL SCHEMATIC DIAGRAM OF 100-A or 250-A TRANSMITTER

Tuning in the antenna circuit for exact power output is derived through a tuning link or variable link between the tank coil and antenna coil. This method assures the best possible transfer of radio frequency energy without affecting the tuning in any other part of the circuit, harmonic content or balance in the push pull stage.

Metering provided consists of power amplifier grid, power amplifier plate current, power amplifier plate voltage, antenna current, and filament volts.

Power change in the 100-250 watt model is by means of a single key which, when changing from 250 to 100 watts, reduces plate voltage, audio excitation and modulation monitor excitation all in one operation by means of relays.

Temperature Control Oven

The modulator employs two type 805 tubes in the 100-250 watt unit and 838 tubes in the 100 watt unit only. High level class B modulation is employed with full 100% modulation possible by using only 66% capacity of the modulator, assuring low distortion content, improved regulation and long tube life. Modulator plate current meter is provided.

Though the modulator tubes in either case are zero bias design a small amount of bias is provided so that the tubes may be kept in perfect balance at all times by means of a balancing control provided.

The driver amplifier uses a pair of 2A3 tubes in push pull fixed bias providing two and one-half more times undistorted output than required to fully drive the transmitter for 250 watts output. The power supply for the driver amplifier is a separate unit to that of the main power supply as is the radio frequency and modulator bias supply. The transmitter is protected with a bias relay preventing turning on any high voltage or automatically cutting the high voltage in case of bias supply failure.

The main power supply consists of a pair of 872 tubes in single phase full wave delivering 1250 volts at 1 ampere or 25% more than required for 250 watt operation, assuring power regulation of from 3% to 4%. Transformers and filter chokes are of heavy design fully cased in cast housings providing complete shielding and low temperature rise over long heavy schedules.

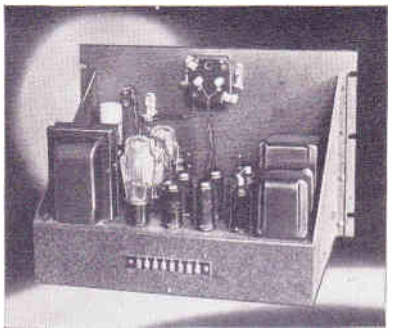
Starting equipment and protective devices are as fine and complete as money can buy. Complete time delay starting, push button control, circuit breaker control in the main primary line and plate overload relay control in the secondary high voltage line is part equipment. Door interlocks for the two front and one rear door are handled by heavy approved switches that will not give trouble. No circuit, either low or high voltage, is handled direct from the

Rear View Frequency Control Unit

control panel, all being done by relays. No fuses are required because of the primary circuit breaker provided.

The main transmitter cabinet is as fine from a mechanical and appearance standpoint as it is electrically. The top inside chassis is of copper plated resistance welded chrome finish steel. Complete frame construction is of aluminum assuring better electrical properties and lighter shipping weight. There is no part in the entire transmitter that cannot be reached quickly for servicing when required.

The outer design provides a galaxy of colors including terra cotta, steel gray, natural aluminum, black control devices and monel metal corners and meter frame trims. The 250-A is smart and commercial in its eye value immediately creating an atmosphere of domination in high quality. Size 72 inches high, 28 inches wide, and 20 inches deep, over all. Other colors available at no extra cost.



Rear View 27-C Limiter

THE AUDIO COMPRESSOR

Not until the announcement of the Gates American 250-A Transmitter has any broadcast transmitter been supplied as standard complete with peak limiting amplifier. This is a separate panel as shown in the illustration and with its use allows a full 3 Db. more average modulation than would be possible without its use. This means without question approximately double signal output over that of transmitters not using a peak limiting type speech equipment. As a result it can be said with close accuracy that at 250 watts the 250-A Transmitter would be quite comparable to any 500 watt transmitter not using a peak limiting amplifier or at 100 watts quite comparable to any 250 watt transmitter without peak limiting amplifier. This is not just a matter of theory but in actual practice has even proved more absolute as a peak limiting amplifier acts as a means of increasing the average signal level which in the average case is a more noticeable increase than a carrier increase.

The 27-C Limiter has three all push pull stages (note that every stage from audio input to the final radio frequency power amplifier is push pull) and employs a regulated design power supply assuring accurate compression at all times regardless of line voltage. The differential bridge type of compression is employed and not electronic, the latter inducing serious distortion into the circuit where tube condition is not to the extreme in perfectness.

The 27-C is finished in steel gray and may be rack or desk mount. Panel size is 12¼ inches by 19 inches with vertical rear design. Tubes employed: two type 6J7, two type 6F6, two type 6N7, one each type 80, 6C6 and 2A3.

Characteristics

	250-A	100-A
Carrier Output	100/250	100
Frequency Range	550—1600 Kc.	550—1600 Kc.
Power Supply	Normally supplied for 220 volt, 60 cycle, single phase. 110 volt on order.	
Power Consumption	250 watt—1700 watts 100 watt—1300 watts	1250 watts
Radio Frequency Stability	±10 cycles	±10 cycles
Radio Frequency Harmonics	Below .05%	Below .05%
Modulation	Class B; full 100% High Level	Class B; 100% High Level
Audio Input 100% Mod.	+3 Db.	—0 Db.
Average Program Level	—2 Db.	—5 Db.
Audio Frequency Response	±1½ Db. 30 — 12,000 cycles	
Audio Distortion (50 - 7500 cycles)	85% Mod. — 2.0% Rms. 100% Mod. — 2.5% Rms.	
Noise Level	More than 60 Db. unweighted below program level	

Operation Costs—At lower cost of 2c per Kwh, and 3,000 hour tube life, for 250 watt operation, approximately 9¼ cents per hour.

Tubes

	250-A	100-A
RF:	2—RK25 or 802	2—RK25 or 802
	1—45	1—45
	1—RK47 or 814	1—RK47 or 814
	2—805	2—838
AF:	2—2A3	2—2A3
	2—805	2—838
Power Supply:	2—872	2—872
	3—5Z3	3—5Z3
	1—80	1—80
Compressor:	2—6J7	2—6J7
	2—6N7	2—6N7
	2—6F6	2—6F6
	1—6C6	1—6C6
	1—2A3	1—2A3
	1—80	1—80
	1—6C5	1—6C5

Presenting

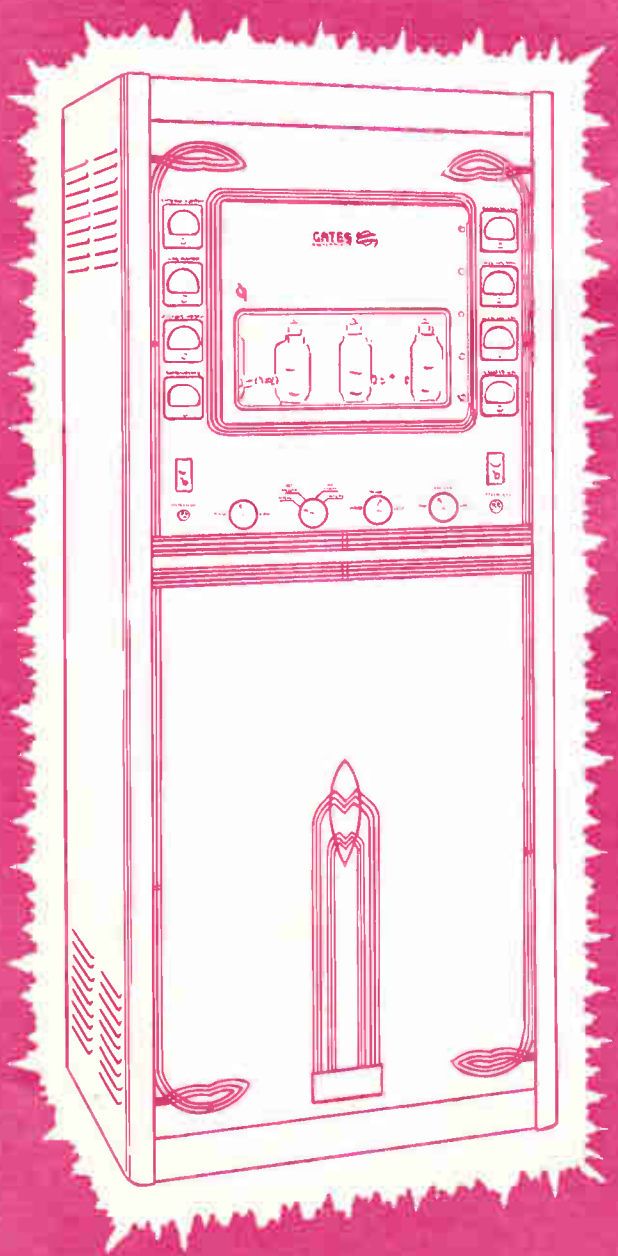
the

Gates

250-C

BROADCAST TRANSMITTER

(Featuring Integrated Design)



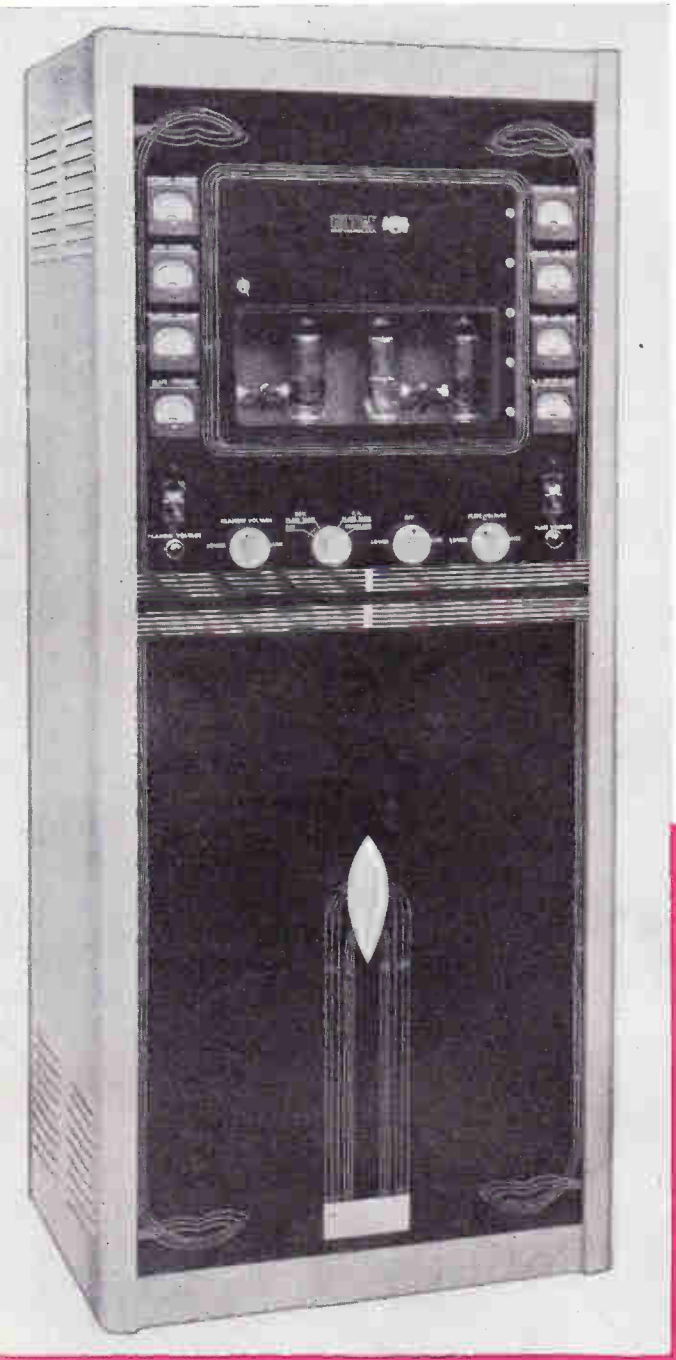
GATES
QUINCY, ILLINOIS, U.S.A.

AMERICAN
CORPORATION

IT IS with a distinct feeling of pleasure that Gates American Corporation announces the 250-C Broadcast Transmitter, the third of an illustrious line, a product that will merit the confidence of the broadcast industry as have the multitude of products that have already come from the Gates Companies.

Integrated Design

Of primary importance in the construction of this transmitter is the important demand of all engineers that maintenance be easy from the standpoint of visibility and accessibility. This feature was incorporated after considerable study by using a complete new type of structural layout. This new layout is INTEGRATED DESIGN—the new simplified style of building transmitters, introduced and originated by the Gates Companies. INTEGRATED DESIGN takes advantage of the natural operational sequence of radio circuits in its evolution and as a consequence the placement of parts is simplified which is a direct contribution to better stability and efficiency. By paying scrupulous attention to the principles of integrated design it is possible to mount all of the components of the 250-C Transmitter on a single panel extending from top to bottom of the transmitter cabinet. Power supplies are placed at the bottom. Next comes the exciter amplifier for the final RF amplifier and then the final RF amplifier and modulator come side by side at the top. Thus, it is easy to see that no space is wasted, the mechanical arrangement is also the logical electrical arrangement—all made possible through an intelligent study of transmitter construction problems, and their solution is now, for the first time, available in the new 250-C Broadcast Transmitter.



Front view 250-C Transmitter. Modern styling of the front panel and cabinet makes this the leading "eye appeal" transmitter. Controls are arranged for the most convenient operation.

Showmanship for the Transmitter

The front panel of the 250-C Transmitter is really the outstanding part of the cabinet design as far as appearance goes and was made purposely to contribute its maximum effect to the "showmanship" function that properly designed transmitting equipment must have if it truly serves its purpose. The panel covers the entire front of the transmitter and is finished in black, trimmed in two colors, ivory and a pleasing red tone, applied in a design of fine narrow lines to give that added touch of distinction and to set off the placement of the controls. Truly the 250-C Transmitter is the Show Transmitter of 1942.

Detailed Description 250-C Transmitter

This transmitter, an entirely new development in the 250 watt field, embodies the latest improvements for the small broadcaster who wants the finest equipment at the right price, and the finest materials incorporated by the most modern engineering practice into a really superb transmitter.

The 250-C will please the most critical station executive because of its pleasing appearance—appearance that will enhance

any installation. This feature plus the day after day, year after year, trouble-free performance that is built into all Gates equipment assures him of the finest in technical apparatus in the most important piece of equipment—the transmitter.

The engineer will be equally proud of the 250-C because of the high quality of materials, excellent workmanship, visibility and accessibility; all features that contribute to better operation and easy maintenance.

Careful inspection of the information that follows, a necessity when considering an investment of this size, will reveal the concrete advantages to be obtained by installing a Gates Transmitter in your present or anticipated station.

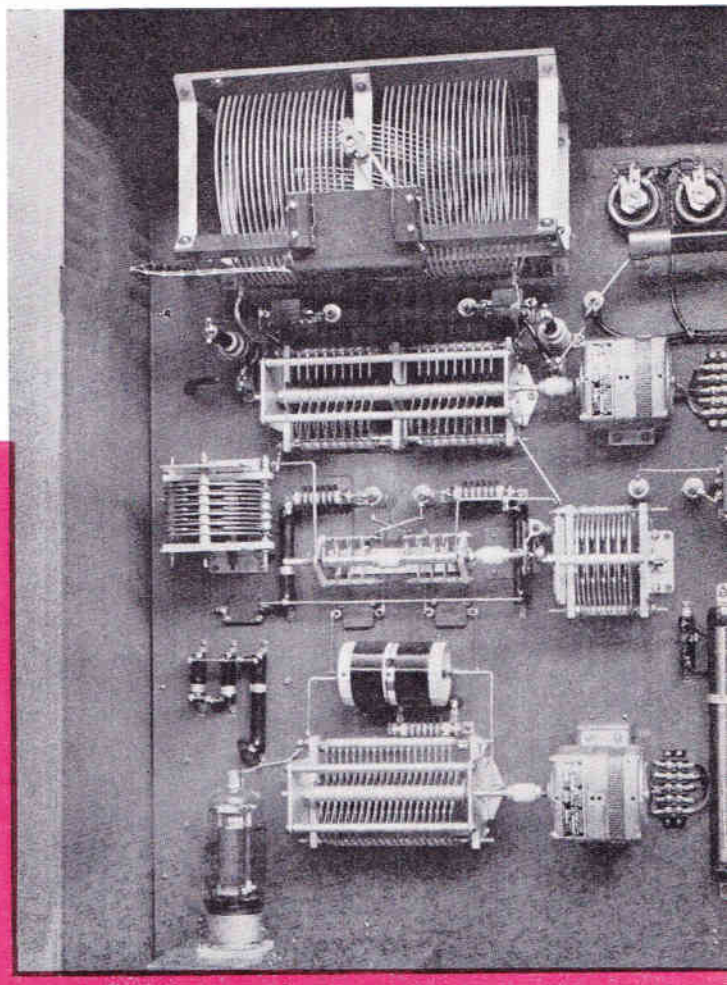
Radio Frequency Circuit

This consists of the final RF amplifier and driver stages in the main transmitter cabinet externally excited by the 25-A Frequency Control Unit. The final RF stage is a push-pull Class "C" high level modulated amplifier incorporating all the well known advantages of simple adjustment, economical operation and low maintenance common to this type of amplifier. The most outstanding advantage, and a superior advancement in the design of 250 watt transmitters is the introduction of MOTOR TUNING in the condenser adjustments of the final stage and the final stage loading to the antenna. MOTOR TUNING has never been incorporated in the design of a 250 watt transmitter before. The simplicity of tuning on routine adjustments is evidenced by the fact that only one control is actually used in the tuning procedure and that is the reversing switch used to operate the tuning motors. The motor to be used in the adjustment is quickly selected by another switch adjacent to the tuning switch on the front panel and all operations are clearly designated above each one.

Another outstanding contribution to the design is the use of air dielectric padding condensers across the final RF amplifier tuning condenser. This is truly a boon to the management of any station as well as to the engineering personnel as it does away with the necessity of replacing padder condensers which are one of the costliest single items in the transmitter. Air dielectric condensers are not materially harmed by flashover which often happens if over-modulation occurs forcibly enough. Under the same circumstances mica dielectric condensers would be harmed beyond repair and would have to be replaced with a consequent loss of time on the air and great expense for the repair parts.

The tubes used in the final amplifier are the well known type 810. The driver stage uses one type 813. Link coupling is used to couple the output of the 25-A Frequency Control Unit to the input of the 813 driver stage.

The 25-A has been in the Gates line for some time and has almost as many users as do the complete transmitters that Gates has been building for the past four years. It consists of an oscillator stage and two buffer amplifiers and provides the comparatively small power output required to drive the power amplifier unit of the 250-C transmitter although more power than is necessary is available as the capabilities are 15 watts. This surplus of power guarantees the maximum in stable operation. These advantages are further aided by the precision

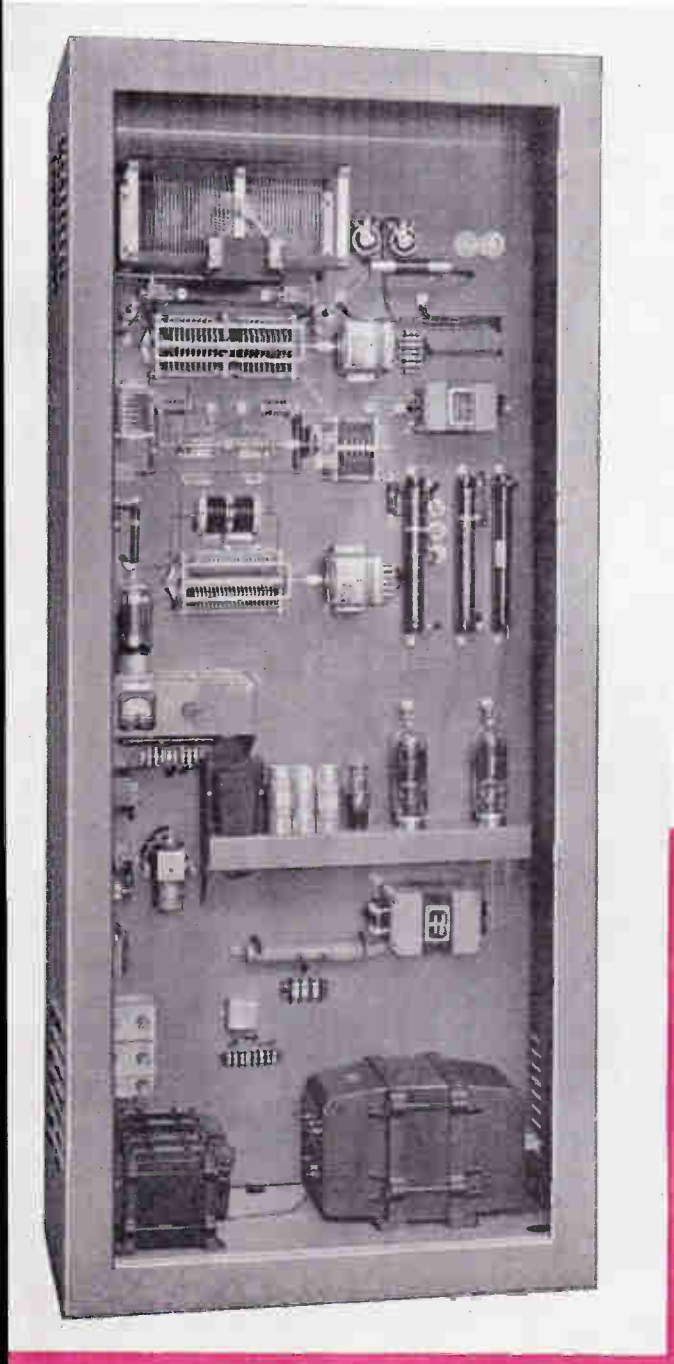


The RF circuit is shown in this illustration. It's easy to see that any component can be examined or removed without disturbing any other one.

ground low drift quartz crystal which accurately controls the frequency of operation of the oscillator tube providing absolute assurance that the operating frequency gets the proper start. The precision of the frequency control circuit coupled with the advantages outlined above for the entire unit insures positive "on frequency" operation and at the same time compliance with the Rules and Regulations of the Federal Communications Commission.

Audio Frequency Circuit

This portion of the 250-C is a Class B stage using a pair of 810 tubes capable of modulating the final amplifier 100%. The power output capability of this stage is actually greater than is necessary to produce 100% modulation and thus when it is considered that the driver amplifier is more than capable of driving modulators to full output, and that this output will never be used in actual practice, it is quite obvious that with the rating this amplifier carries there will never be any possibility of distortion occurring or any lack of ability to modulate the transmitter fully. The driver portion of the audio unit is not contained in the transmitter but is provided either as a push-pull Class "AB" pair of 2A3 tubes with their own power supply all mounted on a separate relay rack panel or as standard equipment the 27CG Limiter Amplifier is supplied with the transmitter to provide the driving power.



Rear view 250-C Transmitter. Neatness and logical arrangement rank with quality in the design of this transmitter.

Antenna Coupling

The final tank of the 250-C Transmitter terminates in a low impedance coupling coil capable of adjustment for feeding any impedance line from 30 to 100 ohms. Higher impedance may be provided on order without incurring any delivery delays. In cases where the transmitter and antenna are close together no antenna coupling unit is necessary. In these instances a special coupling network is provided in the transmitter output circuit to obtain the proper match between the transmitter and the antenna.

Controls

Two large toggle switches, one on either side of the control panel, are used to control application of power to the filament and plate circuits of the transmitter. Not only do these switches turn the equipment on and off in the conventional manner but they also act as overload and circuit breakers. Their action is much more adaptable to transmitter operation than the older and heretofore widely used overload relays and separate circuit breakers as their sensitivity is in inverse proportion to the overload that occurs. Thus if a temporary overload occurs, such as a modulation peak, there is no danger of putting the transmitter off of the air as the switch will not trip for temporary slight overloads of short duration. If the overload would persist then the service would be interrupted. Also if a short circuit occurred in the transmitter the switch would immediately trip and the transmitter would be off the air. These two switches are

in the primary side of the power circuits and being in this location afford protection to the entire transmitter and not just the circuit affected by any possible breakdown. As a consequence if a breakdown of any serious consequence should occur at any place in the transmitter the power would be interrupted and the whole transmitter would have protection. This same feature obviously prevents destruction of costly components in cases where the older methods would have isolated only parts of the transmitter and in no case would have protected the primary power circuits such as the switches in the 250-C do.

The plate and filament voltage controls are large power rheostats and have been specially chosen because of their ability to hold up over long periods of time without developing hot spots or becoming noisy. By judicious use of these two controls it is possible to lengthen tube life by proper regulation of the filament voltage and, of course, the plate control regulation is made to make it easy for the operator to adjust the plate voltage to the proper value to comply with the regulations of the FCC. The motor tuning selector switch has an "off" position and three "on" positions for selecting the driver plate tank tuning, power amplifier plate tank tuning and coupling respectively. The motor tuning control is merely a two position switch with the center position neutral and the left and right hand positions for "lower" and "raise" of the tuning adjustment selected by the motor tuning selector switch.

Above the controls is the plate glass door through which the RF and modulator tubes can be seen clearly at all times. On each side of the door are the meters, four on a side, with their functions clearly designated above them.

Meter Complement

The 250-C Transmitter is the only one that has provision for mounting the remote reading antenna current meter on the front panel of the transmitter without removing the antenna current line meter. Also the 250-C Transmitter has nine meters in all—more than any other 250 watt transmitter on the market previous to the announcement of the 250-C. The entire meter complement is mounted in the front panel of the transmitter with exception of the driver grid current meter. This is mounted in the rear and is readily accessible by opening the rear door. It is readily seen that all the meters that are necessary to observe to comply with Commission regulations are on the front panel and as they are all of the 3 inch scale size mounted at eye level it is indeed a simple matter to take meter readings at any time. The complete meter complement is as follows:

Antenna Current
R. F. Line Current
Filament Voltage
Plate Voltage
Modulator Plate Current
Power Amplifier Plate Current
Power Amplifier Grid Current
R. F. Driver Plate Current
R. F. Driver Grid Current

The other meters associated with the transmitter are in the 25A Frequency Control Unit and consist of the oscillator plate current meter and one each plate current meters for the first and second buffers.

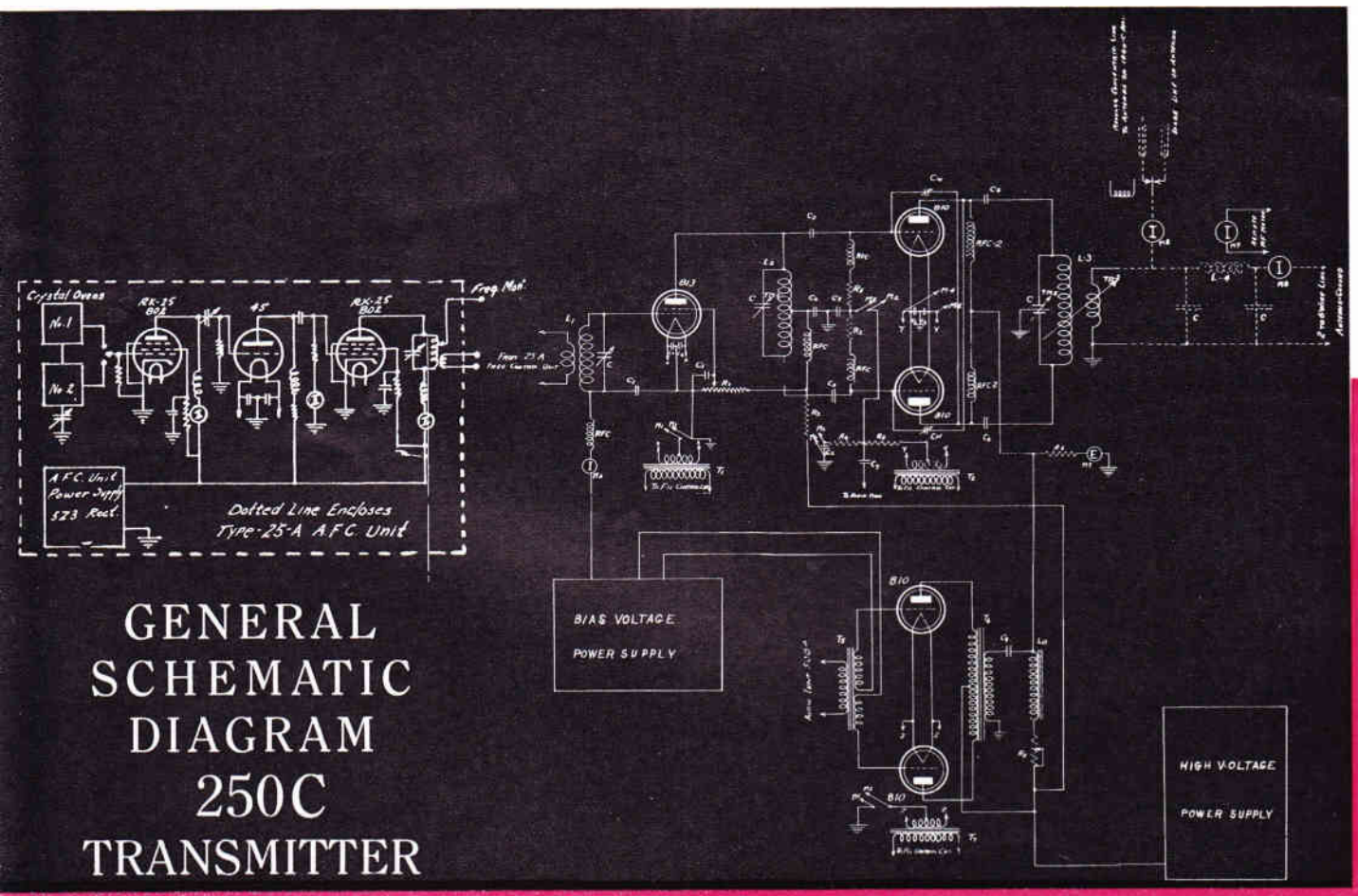
Meter arrangement for the 250-C is symmetrical and makes it easy to take the necessary readings. The plate glass door in the panel opens to allow access to the modulator and final RF amplifier tubes.

ACCESSORY EQUIPMENT FOR STUDIO AND TRANSMITTER INSTALLATIONS

Gates has long served the broadcast industry in the capacity of a source for every item of equipment needed in the station for programming. As a consequence many articles are carried in stock to give the broadcaster a well rounded source for his every need. Among the items available on short notice are the ER215 relay rack for housing the monitors, amplifiers and patch panels and any other accessories that are needed at the transmitter, the Model M velocity microphone, Model 555A cardoid dynamic microphone, microphone wall sockets and plugs, microphone stands and a host of other things too numerous to mention. Gates maintains a staff specially schooled in the needs of broadcasters and will be glad to recommend an equipment list to fit your particular requirements.

ACCESSORIES SUPPLIED WITH THE 250-C

Complete 250-C Equipment consists of the transmitter with tubes, FCC required spares, two crystals, two ovens and a Compressor Amplifier complete with its tubes. Thus it is easy to see that the 250-C is really the most completely furnished transmitter on the market and will fit into any station in existence. Of course, in some cases where a limiter amplifier is already in use the limiter amplifier normally supplied with the 250-C is not required and in such cases a separate amplifier consisting of two 2A3 tubes in push-pull complete with power supply is furnished for mounting in your own relay rack or other convenient location. This amplifier is provided so that the zero level output of your present speech equipment is raised to at least 27 Db., which is the level required for driving the modulators in the 250-C.



TECHNICAL DETAIL 250-C TRANSMITTER

CARRIER OUTPUT—250 Watts.

FREQUENCY RANGE—500-1600 Kc.

POWER SUPPLY—Normally supplied for 220 volts 60 cycle.
Single phase 110 volts on order.

POWER CONSUMPTION—1700 watts.

RADIO FREQUENCY STABILITY—10 cycles.

RADIO FREQUENCY HARMONICS—Below .05%.

MODULATION—Class B; 100% high level.

AUDIO INPUT FOR 100% MODULATION—Plus 26 Db.
Not including gain of 27CG limiter or optional 2A3 amplifier.

AVERAGE PROGRAM LEVEL—Plus 22 Db.
Not including gain of 27CG limiter or optional 2A3 amplifier.

AUDIO FREQUENCY RESPONSE—Plus or Minus 1½ Db.
30 to 12,000 cycles.

AUDIO DISTORTION (50 to 7500 cycles)—85% Modulated, 2.0% Rms.
100% Modulated, 2.5% Rms.

NOISE LEVEL—More than 60 Db. unweighted below program level.

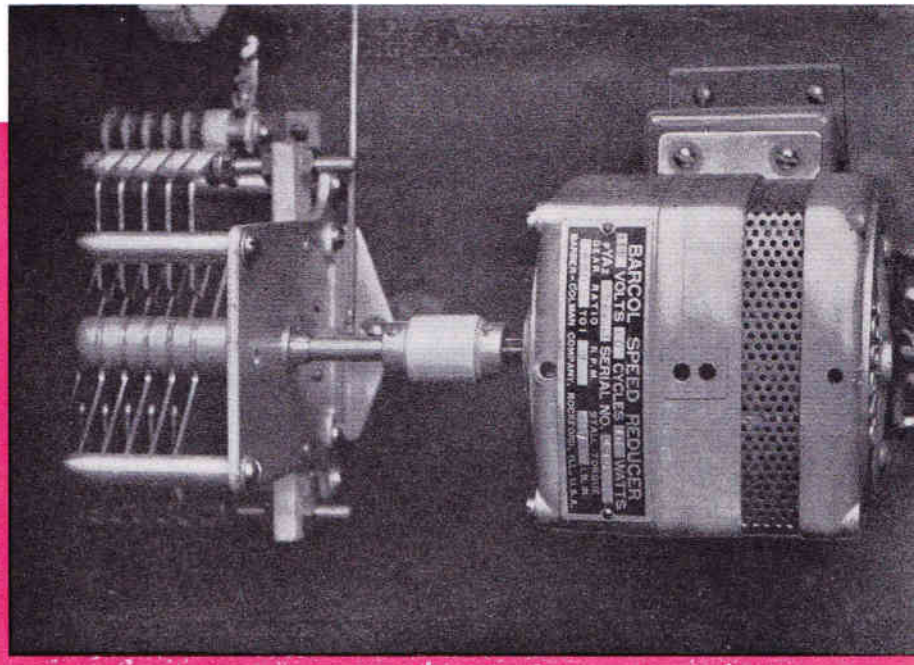
OPERATION COSTS—At power rate of 2c per Kwh. and 3,000 hour tube life for 250 watt operation approximately 9¼c per hour.

TUBE COMPLEMENT—

(In 25A A. F. C. Unit)	2-802	or RK25
(Supplied with 250C)	1-45	
(R. F. in Transmitter)	1-813	or RK48A
	2-810	
Modulators (Class 'B')	2-810	
High Voltage Power	2-872	
Bias Voltage Power	1-5Z3	

DIMENSIONS—76 inches high, 32 inches wide, 24 inches deep.

WEIGHT—900 pounds.

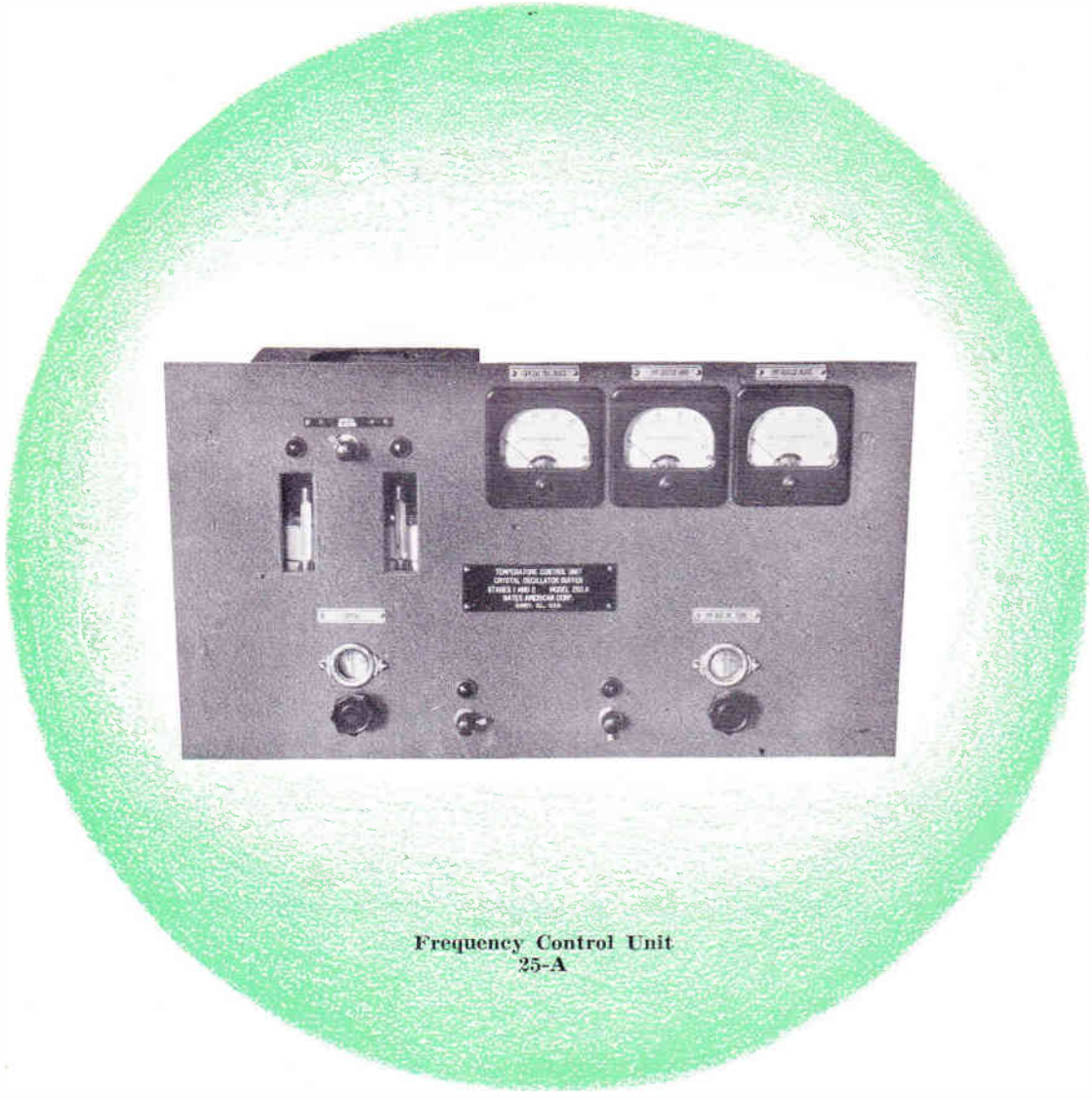


This is a close-up of the motor used to tune the final grid circuit. Considerably more power is available than is necessary to assure smooth operation at all times.

RELAX!

and have

ONE CYCLE ACCURACY---BY USING



Frequency Control Unit
25-A

Gates American Corporation

Model 25-A

FREQUENCY CONTROL UNIT

Fully F. C. C. Approved

Please turn the page

THE 25-A FREQUENCY CONTROL UNIT

is complete

There are few, if any, frequency control equipments on the market as complete as the Gates American 25-A. There are none with such a galaxy of features and fully F. C. C. approved that are as moderate in price yet so fine that it boasts of customers in every rank and file of the industry.

The 25-A has oscillator, first and second buffer stages, power supply, two separate temperature control ovens equipped with the latest AT cut crystals, complete Weston metering, provision for frequency monitor take off, link coupled output for easy coupling to succeeding stage of transmitter, crystal change over switch, indicating lamps for each temperature chamber, individual power cut off switches for oscillator and buffer stages and tuning controls for both the oscillator and final buffer stages. Most certainly the 25-A is complete. It need only be placed in the rack, connected to the transmitter and monitor and it is ready to go. As the 25-A carries full F. C. C. approval no long delays are had before installation can be made.

Material Features

The 25-A is constructed of only the finest materials to assure freedom from breakdowns and continual operation year in and out. Look over these features:

1—Oscillator stage utilizes commonly known untuned circuit or this stage is tuned at the factory to your frequency, assuring stability under all conditions. A small grid tuning capacity is provided to obtain a frequency variance within 50 cycles.

2—Quick heat cycle ovens with carefully ground AT cut crystals are supplied. Two complete ovens with crystals standard equipment.

3—Isolating type first buffer stage assures frequency stability regardless of condition existing in succeeding stages of the transmitter. This is an exclusive Gates American feature.

4—No neutralizing employed as first buffer is self neutralized and second buffer is screen grid design.

5—Interchangeability of tubes. Either type RK25 or 802 tubes may be used in oscillator and second buffer.

6—Heavy duty power supply, oil filled condensers throughout and guaranteed cool operation under heavy schedules.

7—Weston metering in oscillator plate and second buffer grid and plate. No midget meters, full 3 inch.

Rear View Frequency Control Unit

The 25-A Carries a Triple Frequency Check

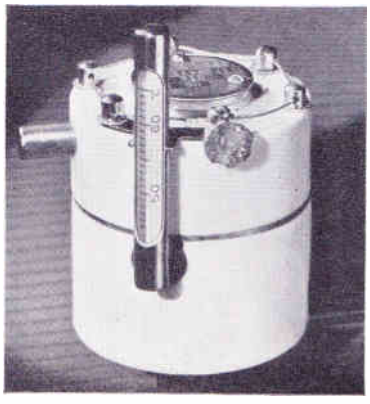
. . . . for your assurance

Here is part of the service you obtain before delivery of the 25-A Frequency control unit to your station. First, each of the crystals is checked in the ovens by the elaborate apparatus of the manufacturer of the ovens and crystals for Gates American which is at the Bliley Laboratories in Erie, Pa. Here each unit is tested for several hours to make certain that no frequency inaccuracy or drift prevails.

These crystals with ovens are then shipped to Gates American where they are given a second and complete identical test as operated in the 25-A as a complete unit. Crystal current is checked against frequency. It is checked on low and high line voltages to make certain this will not affect the thermostats either in operation or sticking.

After the 25-A has been fully tested and pronounced okay by Gates Engineers it is tested for three days for frequency drift under varied line voltage and heat conditions and not released until you can completely relax as to your frequency accuracy when the 25-A is installed in your station.

This triple check is for your relaxation after installing the 25-A that it can and will stay on frequency.



One of the two 25-A Crystal Chambers

Don't Gamble with your frequency stability

There's no odds when the Gates American 25-A is used.

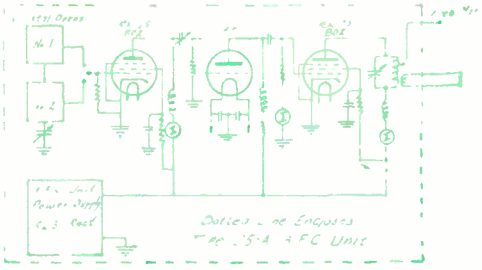
Are you revamping the transmitter? Make the 25-A a part of your program.

Are you depending on one crystal? The 25-A has two.

Please turn the page

General Description 25-A

The 25-A equipment is constructed for standard rack mounting having a panel size of 19 inches by 10½ inches and finished as standard in baked black ripple enamel unless supplied with Gates American transmitters where the finish is gray. Other finishes may be had to match customer's other equipment such as telephone black, steel gray, platinum gray and tan. Chassis size extends 14 inches to the rear and 16 inches wide. Bottom of chassis removes by self tapping screws for servicing if required. Crystal chambers are protected by a removable shield cover (from the top) and oscillator tube is enclosed in this same shield but may be removed through a hole in the top of the shield thus making unnecessary removing the shield to remove the tube.



A type RK25 (interchangeable with type 802) tube is used as oscillator and second buffer. A type 45 tube untuned as first buffer and a type 5Z3 as power rectifier. Power supply is fused, uses oil filled condensers and designed for cool operation. Standard equipment is for 110 volts 50-60 cycles, but other voltages and frequencies may be had at $5.00 additional.

The complete crystal oven with crystal is of the plug-in type, quick heat cycle type and will hold the frequency under all conditions within 3 cycles or less of the assigned frequency. The 25-A may be had for any frequency from 525 to 9000 kilocycles covering either standard broadcast or high frequency broadcasting stations.

Tuning controls are provided for minor frequency adjustments in the oscillator stage (approximately 50 cycles) and second buffer plate tank tuning. Output is link coupled but may be had capacity type coupling at no extra cost where specified. Front panel switches are provided with adjoining pilot lights with one switch as the master switch and the second to turn off the plate voltage from the buffer stages so the isolated tuning of the oscillator stage may be made if desired when the transmitter is off the air.

Complete metering is provided with full size Weston Pattern 301 square case meters in the oscillator plate, second buffer grid and second buffer plate. All meters and controls are plainly marked.

In the 25-A the purchaser has a complete self contained unit up to the third buffer stage. For those using composite transmitters it is ideal, eliminating the need for lengthy approval data as well as the time for designing the most touchy part of the entire transmitter. For those stations having factory built transmitters that could improve on frequency stability or lack proper excitation the 25-A is the answer. A full 7 watts of excitation is obtained with the 25-A equipment.

At the moderate cost of the 25-A equipment no broadcasting station can afford to take chances with being off frequency and with the elaborate construction of this equipment no broadcasting station need pay more.

Price **$373.00**

Code Word (YUHAS)

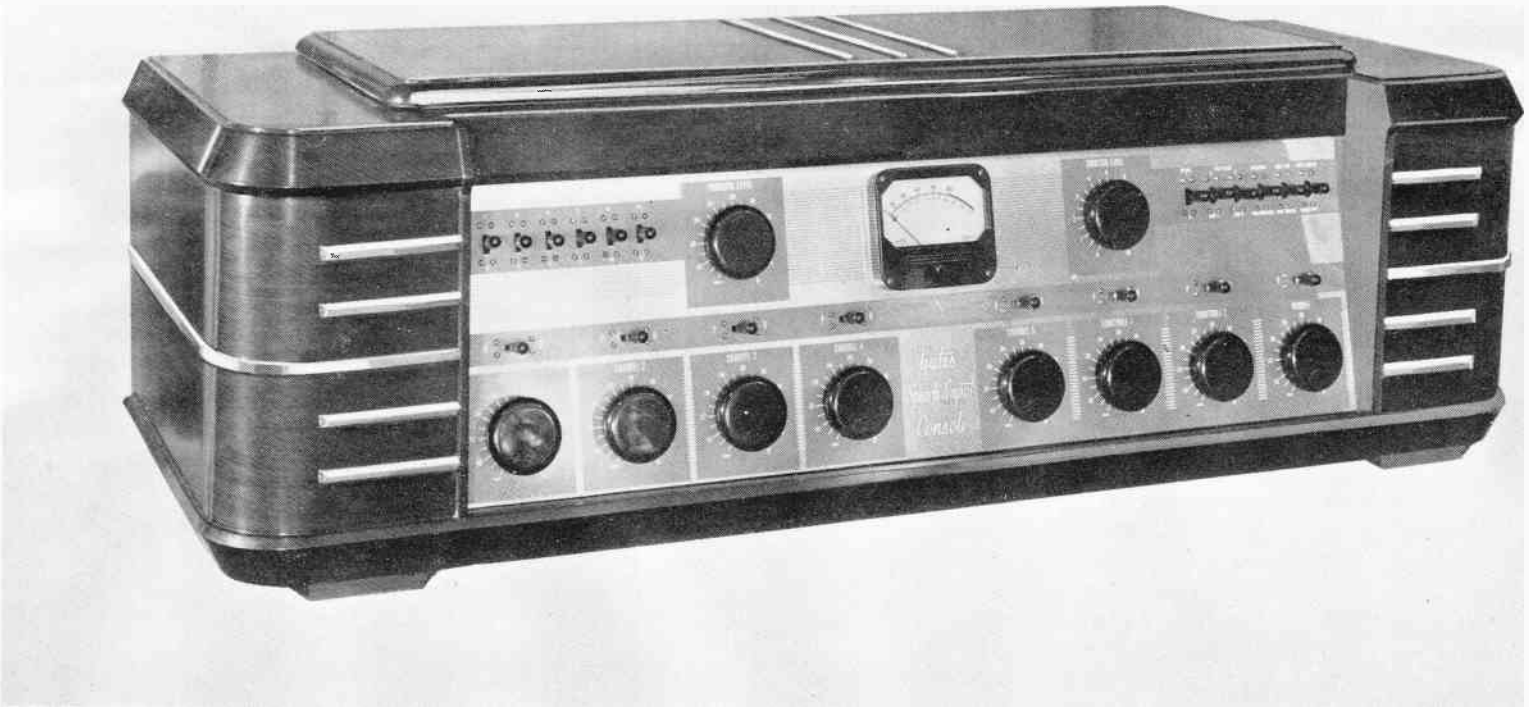
Manufactured by

GATES
QUINCY, ILLINOIS, U.S.A.
AMERICAN CORPORATION

SPEECH INPUT CONSOLE —

Deluxe Model 30

- *Enlarged*
- *New for 1944*

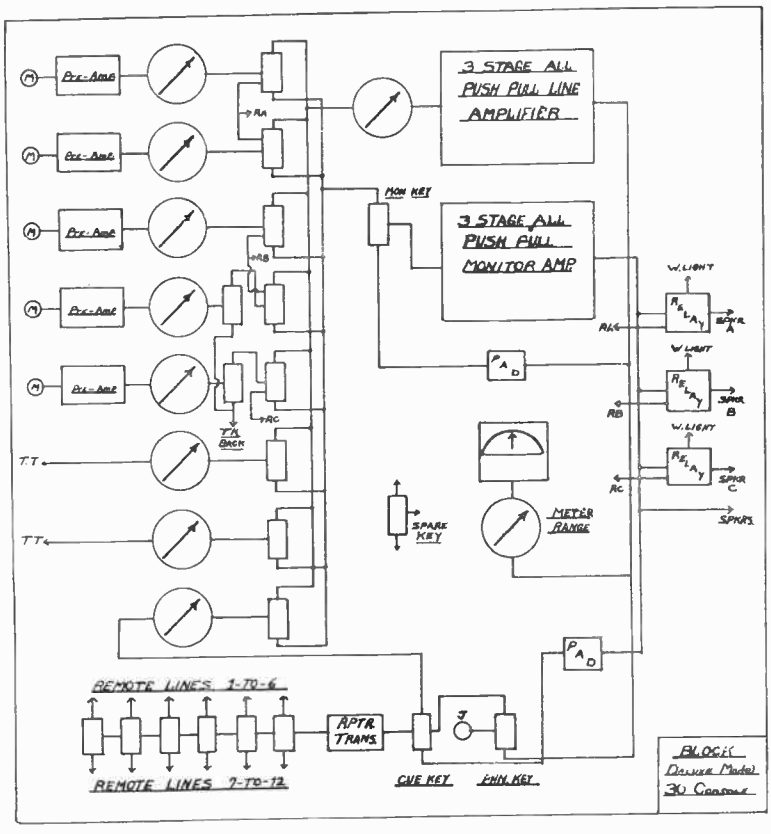


General Description

The deluxe Model 30 Gates speech input console is without a doubt the finest speech input equipment of the console type that Gates has ever manufactured. In fact it is doubtful that any console equipment offers both the engineering perfection and eye value that will be found in the new deluxe Model 30. Gates has combined the stream lining of design and appearance into a truly remarkable instrument that will command the show off position in any radio studio installation.

Appearance however not backed up with performance of equal magnitude is valuless. Thus behind beauty is an electrical instrument that quickly reflects to the trained engineering eye a mark of thoughtful layout, expert workmanship and convenience of control both by location of front panel instruments and a complete compliment of all necessary circuits to make possible the use of the new deluxe Model 30 console in radio stations and recording studios of all sizes.

The Console is 50 inches long, 15″ high and 18″ deep. Panel slopes at 12 degrees angle considered correct for best control and vision. A one piece chassis is employed assuring ease of serviceing, short wiring leads and more apparatus per inch of space. The panel is steel, copper flashed with three color finish of black, satin grey back ground and lettering in ivory. Terminations are all to the rear. Controls may be cleaned by simply removing the bottom plate held in place by six screws. Cabinet is of steam formed heavy walnut veneer with rounded corners, stream lining trims and top of inlaid selected maple in four sections, each section in four matched units. This is a cabinet that will outlast steel both in wear and long time good appearance. Shielding is effected in the equipment itself and the cabinet is not required as any part of the electrical operation.



Technical

AMPLIFIER COMPLIMENT — 5 pre-amplifiers each single stage with individual input and output transformers and input may be arranged for 30, 250 or 500 ohms. Pre-amplifiers are ahead of the mixer assuring high level results. Line amplifier is famous Gates 3 stage all push inverse feed back unit using a high gain circuit for plenty of control over dynamic range of broadcasting and recording. Monitoring amplifier is also a 3 stage unit, all push pull with 6 watts output for ample loud speaker distribution.

MIXER — Eight mixing channels in all. Five for microphone stages, two for turn tables and one for remote and net work lines. Each mixing control is large ladder type control with extreme low contact noise and steps of 1½ Db. over a large range of attenuation. Each control is adjoined by a key above which allows selection of any mixing channel into either the program or monitoring amplifiers. Keys above microphone controls also operate loud speaker relays (see relays).

REMOTE LINES — Provision for 12 remote lines which feed through a common repeater transformer into the remote mixing channel. Remote lines may be used for net work also. Each remote line may be cued through the monitoring amplifier (see cue key).

CUE KEY — Provided so that the 12 remote lines may be cued before broadcasting. Receives signal from padded output of monitoring amplifier. When key up program is being cued. When down being broadcast.

SPARE KEY — Provided unwired for any additions local engineer desires to make.

TALK BACK KEYS — Microphone channels 4 and 5 are wired through two keys known as talk back keys. When down both channels are normal into the mixer circuit. When up either or both channels may be fed to an external amplifier for complete independent control which may be used for talk back, separate broadcasting or recording or auditioning.

PHONES KEY — Used so that head phones may be connected across either the output of the program amplifier or listen across any remote line.

MONITOR KEY — When up the monitoring amplifier is connected as an audition amplifier and operates from any of the mixer positions. When down the monitoring amplifier is connected through a pad across the output of the program amplifier for exact program monitoring.

RELAYS — Three are provided operating in sequence of one relay for the first two microphone channels, a second relay for microphone channels 3 and 4 and a third relay for microphone channel 5. Each relay cuts off the loud speaker before each live microphone and provides contacts for operating standard 110 volt warning lights in the studios. Relays operate from 6 volts DC through a coprus oxide rectifier on the power supply.

TERMINATIONS—By means of screw type terminal strips on the rear so that all circuits may be cabled in with excellent appearance and convenience.

METER — Standard VU meter illuminated 4" square Weston Model 862 or equal with five step range control, located on console chassis.

POWER SUPPLY — Mounted on small separate chassis for location under the control desk. Supplies all filament and plate voltage plus DC voltage for relays and constructed of heavy parts for 24 hour a day service.

IMPEDANCES — Microphone inputs variable from 30 to 500 ohms. Turn tables 250 ohms. Remote lines 500-600 ohms. Output of program amplifier 500-600 ohms. Output of monitoring amplifier 500 ohms.

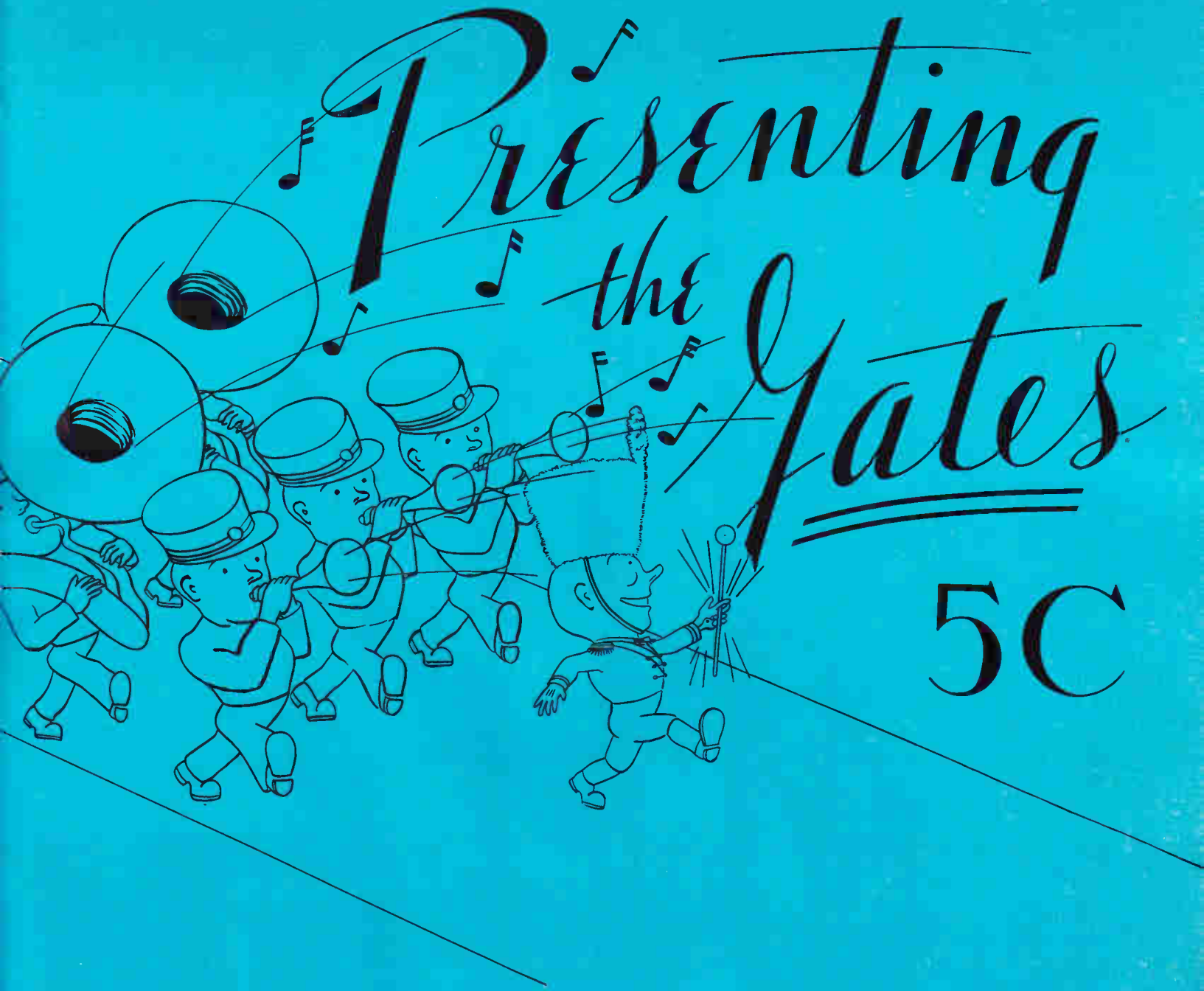
RESPONSE — Over all from microphone input to program amplifier output flat from 30 to 15,000 cycles within 2 decibels. A rise of about one decibel is effected at 30 cycles for normal loss at this frequency in most transmitters or recording equipments. Response of program amplifier only, flat from 30 to 10,000 cycles within one decibel. Flat from 30 to 15,000 cycles within 2 decibels. Monitoring amplifier, flat from 40 to 10,000 cycles withing one decibel. Remote channel, flat from 40 to 10,000 cycles within one decibel.

NOISE AND DISTORTION — Overall noise from microphone pre-amplifier to line amplifier output with average tubes—60 decibels. Distortion at plus 20 VU output of program amplfiier ½ of one percent. Distortion of monitoring amplifier at 6 watts output 4 percent.

TUBES — 5 type 6F5 pre-amplifier tubes. Two 7C7, two 7A4 and two 59 program amplifier tubes. Four 7A4 and two 6F6 monitoring amplifier tubes. One 5Z3 power supply rectifier.

Model 30 DeLuxe Console with power supply and tubes code word YUPID ..... **Price on Application**

Where turn table pick up design requires pre-amplification Gates has designed a special pre-amplifier that fits into the end of the Model 30 cabinet. This is known as Model 58B amplifier.



STUDIO SPEECH EQUIPMENT

The 5C — An Economical Way of Handling More Programs Better

GATES RADIO & SUPPLY CO.
MANUFACTURING ENGINEERS SINCE 1922
QUINCY (Cable Address Gatesradio) ILL., U. S. A.

A New Standard in Studio Speec

Model 5C Dual Cabinet Deluxe Speech Equipment

THE Model 5C Speech Equipment is designed for the radio broadcasting station that desires the very best in both equipment quality and wideness of facilities. There is no standard speech system on the market today that will equal in performance and flexibility the Model 5C Equipment.

The basic units of the Model 5C consist of the special control console which is the nerve center for the entire speech equipment and the dual rack cabinet assembly which houses the numerous amplifiers, patch panels, power supplies and accessory equipment to complete this very elaborate installation.

CONSOLE EQUIPMENT

The control console will be instantly recognized as a take-off of our famous Model 30 Speech Input Console but in this particular equipment the control circuits only, are used in the console unit and no amplifiers of any kind are provided as these are all in the dual cabinets. However, the interlock system employed in the patching equipment and the many additional patching, bridging and feeding circuits in the dual cabinet equipment added to the wide flexibility of the control console, itself, create a circuit setup that is unusual in its flexibility and essentially much greater in capacity than any standard equipment ever offered by any broadcast equipment manufacturer.

The control console has, as will be seen by the illustration, eight mixing positions. Seven of these mixing positions operate the seven pre-amplifiers in the rack cabinets. These pre-amplifiers interlock through the patch panel on the rack cabinet into the seven mixing channels of the console, thus the pre-amplifiers can be patched into any other circuit irrespective of the circuit setup created by the standard terminations.

Five of the mixing channels with pre-amplifiers are for studio service with microphones. The remaining two can be used with microphones if desired, but are primarily intended for turn-table service with low level pickups. The mixing channels are labeled on the panel Channel 1 to Channel 5 and Turntable 1 and Turntable 2. The eighth mixing channel is the remote channel which simply is used for riding gain on remote circuits. The input to the remote mixing channel is through the cue circuit which is one of the keys in the group of six in the upper right hand corner. This cue key simply provides a method of cueing the remote line before the actual broadcast. The remote cue circuit, of course, is only an intermediate point between the remote mixing channel and the actual remote lines which are fed by the twelve key positions which is the group of six keys in the upper left hand corner of the panel. These keys feed directly to the

Yes, the console certainly has "it" when it comes to appearance; the result of good taste combined with master craftsmanship. Remember, too, that all controls are logically arranged and clearly marked. Practicability is combined with beauty.

Handling Facilities for Broadcast Stations

patch panel circuit of the second rack cabinet thus allowing the patching of any remote line terminating at the patch panel into the twelve key positions on the console, allowing the setting up of twelve complete remote circuits at the fingertips of the control operator.

Other circuits on the console include the selection of any mixing channel by means of the key above into either of two program amplifiers which are provided on Cabinet No. 1 of the dual assembly. For convenience these channels have been indicated as the program channel and the audition channel, though both amplifiers are the same in the No. 1 cabinet, so actually the circuit arrangement is identical. Thus it can be said that any mixing channel can be set up into a choice of two amplifier circuits giving provision for emergency as well as complete auditioning and recording simultaneous with broadcasting.

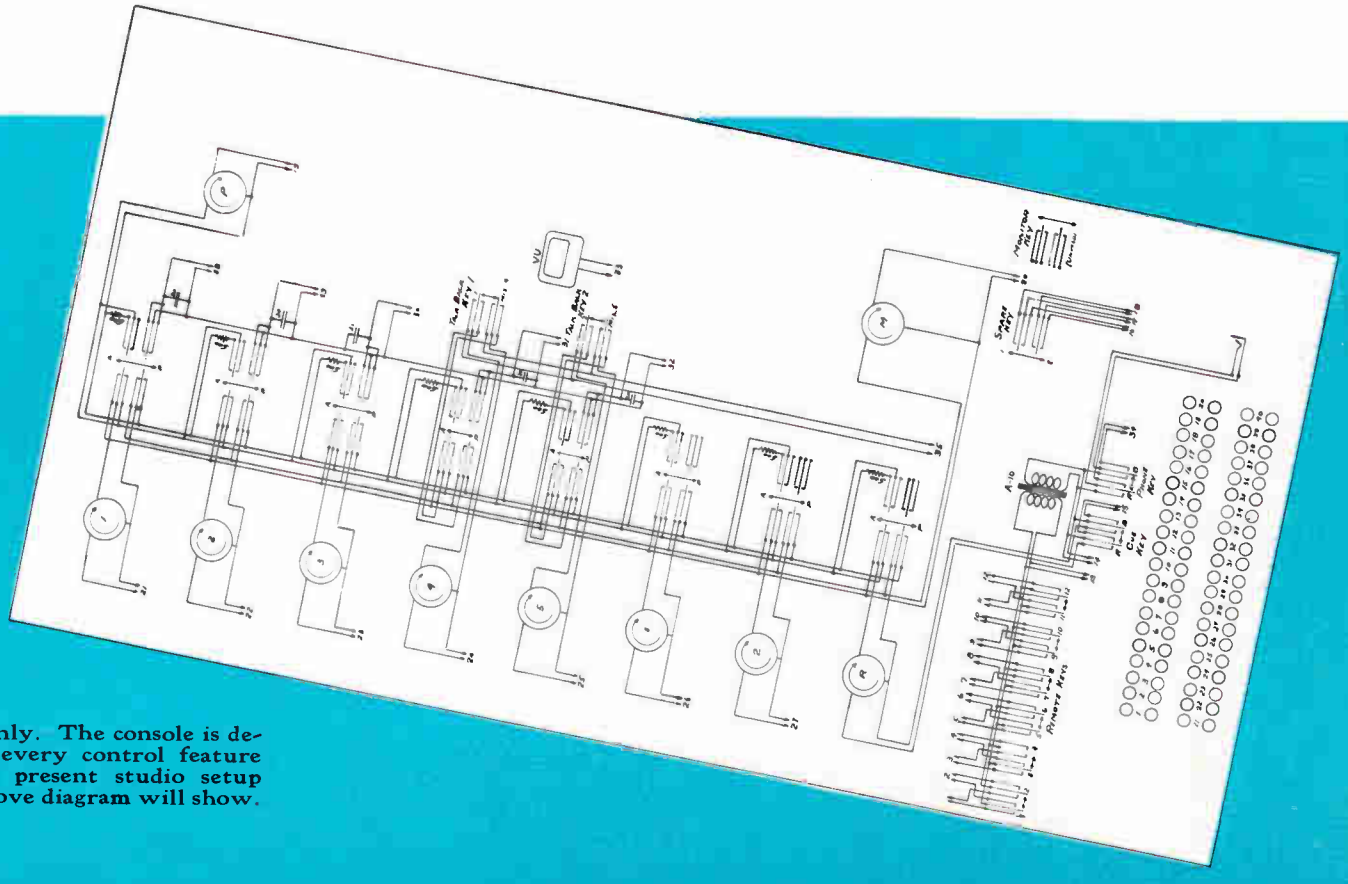
Additional key circuits include two talkback provisions, a spare key which is left unwired for any simple addition that the purchaser might desire to make and a headphones key which makes possible the selecting of the headphones from the program circuit to the remote listening circuit. Also an order phone may be plugged directly into the remote line by means of this key.

Provided on the console is a Model 802 VU meter Scale B which is the largest size VU meter and is controlled by the meter range switch on Cabinet No. 1. This meter is selectable by means of a key on Cabinet No. 1 to operate from either of the program amplifiers on the Cabinet No. 1 equipment.

The control console is beautifully housed in a steam fitted combination walnut and foreign Rakuda wood cabinet modernly streamlined and styled in chromium. The appearance of this console equipment is indeed ultra modern and commanding to say the least. The panel, proper, is available in a wide variety of color ranges as follows:

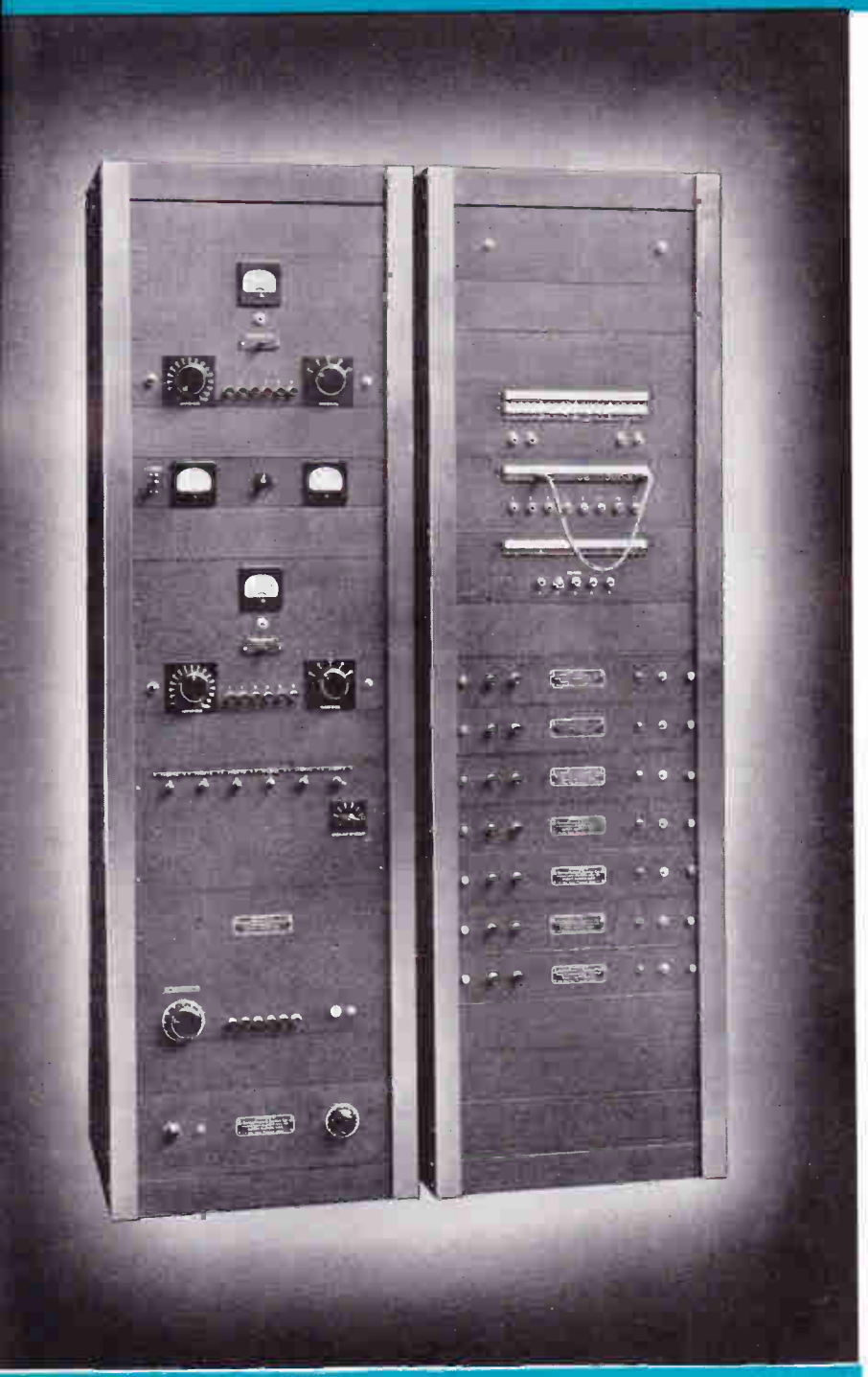
Selection 1—Base color black. Body color brushed aluminum. Lettering white. Control knobs black.
Selection 2—Base color gray. Body color brushed aluminum. Lettering white. Control knobs black.
Selection 3—Same as Selection 2 only control knobs ivory.
Selection 4—Base color maroon. Body color brushed aluminum. Lettering ivory. Control knobs ivory.

From the above color schemes the proper color combination should be selected to match the studio fittings. Terminations to the console are made by numbered and lettered terminal strips extending across the back of the console. 500 feet of 2 conductor shielded wire is provided for making all terminations to the two rack cabinets.



Flexibility? Certainly. The console is designed to provide every control feature necessary in your present studio setup as a study of the above diagram will show.

A Unified System for Meeting Every Studio



With these two cabinets and the console your studio will be equipped to handle any speech requirement for one or a dozen studios.

CABINET No. 1

The dual cabinet system connects to the console equipment previously described. Cabinet No. 1 is the left of the two cabinets shown. Looking from top to bottom, it incorporates the following equipments: 10F Amplifier, meter, control panel, a second 10F Amplifier, loud speaker control panel, monitoring amplifier, bridging panel and 6 volt DC rectifier panel. External connections for the console to these panels and cross connections from Cabinets No. 1 and 2 are made to lettered and numbered terminal panels at the bottom of each cabinet.

10-F AMPLIFIERS—The 10-F Amplifiers comprise the latest design program amplifier utilizing a three stage all pushpull circuit with inverse feedback and high fidelity performance considered very satisfactory for frequency modulation. The amplifiers incorporate their own self contained power supply and are complete and individual units in every respect. Two of these amplifiers are supplied on Cabinet No. 1 and are so wired into the circuit that they are instantaneously switchable into any circuit used in the entire equipment. The horizontal three position key directly below the volume indicator meter is the output key which feeds the output of the 10-F directly into the program line, speaker control panel (See detail on speaker control panel) or the 500 ohm line. These positions are marked "Transmit," "Speaker" and "Record" respectively. The recording line may be used for any purpose requiring a 500 ohm high level line.

The output keys of the 10-F Amplifiers are in effect wired in parallel in that both amplifiers connect to the same three lines. This is a very desirable feature. In case of failure of one 10-F the other one may be immediately substituted by throwing the output key to the proper line and changing the key position on the control console from one 10-F to the other.

Although provision for emergencies is an excellent feature of the two 10-F's the most desirable function is that of providing greater flexibility. It must be remembered that a monitor amplifier is provided for the speaker system so that the speakers are never dependent on the 10-F's thus leaving both free for the "Transmit" or "Record" functions.

The 10-F Amplifier consists of three stages, using Type 6J7 tubes in the first stage, 6C5 tubes in the second stage and Type 59 tubes in the output stage. These are all in pushpull. A Type 80 rectifier is employed. Inverse feedback keeps the distortion content in the neighborhood of one-half of one percent and by means of unusual shielding and engineering the noise level of these amplifiers in many cases if 70 Db below program level, program level in most cases being considered as 0 Db.

Pushbuttons are provided for plate current reading of every audio tube in the amplifier. A master gain

peech Requirement

is provided for general gain adjustments and a meter range switch is provided for controlling the individual VU meter reading with five positions. The VU meter provided is a standard Model 301 Scale B VU meter. Each amplifier is provided with a pilot light and starting switch and mechanical construction is the extremely popular conventional vertical chassis type employed in all Gates amplifier units.

As the gain of these amplifiers is in the neighborhood of 85 Db it can be seen that when used in combination with the preamplifiers and control console the gain with even the lowest level circuit is never wanting.

METER PANEL—The meter panel consists of a two range milliameter which measures the plate current of all tubes in the amplifiers of both cabinets and a 150 volt AC line meter which merely indicates line voltage conditions. Also, on this panel is a key selector switch used in selecting the output of either of the 10-F Amplifiers to the VU meter on the console. Between the two meters is the range switch for the VU meter on the console. These meters are three inch square case standard 40 scale division meters.

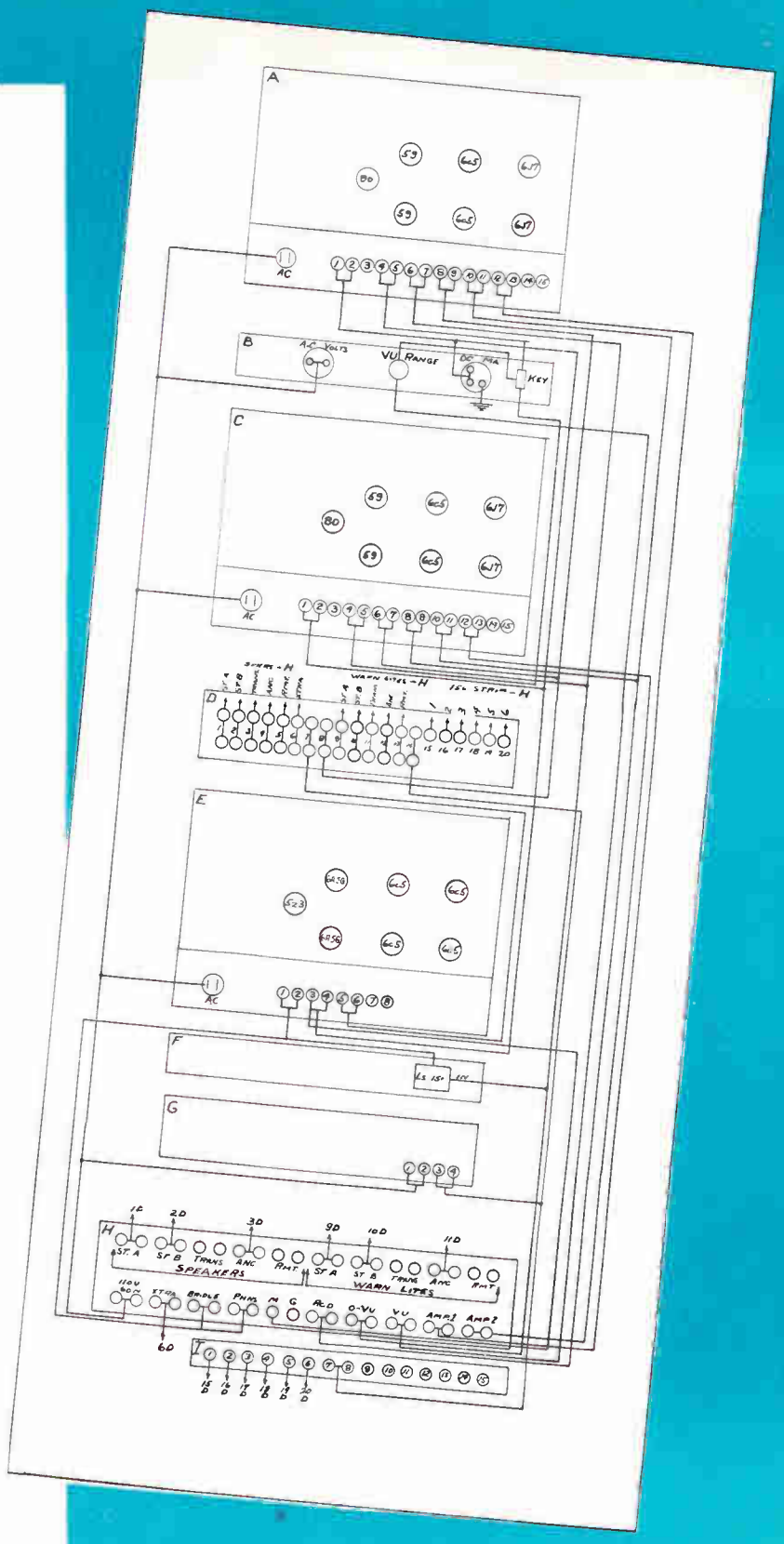
LOUD SPEAKER CONTROL PANEL—The loud speaker control panel has six loud speaker positions, five of the positions being controlled by relays which obtain their excitation on Mixing Channels 1 to 5 of the console when the keys on the console are turned to the "on" position. These relays provide loud speaker cut-off and studio warning light operation for five different circuits. The sixth loud speaker circuit is excited at all times without means of relay cut-off for loud speakers in reception rooms, offices, etc. This loud speaker panel is unique to say the least. It is actually a small distribution system somewhat like those used in hotel radio systems. It provides a selection of each of the loud speakers into two circuits with an "off" position as the third circuit. One of these circuits connects the loud speaker to the output of the monitoring amplifier. The other circuit connects the loud speaker to the output of either of the 10-F Amplifiers when the keys on the 10-F Amplifiers are at "speaker" position.

All of the loud speaker switches on the control panel are provided with dummy resistors so that when any speaker is changed or cut out of the circuit the impedance on the loud speaker line is always constant.

Any standard loud speakers employing universal matching transformers may be used.

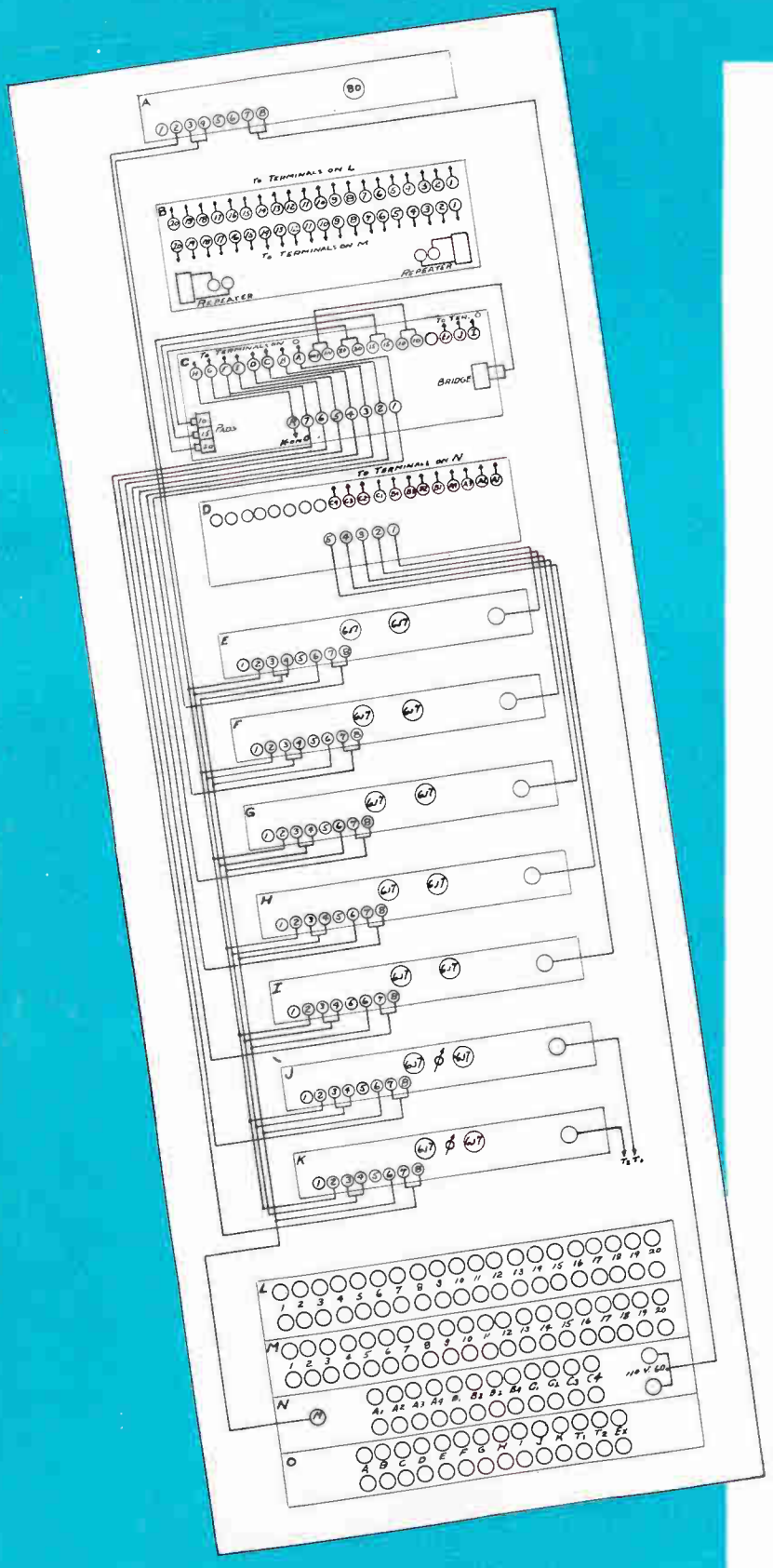
50-C MONITORING AMPLIFIER—The 50C is a three stage pushpull amplifier quite similar to the 10-F Amplifiers less the VU meter and having higher audio output. Three pushpull stages are employed utilizing four Type 6C5 and two Type 6A5G tubes. A Type 5Z3 rectifier is employed. Pushbutton metering for each of the audio tubes, master gain, pilot and starting switch comprise the control equipment. The usual vertical type chassis construction is employed.

The 50-C Monitoring Amplifier bridges the output of either of the 10-F Amplifiers when these amplifiers are at "transmit" position. In other words, the monitoring amplifier is always operating across the program line or the line feeding the transmitter. This positive connection is made without switching for the simple reason that the extra 10-F Amplifier in this cabinet



Complicated? Not for you. Our engineers did all the hard work. All you have to do is follow directions. You can put the 5C to work in less than an hour after delivery.

With the 5C Small Stations Ca



Here is everything needed for pre-amplification and patching.

is switchable into any circuit and the monitoring amplifier becomes singularly used as the word implies, namely, for monitoring the program.

The output of the 50-C feeds the loud speaker control panel which, as previously outlined under the loud speaker control panel data, makes possible selecting any speaker to either the 50-C Amplifier or the 10-F Amplifiers.

BRIDGING PANEL—The bridging panel consists of a simple bridge transformer having a primary impedance of 16,000 ohms which bridges the program position of either 10-F Amplifier and its output terminations feed a bridging pair which is terminated at the rack terminal strip. This provision is made for any external feeding circuit such as a network or any other similar circuit.

RECTIFIER PANEL—This panel is located at the bottom of the cabinet. It consists of a copper oxide rectifier and well regulated filter which produces 6—8 volts DC at 2½ amperes for operating the relays.

The above description shows clearly that Cabinet No. 1 contains all the high level speech amplifying equipment and accessories necessary for any studio.

CABINET No. 2

Cabinet No. 2 from top to bottom contains the pre-amplifier power supply, remote patching panel, interlock patching panel, input patching panel, five Model 56B Pre-Amplifiers and two Model 57B Pre-Amplifiers; in fact, a complete low level studio speech assembly. In addition, six blank panels are provided so that extra equipment such as line equalizers or more pre-amplifiers can be added if required.

External connections to the control console and Cabinet No. 1 are made to lettered or numbered terminal strips at the bottom of the cabinet.

The interunit wiring comprises approximately 1000 feet of individually shielded pairs of wire thus effectively eliminating any possibility of cross-talk or noise pickup, an important consideration in any broadcast station and especially for FM.

PRE-AMP POWER SUPPLY—This is our standard P-2 Power Supply which incorporates a Type 80 rectifier tube into a well filtered section and also provides the 6.3 volt filament supply for the pre-amplifier. Its panel equipment consists of pilot light and starting switch.

REMOTE PATCHING PANEL—The remote patching panel consists of 40 open circuit jacks in banks of 20. For convenience, these have been numbered as talking jacks and remote jacks, twenty jacks being provided for talking pairs and twenty jacks for remote lines. Obviously, they all terminate in the same way and all 40 jacks may be used for remote lines, if desired. On this same panel are provided two repeating transformers, which connect to the pair of jacks on each side of the panel thus allowing the patching in of a repeating transformer between the incoming remote line and the broadcast circuit where necessary.

Handle More Programs, Big Stations Handle Them Better

The repeating transformers have universal primaries and secondaries allowing terminations of 50, 200, 250 or 500 ohms. As supplied, they are connected to cooperate in a repeating circuit of 500 ohms to 500 ohms.

INTERLOCK PATCHING PANEL—This patching panel may be considered an all purpose panel. Provided on it is an additional bridging transformer with the 16,000 ohm input and the 500 ohm output terminated at 2 jacks so that this transformer may be bridged across any desired circuit for any particular combination that might be desired. Also, in this panel are provided three pads of 10, 15 and 20 Db attenuation. Each of these pads is brought to a pair of jacks so that the pads may be patched into the circuit where desired. The pads have a 500 ohm terminating impedance. In addition, the output of the seven pre-amplifiers is brought to this patch panel which, when no patch cord is employed, interlock directly into the seven mixing channels on the control console. If patching is provided the interlock, of course, is broken and whatever new patch circuit is set up is employed.

The interlock is accomplished by means of the eight jacks directly below the 20 jack strip with the bottom eight jacks terminating directly to the eight mixing channels on the control console and on the twenty pair strip the seven pre-amplifiers plus the additional jack provided for a remote interlock are as previously stated, wired into their respective circuits. Thus it can be seen that either the control console or the output circuit may be patched to break the interlock and set up a different circuit.

INPUT PATCH PANEL—This consists of a twenty jack strip and five individual jacks, providing terminations for as many as twenty input circuits such as microphones, which are patched into the input of the five 56B Pre-Amplifiers.

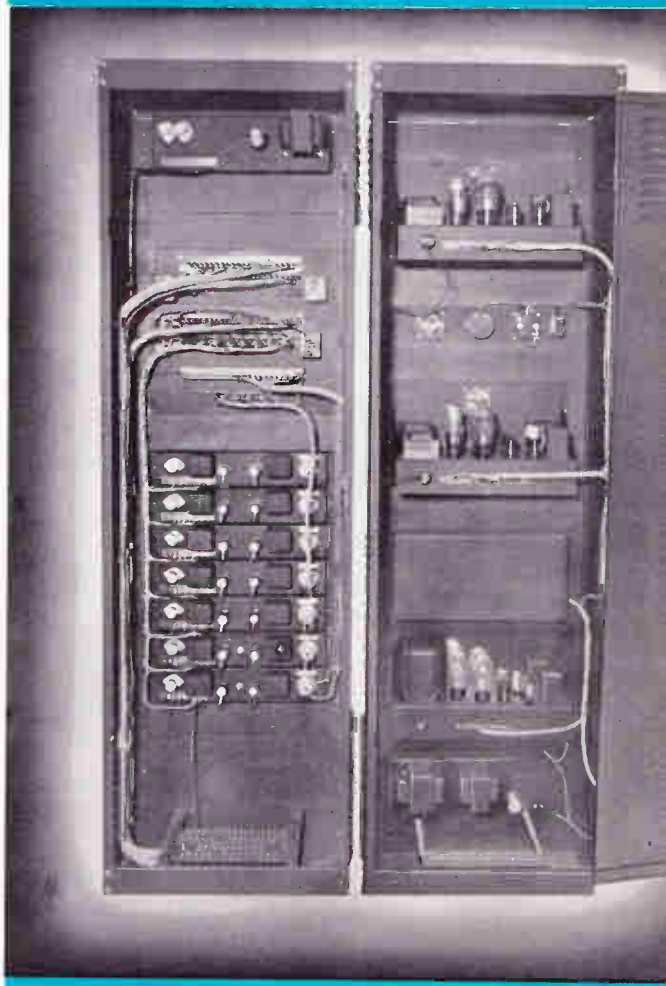
The question may be brought up that handling extreme low level circuits in this manner is precarious but because of the extreme shielding and even the use of completely shielded patch cords the result is the same as a continuous circuit and the additional provided flexibility would not be done without after once used.

The five individual jacks on this patch panel connect directly to the input of the five 56B Pre-Amplifiers, thus it could be said that any of the twenty microphones could be patched into the five pre-amplifiers at will.

56B PRE-AMPLIFIERS—These are standard Gates Model 56B two stage high gain no noise pre-amplifiers famous all over the world for unfailing quiet operation in combination with highly developed gain. They incorporate two stages, each stage using a Type 6J7 tube. Operating controls on each front panel consist of metering pushbuttons, pilot light and "On—Off" switch. Input terminations are made by means of an eight prong plug properly numbered for connection of any type of microphone from 30 to 500 ohms impedance. Output terminations connect directly to the interlock patch panel and are of the proper impedance as used on the mixing console.

57B PRE-AMPLIFIERS—Two of these are supplied as turntable pre-amplifiers and are identical to the 56B except that they are provided with a volume adjusting control on the back of the pre-amplifier for use in balancing transcription turntables for equal level. These pre-amplifiers are wired directly into the turntable circuits and may be used with all conventional low level pickups such as the Western Electric 9A, RCA vertical or lateral, Audak Microdyne or similar type.

PATCH CORDS—Ten 18 inch shielded patch cords are provided utilizing standard PBX equipment throughout for long, satisfactory performance. Both the patch cords and jacks in this equipment are the most expensive that we could purchase with our engineering department well realizing patching troubles in the way of noise and loose jointed connections that cause unending difficulties.



Each unit in the 5C is individually tested and then installed in the cabinet and then the whole assembly is tested for overall performance. All you have to do is connect the AC and the console.

The 5C—A New Standard of Simplicity for Handling Complex Studio Conditions

What is Supplied with Complete Equipment—What Information is Necessary When Ordering

The complete equipment consists of the control console, Cabinet 1 and 2, 10 patch cords, complete tubes in all sockets and 500 feet of connecting cable in the form of two wire shielded cable for connecting the various units together. Also, there is one complete set of instructions with blueprints and drawings for proper terminations.

What the Model 5C System Will Do

The Model 5C System may be used in any multiple studio installation. It is not limited to two or three studios but would handle a ten or twelve studio installation with equal simplicity and satisfaction. In designing this equipment Gates engineers have attempted to combine a rather complex installation into one of simplicity of control and original connecting and placing into service.

By using the control console as the nerve center the control operator need not necessarily be of the engineer class but only with average knowledge of control equipment. The two main cabinets are all clearly labeled as to what every control, jack, etc., consists of and with simple instructions by the installing engineer the layman type of operator should be able to handle this equipment successfully.

The flexibility of the instrument can only be realized by inspecting it and by seeing it in operation. Interested purchasers will gladly be supplied a complete circuit diagram of the equipment at no cost, whatsoever, with the only request being that the circuit diagram be returned if no additional need is had for it.

This equipment carries the usual broad Gates guarantee and likewise the moderate price tag which accompanies all Gates made apparatus.

(An inquiry on your letterhead will bring you a quotation on the 5C)

SPECIFICATIONS

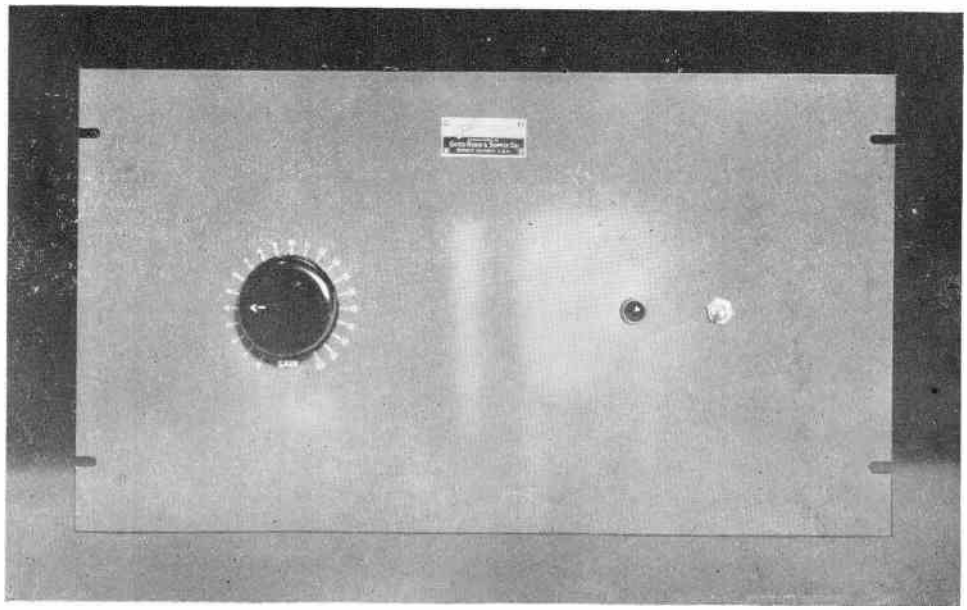
Tubes Used	Sixteen 6J7's, Six 6C5's, Two 59's, Two 6A5G's, Two 80's, One 5Z3.
Input Impedances	Variable 30 to 500 ohms for 56B Pre-Amplifiers. 250 ohms for connecting phonograph pickups to 57B Pre-Amplifiers. 500 ohms remote channel.
Output Impedances	500—600 ohms for 10-F's or 50-C.
Overall Gain	112 Db from pre-amplifier input to 10-F output. 103 Db from pre-amplifier input to 50-C output. 79 Db 10-F only, 70 Db 50-C only. 49 Db 56B and 57B only. Allowance is made for insertion loss in all cases.
Distortion	10-F .4% at 0 Db .6% at 15 Db 50-C .9% at 10 Db .3% at 33 Db
Response	½ Db from 30 to 15,000 cycles for all units.
Noise	10-F Amplifier, at least 65 Db below program level. 50-C Amplifier at least 58 Db below program level. 56B and 57B, at least 65 Db below program level.
Power Consumption	Both cabinets, 545 watts.
Weight	Gross, packed for shipment, 815 lbs.
Dimensions	Packed for shipment, 33 cu. ft.

Like all other Gates Equipment the 5C may be purchased on easy payments by anyone in the United States with approved credit.

GATES RADIO & SUPPLY CO.

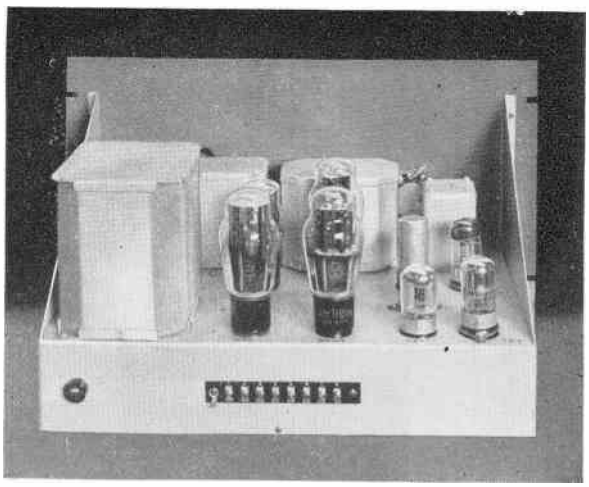
MANUFACTURING ENGINEERS SINCE 1922

QUINCY (Cable Address Gatesradio) ILL., U. S. A.



FRONT VIEW MODEL 51

The Gates Model 51 Utility Amplifier



REAR VIEW MODEL 51

Design Purpose

In every radio station, recording laboratory and in many types of communications there is need for an amplifier that is of such quality and flexibility that it will serve many purposes. Gates engineers have designed an amplifier that may be used for recording of the highest quality, as a line or program amplifier, as a monitoring amplifier, a repeater amplifier, a distribution amplifier and for many other services where low noise, low distortion, flat frequency response and good power output are a requirement. It is a Utility amplifier that allows standardization of many services into one type of amplifier.

Technical Detail —

The Model 51 amplifier is designed to provide a gain of 60 Db. with a noise level measured at 55 Db. or better below program level where program level is plus ten decibels or at higher levels the signal to noise ratio is much improved. As in most every case higher levels are employed as a pad is inserted in the output circuit in case of low level requirements it can be said the noise level in all practical applications is 60 Db. below program level or much better. As the Model 51 Utility amplifier will supply 16 watts of audio power at less than 5% distortion or ten watts of audio power at less than 2% distortion it becomes ideal for high quality monitoring, recording and auditioning.

The amplifier has 3 stages all of which are push pull employing two power supply rectifier tubes to allow the use of fixed bias on the output tubes for greater power output in a minimum of space and lower distortion. The power supply is all self contained and controls consist of the master gain control and starting switch including pilot light. All terminations are made to numbered rear terminal strip. The well known shelf type of chassis construction is used in accommodation of all operating parts.

As a program amplifier where power output is not a major requirement it may be used at input levels as low as -40 Db. with the noise level still satisfactory for good operation. At higher inputs a better method is an output fixed pad to bring about very low noise ratio plus perfect line balance.

As a monitoring amplifier the Model 51 equipment is ideal with it's 16 watts power output and high fidelity performance. It may be used as a bridging amplifier by a simple resistor addition in the input circuit giving an effective bridging impedance of 10,000 ohms.

As a recording amplifier again the high output, low noise and distortion and good response makes it ideal for finest commercial recordings.

Specifications.

Tubes used: two 6A5G, four 7A4, one 80 and one 5Z3.

Gain: 60 decibels.

Noise level: At max. output as much as 70 Db. below program level and average practical operation 55 Db. below program level.

Distortion: At one watt 1%, at 10 watts 2% and at 16 watts 5%.

Response: Flat within plus or minus one decibel from 30 to 10,000 cycles tapering to -3 at 12,000 cycles and -5 at 15,000 cycles.

Line voltage: 110-115 volts 50-60 cycles.

Power consumption: 125 watts.

Size: 10½" high, 19" wide and 12" deep. (Standard rack mounting.)

Finish: Panel steel gray, chassis light gray.

Input impedance: 500 ohms.

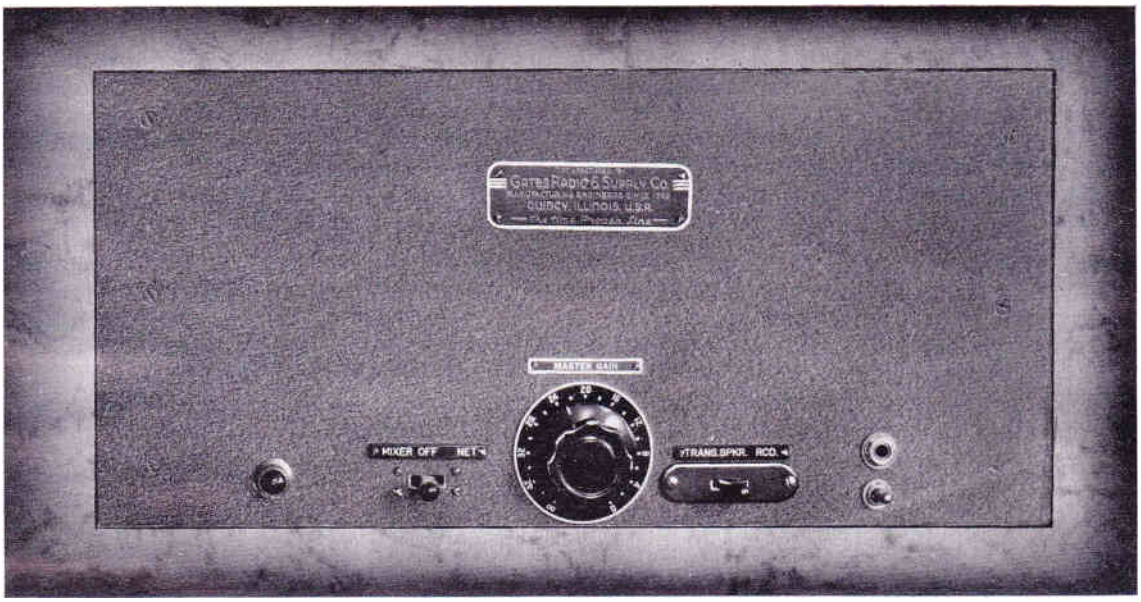
Output impedance: 500 ohms and 8 ohms. (Separate windings.)

The Model 51 amplifier may be had at other line voltages and frequencies as well as other panel colors at slight extra cost.

Linear Broadcast Amplification

in the

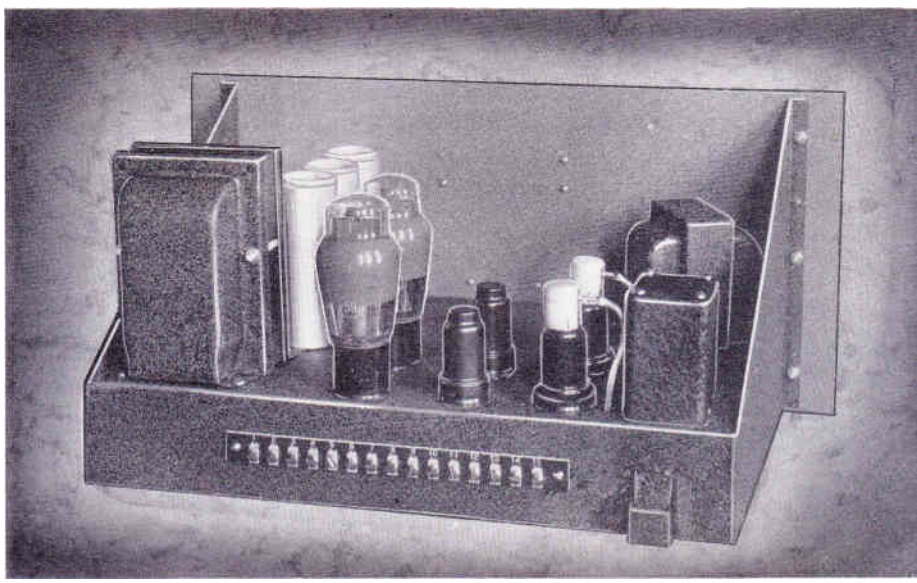
10-D and 10-E
HIGH GAIN AMPLIFIERS



Five Top-Notch Features:

1---Three stage all push-pull circuit
2---Inverse feed back
3---Input key, selective 2 circuits
4---Output key, selective 3 circuits
5---Flat curve 30 to 15,000 cycles

Here is an all purpose amplifier that can be used as a studio, line or monitoring amplifier with the finest response and lowest noise characteristics known to the industry. We urgently recommend reading descriptive detail on the 10-D amplifier.



Grade A Line

A New All-Purpose All-Frequency Amplifier for Radio Broadcasting and Recording

In this new amplifier is offered to the radio broadcasting station and recording industry a unit of unusual performance and unusual features at a remarkably moderate price. We are usually accustomed to seeing a line amplifier with so many tubes, a gain control and a switch to turn it off and on. In the Gates 10-D will be found, (1) a high quality high gain 3 stage amplifier with inverse feed back, (2) an input key allowing the amplifier input selective to two distinct circuits, (3) an output key allowing the output to be switched to any of the three circuits with one of these circuits padded for 0 Db. output, (4) push button tube plate current reading as optional, and (5) new approval vertical chassis construction giving more panel space and easier access to all parts.

GENERAL DESIGN

Built on standard panel 19x8¾ inches and extending 10 inches behind the panel. Chassis made of resistance welded cold rolled steel in one piece, including side brackets which mount to the front panel by three screws on each side. Bottom cover removes easily for access to every part. Numbered terminal strip on rear provided for all terminations. Panel finish is available in a wide variety of colors, including black, steel gray, platinum gray, terra cotta and battleship gray. Though construction is principally for rack mounting, its size and design lends itself quickly to table or special console arrangements.

AMPLIFIER

Incorporates the much used all push pull circuit developed and featured by Gates during the past two years. Extremely low distortion and noise level is possible by the combination push pull, inverse feed back and four shield transformer construction. High gain of nearly 80 Db. adds to the desirability of this equipment. Three stages using two type 6J7 tubes in the first stage, two type 6C5's in the second stage, and two type 59 in the output stage provides a most efficient amplifier with a low tube cost. In this day of true high quality in broadcasting, low distortion content is demanded. A recent stock unit tested produced an actual distortion content of .25% without special selection of tubes and no special alterations whatsoever. These amplifiers are not released for shipment where the distortion exceeds .4% on test.

INPUT KEY

As this amplifier has been designed for versatility an input selector key is provided so that the amplifier may be selective of two input circuits as well as off. For example, the input key at one position may be connected to the mixer, while to the other position may be wired to the output of another amplifier, thus using it for recording, feeding a net work or auditioning. It is for this reason the input key has been labeled "Mixer" for one position and "Net" for the other. The input key is the left key on the front illustration.

OUTPUT KEY

In most modern speech cabinets will be found from two to five amplifiers such as the Model 10-D. In every case they are used for numerous purposes as well as spares. The output key allows direct switching of the output to three positions which have been labeled "Transmit" for use as a line amplifier for broadcasting, "Speaker" for use in feeding a loud speaker or speakers, and "Record" for use in feeding a recording head. The transmit position is series'd with a 10 Db. pad as level to the line for transmitting usually ranges from 0 to plus 5 Db.. Needless to say the markings given this key are merely for sake of labeling and any common requirement for the output may be handled by the output key. The point in having it in the circuit is that outputs from all amplifiers on the same circuit may be paralleled yet disconnected from each other by the fact that no two amplifiers will be operated at the same key position, yet in case of amplifier failure the second can be cut into the circuit instantly.

OTHER PROVISIONS AND SHIELDING

Controls are completed with the master gain control, head set jack, pilot light and starting toggle switch. Power supply is of full wave transformer type (no voltage doubler circuits used). All power supply equipment is properly shielded and phased for extreme low noise level. The input audio transformer has four complete shields as well as hum bucking design which results in a hum pick up so low that normal noises in battery operated amplifiers will show a higher reading on a noise meter than produced by this amplifier. Stock run equipments are producing noise level as low as 72 Db. below program level, which any engineer will agree is remarkable.

TECHNICAL DETAIL:

INPUT IMPEDANCE—Selective at 50, 125, 200, 250, 333 or 500 ohms.
OUTPUT IMPEDANCE—500-600 ohms.
TUBES USED—Two each 6J7, 6C5 and 59, one 80.
GAIN—79 Db.
OUTPUT LEVEL—Maximum plus 22 at .4% distortion or less.
FREQUENCY RESPONSE—Flat within ½ Db. from 30 to 15,000 Cps.
NOISE LEVEL—60 Db. or greater below program level.
LINE VOLTAGE—110 as standard but available for all voltages and frequencies.
WATTAGE—Consumes 117 watts at 110 volts 60 cycles.

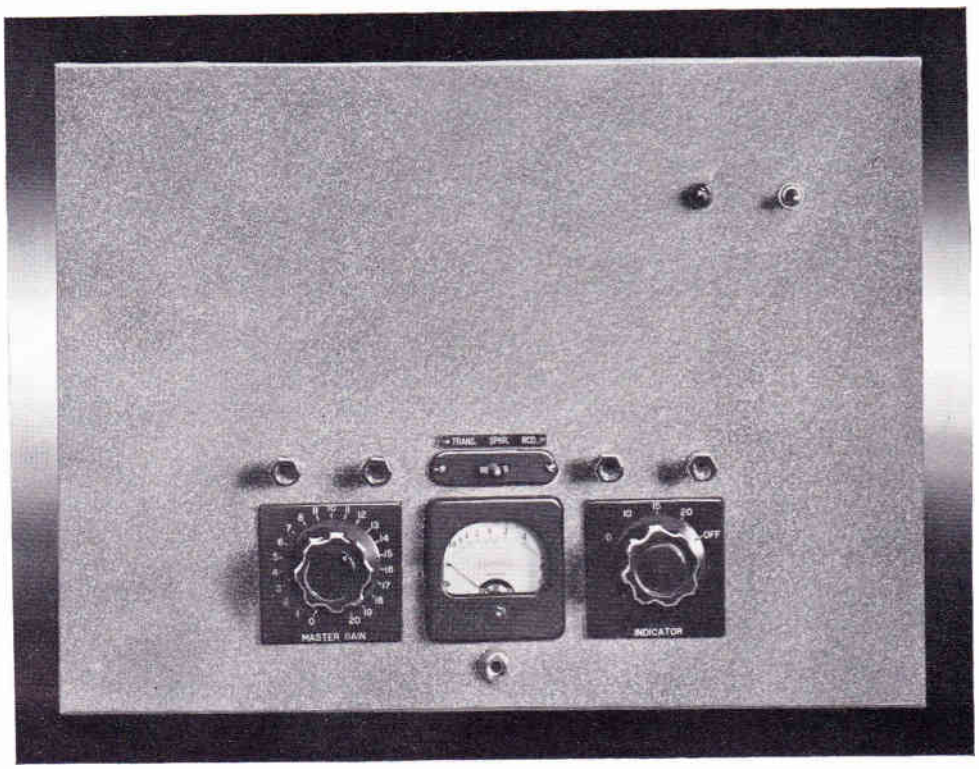
Price

Model 10-D Amplifier—Complete with tubes ready to operate on 110 volt 50-60 cycle line **$122.50**
Code Word (YUKOZ)

Model 10E Amplifier—Same as above only push button meter **$137.50**
Tube Check, including meter
Code Word (YUMOC)

Add $5.00 for Odd Voltage or Cycle

New Model 106-C Program Amplifier



In the new and improved model 106-C amplifier will be found many features reflecting the modern and up-to-date broadcasting instrument requirements. It is complete and self contained, has no separate power supply, yet the noise level is guaranteed to be as low or lower than any similar equipment on the market today. Likewise it uses no voltage doubler type power supply but a full design full wave transformer type equipment not requiring isolation transformer or extreme care in grounding.

AMPLIFIER—Consists of 3 high gain stages developing 83 Db. gain by use of two 6J7 tubes in first stage, two 6C5 in second and two type 59 in third. A type 5Z3 rectifier is employed. Inverse feed back is part of the circuit producing distortion content of approximately .3% at plus 22 Db. output. Noise level is kept at 60 Db. below program level or greater by means of the special 3 shield transformer design, exclusive on all Gates A grade equipments. Frequency response is quite like drawing a line with a ruler, perfectly flat from 30 to 12,000 cycles not varying over 1 Db. at any point.

DESIGN—Panel is 10½x19 inches and may be had in ripple black, steel gray or terra cotta or in telephone black and plain steel gray. Vertical mounting of all parts on rear is provided by the shelf type chassis construction bolting to the front panel. Controls include master gain, meter range switch, push button plate current metering for all stages, output switching key and head set jack. Pilot light and starting switch part equipment. Meter may be choice of decibel meter having usual scale reading of —10 to plus 6 Db. or V. U. meter scale B Model 301. Decibel range switch has 5 positions of 0-10-15-20-Off. V. U. range switch has 6 positions of 0-5-10-15-20-25. State which type meter desired when ordering.

OUTPUT SWITCHING—A standard telephone key having three positions is provided and marked "Transmit", "Record" and "Speaker". At transmit position the output is padded 8 Db. before entering line. At record and speaker output is high level. This key allows use of the amplifier without changing of wires on varied output loads and is especially desirable where more than one amplifier is used as output circuits are paralleled yet never connected to the same common circuit.

POWER SUPPLY—Uses type 5Z3 tube in regular full wave design having impregnated power transformer, dual impregnated chokes and 600 volt oil filled filter condensers. For 110 volts 60 cycles or available for other voltages and frequency on special order.

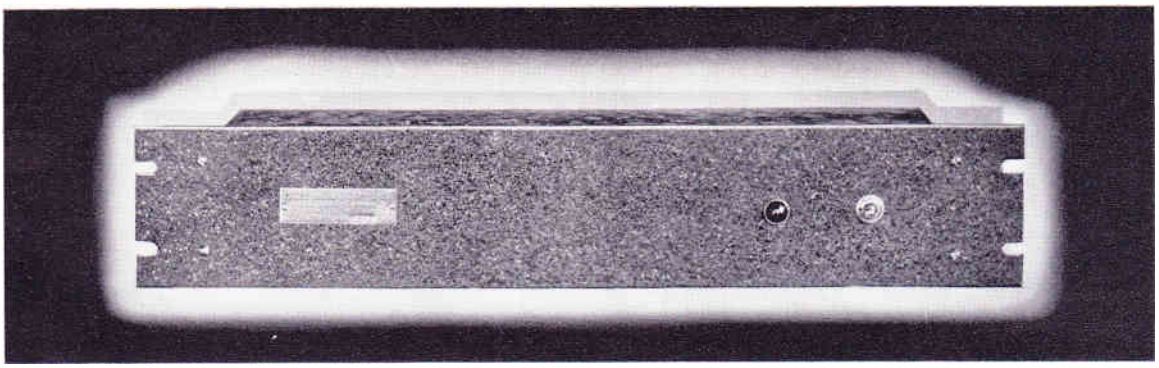
TECHNICAL DETAIL

GAIN OVER-ALL—83 Db.
NOISE LEVEL—From 60 to 70 Db. below program.
RESPONSE—Flat from 30 to 12,000 Cps.
INPUT IMPEDANCE—Universal 50, 125, 200, 250, 333 or 500.
OUTPUT IMPEDANCE—500-600 ohms.
MAXIMUM OUTPUT LEVEL—Plus 22 Db. at .3% distortion.
DEPTH BEHIND PANEL—14 inches.

***Price*---Model 106-C Amplifier**—Complete with Tubes **$175.00**
Code Word (YULUC)

Grade A Line

MODEL P-2 PRE-AMPLIFIER POWER SUPPLY



As a companion unit to our 56-B and 57-B pre-amplifiers the P-2 power supply takes its place to supply all filament and plate current for as many as 8 pre-amplifiers. It, of course, is by no means limited to Gates pre-amplifiers alone, as it, like all Gates apparatus, is built along standard engineering lines and quickly adapts itself to all standard-made equipment.

The P-2 power supply is built on a 19 in. by 3½ in. panel and is 5 inches deep behind the panel. Regular wide variety of finishes are availble, such as black, steel gray and terra cotta ripple enamel, telephone black, and plain steel gray. Toggle starting switch and pilot light are only front panel items. Terminations are made to a numbered terminal strip on rear.

A full wave full design transformer type power supply is employed, using an excess of inductance and capacity for pure direct current to tube plates. A type 80 rectifier tube is used.

TECHNICAL DETAIL: FILAMENT CURRENT—5 Amperes at 6.3 Volts.
PLATE CURRENT—40 Ma. at 250 Volts.
LINE WATTAGE—45 at 110 Volts 60 Cycles.

***Price*---Model P-2 Power Supply**—With Tube **$24.75**
Code Word (YUMAY)

LOW VOLTAGE RECTIFIER

In broadcasting stations and recording laboratories many occasions arise where a good low voltage direct current supply is needed such as for quiet relay operation, certain types of amplifier filament supply, etc.

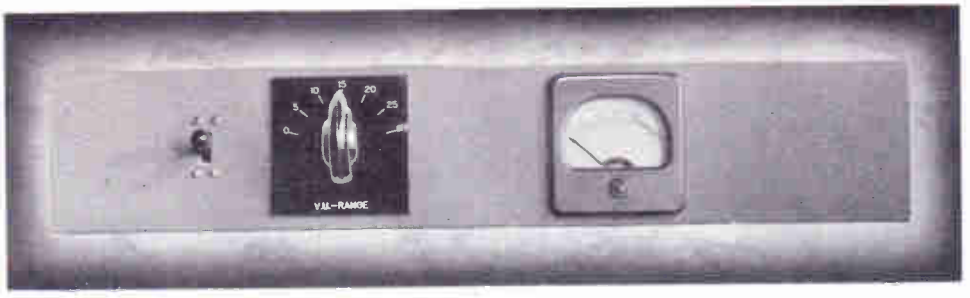
In the A-5 rectifier illustrated will be found an equipment above the average for this general type of apparatus. Extra filtering by means of both large inductance and capacity plus a wide variety of voltages by means of primary adjustment makes the A-5 rectifier adaptable to a wide variety of purposes. It is built on a 5¼x19 inch panel and extension behind the panel is 6 inches. Terminations are to a numbered terminal strip. Pilot light and toggle switch comprise front panel equipment. On rear of chassis a rheostat is provided so that any voltage compensation can be made for increased or reduced load within plus or minus 40% of the rated voltage.

Model A-5—Delivers 6 Volts at 2.5 Amperes and Adjustable from 3½ to 9 Volts. Continuous Operation **$45.00**
Code Word (YULWA)

Model A-5A—Delivers 12 Volts at 2.5 Amperes and Adjustable from 7.5 to 16 Volts. Continuous Operation **$55.00**
Code Word (YULYE)

Model 9K Volume Indicator

V. U.



V. U.

In the past few months the V.U. meter has come into a great deal of popularity, some of which is rightfully deserved, and Gates offers in the new Model 9k volume indicator panel a neat commercial unit in a variety of styles to suit the requirements of all broadcasting stations. The variety is not in the actual equipment supplied so much as it is in the type of range switch and meter scale required by the particular installation, and it is because of this that various models different than the standard model are available.

The standard model uses a Weston Model 301 rectangular case V.U. meter having scale B or that scale with the numerical listing on the top of the scale such as 0 to 100 and the V.U. listing directly under the numerical listing. This scale is most widely used. A six position range switch is provided giving six V. U. steps of 0-5-10-15-20-25. Range switch is a special design L pad made to Gates specifications by Daven. A key is provided on this panel which is used for making the V. U. meter instantly available for measuring two amplifier circuits instead of one by simply throwing from one circuit to the other by means of the key, or one side of the key may be connected to the program amplifier output with the other side terminated at the patch panel for measuring any circuit desired.

DESIGN

Panel size is 3½x19 inches and like all Gates equipment may be had in any commonly used color such as ripple black, steel gray, or terra cotta or telephone black or plain steel gray. Dust cover is provided to protect rear equipment, and an 8 contact terminal strip accommodates all connections.

The advantages of the V.U. meter need not be mentioned in detail on this page as they are well known, most important being extreme accuracy, almost instant up-swing and retarded back-swing giving a meter easy to follow, combined with lack of overshoot and inaccuracy that oftentimes prevails with other types of meters.

SPECIAL TYPES

Three models are available to meet broadcast requirements besides the standard model listed above. All models consist of the same essential material, namely, key, range switch and meter and vary as to design.

TYPE 10K and 10KK

Has a range switch reading from 0 to 40 V. U. in steps of 0-15-20-25-30-40 and is for amplifiers operating at a higher level than 25 V. U. which is maximum for the standard model and yet has no added cost. Model 10K has meter scale B and 10KK meter scale A.

MODEL 11K and 11KK

Same as above model only has 8 position range switch reading 0-5-10-15-20-25-30-35 V. U. Model 11K has meter scale B and 11KK scale A.

MODEL 12K and 12KK

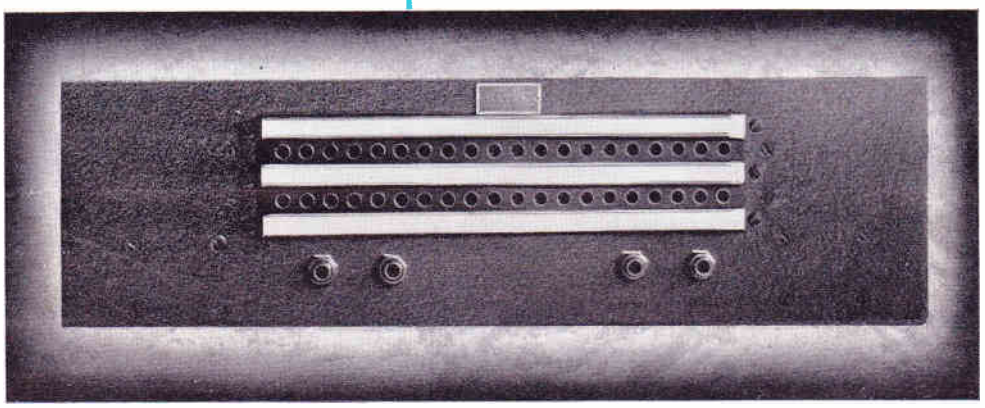
Same as above only reads to 50 V. U. in 5 V. U. steps of 0-5-10-15-20-25-30-35-40-45-50. For use with high wattage amplifiers or laboratory service. Model 12K has meter scale B and 11KK meter scale A.

Prices

Model 9K ***---Standard Model, Scale B***	Code Word (YUJOY)	**$54.00**
Model 9KK*---Standard Model, Scale A*	Code Word (YUJTA)	**$54.00**
Model 10K ***---As described***	Code Word (YUJUZ)	**$60.00**
Model 10KK*---As described*	Code Word (YUJVE)	**$72.00**
Model 11K ***---As described***	Code Word (YUJYO)	**$72.00**
Model 11KK*---As described*	Code Word (YUKAV)	**$54.00**
Model 12K ***---As described***	Code Word (YUKCY)	**$54.00**
Model 12KK*---As described*	Code Word (YUKIX)	**$60.00**

Grade A Line

Patch Panels



In the rack type speech system the patch panel is an almost indispensable piece of equipment, as of course it is this equipment that binds by means of either patch cords or interlock the various circuits of the entire speech equipment and likewise terminates the outside circuits such as remote lines, microphones, etc. In these new Gates patch panels is provided what is perhaps the finest jack obtainable today manufactured for Gates by Stromberg-Carlson and having behind it the actual telephone board proven test of millions of patches without wearing of contacts or spring tension. Several types are offered differing in the type and quantity of jacks supplied. All jacks are mounted 20 to a strip over which is a standard No. 2 designation strip supplied blank and on which may be penned or typed the jack heading.

Two types of jacks are available. No. 130 is the open circuit type or having two circuits, and the third circuit (shell) grounded. Jack No. 135 is a closed circuit jack used in interlock as well as open circuits so that when the patch cord is not used the jack locks up to the circuit automatically. The shell circuit is ground and is the fifth connection for the No. 135 jack. Like every Gates item all types of finishes are available such as ripple black, steel gray and terra cotta, and telephone black and plain steel gray.

Patch cables are not supplied with panels and are listed separately and may be purchased in the number required. Standard cable uses an 18 inch shielded green telephone cable with Stromberg-Carlson No. 53X plugs on each end. Longer patch cords may be had at slight additional cost.

Type A-130—This type has 20 No. 130 jacks and indicator strip on 3½x19″ panel ..... ***Price*** **$34.00**
Code Word (YUKUB)

Type A-1300—This type has 40 No. 130 jacks with indicator strip over each bank of 20 jacks ..... ***Price*** **$54.00**
Code Word (YUKVA)

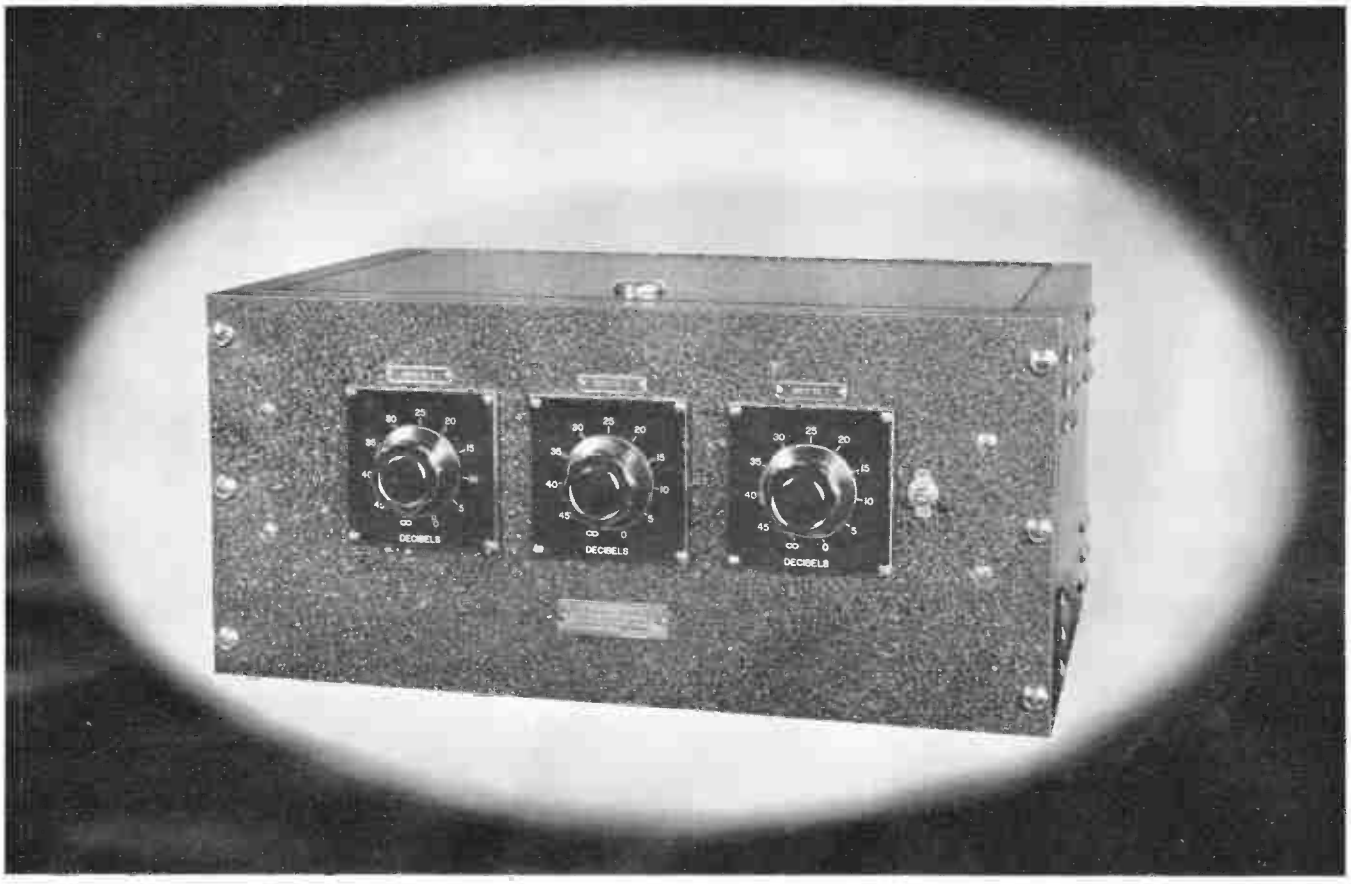
Type A-1301—This type has 60 No. 130 jacks with indicator strips over each bank of 20 jacks and on 5¼x19″ panel ..... ***Price*** **$74.00**
Code Word (YUKWE)

Type B-140—Same as type A-130 only No. 135 closed circuit jack used ..... ***Price*** **$39.00**
Code Word (YUKZO)

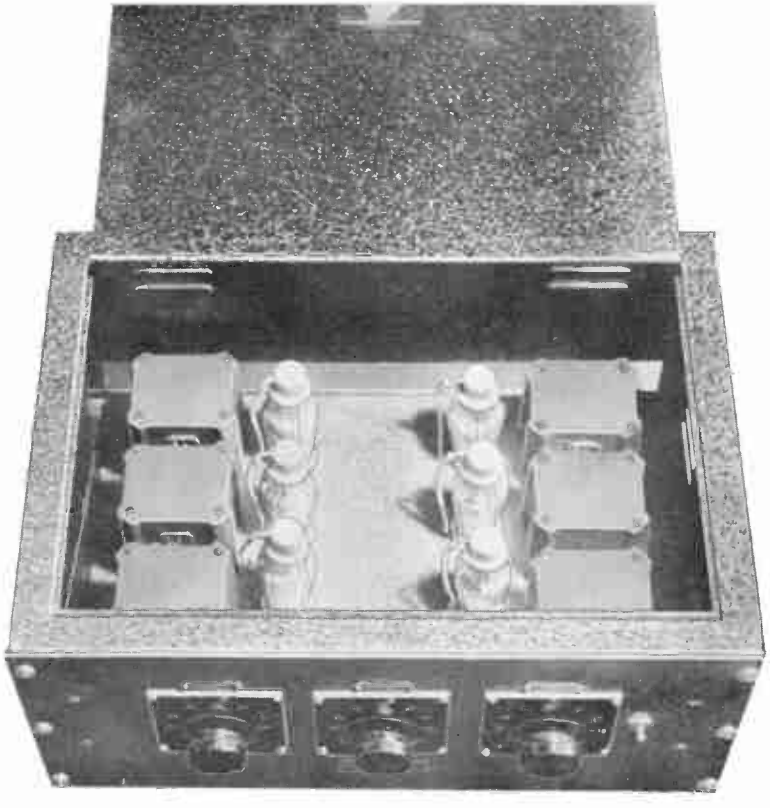
Type B-1400—Same as type A-1300 only No. 135 closed circuit jack used ..... ***Price*** **$64.00**
Code Word (YULBO)

Type B-1401—Same as type A-1301 only No. 135 jack used ..... ***Price*** **$89.00**
Code Word (YULIZ)

Patch Cables—As above described complete ..... ***Each*** **$5.00**
Code Word (YULOB)



"The Trio-Pre"



This is a popular item in the Gates line for many months. It is actually three Model 56-B two stage pre-amplifiers on one panel 8¾x19" and extending 14" behind the panel with a potentiometer type mixing control in each pre-amplifier. The output of each amplifier is tied together common so that only one input is required to the high level amplifier. Its major purpose is to supply a need where both additional mixing and pre-amplification is required and a minimum of rack space is demanded or offering an equipment for desk control where used in the cabinet model as illustrated.

A complete detail as to each amplifier can be obtained by referring to bulletin A1004 on the 56B pre-amplifier as each of the 3 pre-amplifiers in the trio-pre are identical to the 56-B having added the mixing control for each pre-amplifier. Input connection by plugs and any impedance may be had from 30 to 500 ohms. Output is also likewise variable. Power may be obtained from P-2 power supply listed bul. A1002 or equal. Model B is for rack mounting while Model C is supplied in handsome desk cabinet finished in black 8¾" high, 15" deep, 19" wide with hinged lid. Amplifier uses optional of 6C6 or 6J7 tubes.

Model B **$140.00**
Code Word (YUMUD)

Model C **$148.00**
Code Word (YUMYA)

Guardian of the Air Lanes

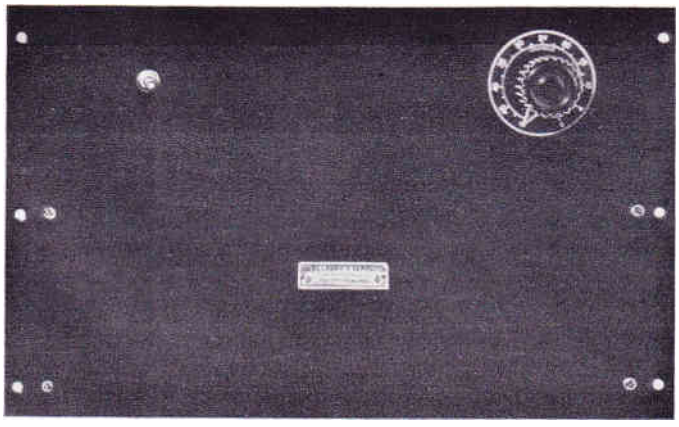
In the making of radio transmitting equipment it of course cannot be said that with each instrument some life depended upon its performance. However it is not infrequent when Gates supplies equipment where human lives in a measure depend on its ability to produce unfailingly under a wide variety of conditions. In the above illustration is the main control tower at the Chicago Municipal Airport, world's largest, where nearly a million lives are brought in and sent on their way via air each year. Gates audio equipment including their latest contribution to broadcasting, the improved limiting amplifier, is used every hour of every day at this world's busiest dispatching point for air transportation.

Is it not only fair to say that such important uses of Gates equipment indicates confidence in its design, performance and construction in the greatest degree possible? In all probability if any instrument you might purchase from Gates would fail no life would change even one heart beat, but it is indeed gratifying to know that the equipment you are purchasing is built just as if some life depended upon its continual unfailing service day in and day out.

Gates Equipment Is Made That Way

GATES RADIO & SUPPLY CO. MANUFACTURING ENGINEERS **QUINCY, ILL., U.S.A.**

MODEL 50-A MONITOR AMPLIFIER



In the broadcasting station in many cases the monitoring amplifier need not be as elaborate as the program or line amplifier yet of course equally fine in fidelity and performance. The Model 50-A is a moderate priced rack type amplifier with all fundamentals existing, yet having the so-called ginger bread eliminated to keep the price at a moderate level for an item of this type. Built on a vertical rear chassis quite similar to all Gates products and having a front panel of 10½x19 inches it uses three stages, the last of which is push pull. Master gain control, pilot light and starting toggle switch only panel equipment.

AMPLIFIER—Has 3 stages using 6J7 first stage, 6N7 second stage, and push pull 2A3 in last stage. Uses 5Z3 rectifier and full transformer type power supply with oil filled filter condenser 600 volt size. Model 50-A has input of 50, 125, 200, 250, 333 or 500 ohms, while Model 50-B has bridging input of 16,000 ohms. Both models have output of 500 ohms.

TECHNICAL:
GAIN—70 Db.
RESPONSE—Flat from 40 to 12,000 cycles.
NOISE—50 Db. below program level.
OUTPUT—12 watts at 4% distortion, 6 watts at 1% distortion.

Model 50-A or 50-B Amplifiers—With Tubes **$79.00**
Code Word (YUMCO)

Grade A Line

MODEL 10-C LINE EQUALIZER

The 10-C equalizer is designed for strict telephone line equalization or where low frequencies become boomy and high frequencies either thin, lacking or distorted. Equalizes at low frequencies based on line capacity reducing high frequency response. Has maximum equalization of 48 Db. or capable of excellent equalization of a 24 mile line and quite satisfactory equalization of much longer lines.

Panel is 5¼x19 inches, having rear dust cover protecting all parts. Input key provided to cut equalizer in and out of circuit which parallels line to be equalized. A two position key on right side of panel allows two equalizing settings, thus giving a greater dial range for varied steps of equalization.

Model 10-C Line Equalizer—Complete **$49.00**
Code Word (YUCUS)

Grade A Line

A Word About Broadcast Speech Material

As we all know, audio equipment can be built cheaply or well. Obviously a cheap amplifier can sell for much less than a well built one, but like any other product whether or not it be broadcast equipment, top quality cannot be improved upon by merely adding to the price. In Gates made speech units absolute top quality is employed and the prices as stated all cover equipment that cannot be bought in any better form either in parts quality or workmanship. If Gates prices are lower than competition it is simply because they, as always before, have been willing to accept a reasonable rather than an exorbitant profit. We realize that there are still a few in the broadcast industry that believe they only obtain the best by paying the highest price. Fortunately these individuals are fewer each year, in fact more than ever before Gates has in its list of clientele many names of international importance and prominence. Corporations that could easily afford the highest priced prefer Gates as they have realized that into each Gates item, no matter how small, goes the most possible in research and quality.

It can therefore be said that the Gates line is so priced that it can be afforded by those companies with the most restricted budgets yet preferred by Corporations that weigh their equipment dollar, buying equipment on merit alone and not on high price or name prejudice.

Research of course like the word guarantee is much overworked. Those that have purchased Gates equipment can hardly deny that research has been the foundation of the equipment. Those that have purchased some Gates item that require exercising of the guarantee rights likewise cannot do other than say that Gates has been quick to replace or adjust the defect and that interpretation of the guarantee was broad and open-minded.

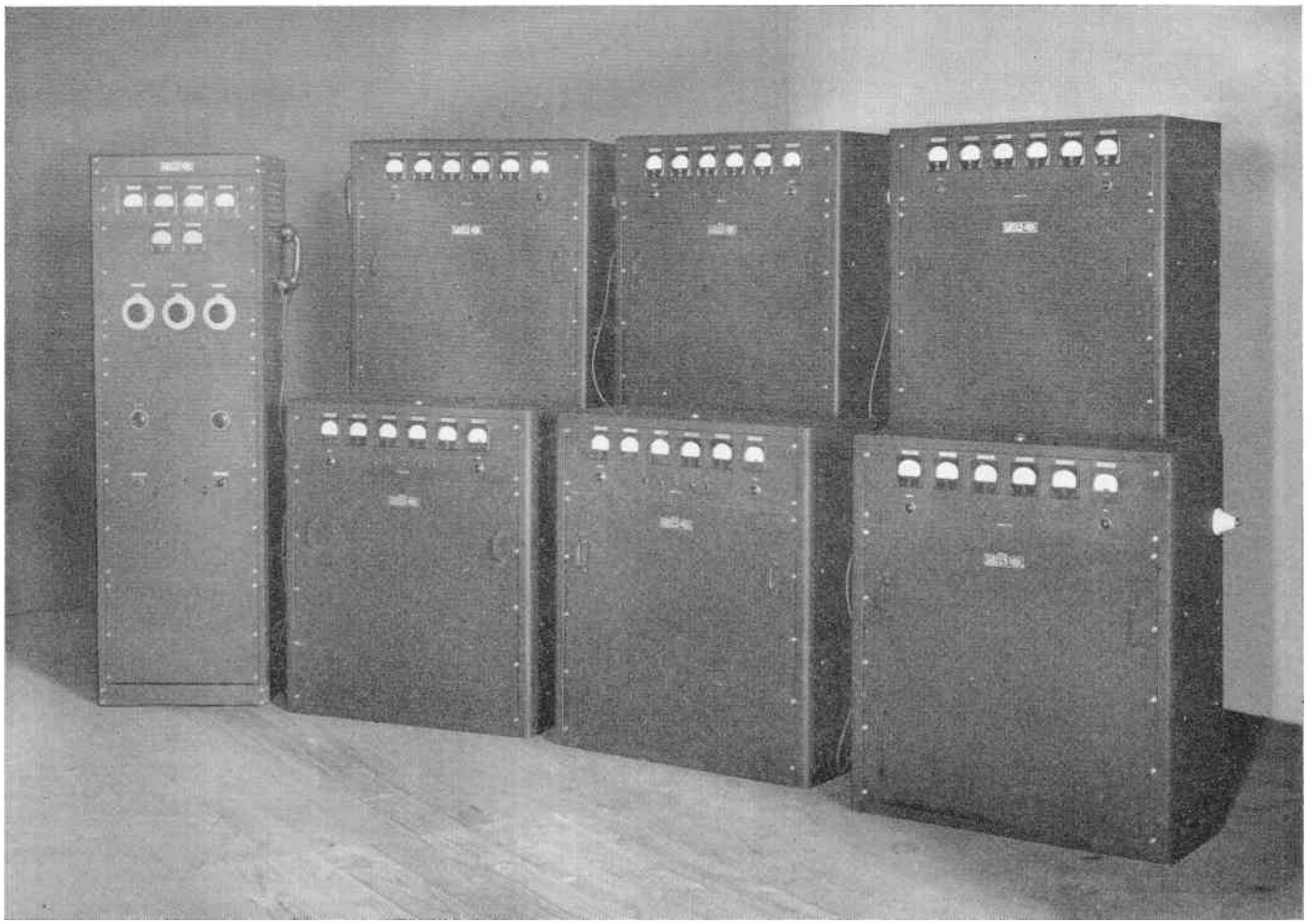
The Gates organization was founded by the late Henry C. Gates in 1922. Started from scratch, so to speak, it has grown to an organization of international note in the affairs of radio transmitting. In the government classification of small business (roughly 500 employees or less) Gates is definitely a small business. Our customers know this is only to their advantage as, like the large university with thousands of students, individual personal attention in large amounts in student-professor relations is no more possible than in a large business is individual customer-company relations. Gates is proud of the fact that each customer can be given every co-operation in problems, suggestions and attention. Our customers cannot take too much of our time and they cannot exasperate us with unlimited questions, no matter how simple they may seem to us. We likewise realize that we are not above making a mistake, but realizing that our number of customers are restricted to the relatively small number of broadcasting stations in the world, we strive to prevent mistakes and hasten to remedy the error if it prevails.

Our terms are net cash or C.O.D. if credit has not been established. All equipment is F.O.B. Quincy, Ill. Export terms are strictly net cash in advance plus estimated transportation and insurance costs where purchaser is located in a warring country. Neutral countries may send 50% with order and the balance will be sent C.O.D. except in those countries that allow equipment to be delivered to the consignee by the purchase of a bond and in this case full cash in advance is demanded.

A NEW RADIOTELEPHONE

for: Inland Waterways
Coastal Waterways
Private Yachts
Police Service
Public Utilities Service
Airports

The C-40 "Radio-Mate"
The C-50 "Radiospatcher"



Above—Six C-40 "Radio-Mates" and a C-50 "Radiospatcher" for Erlbacher Bros., Cape Girardeau, Mo., large inland waterways fleet operators.

GATES
QUINCY, ILLINOIS, U.S.A.

AMERICAN CORPORATION

"On the Mississippi"

Are tie-ups costing you money?

Are communications to your boat difficult and costly?

Are your present toll calls a major expense item?

Do crew turnovers enroute cause you great inconvenience?

The C-40 *Radio-Mate*

Will pay for itself quickly by speeding up ordinary communications that are now being delayed,

and

by nearly eliminating toll charges,

and

by doing away with many costly tie-ups.

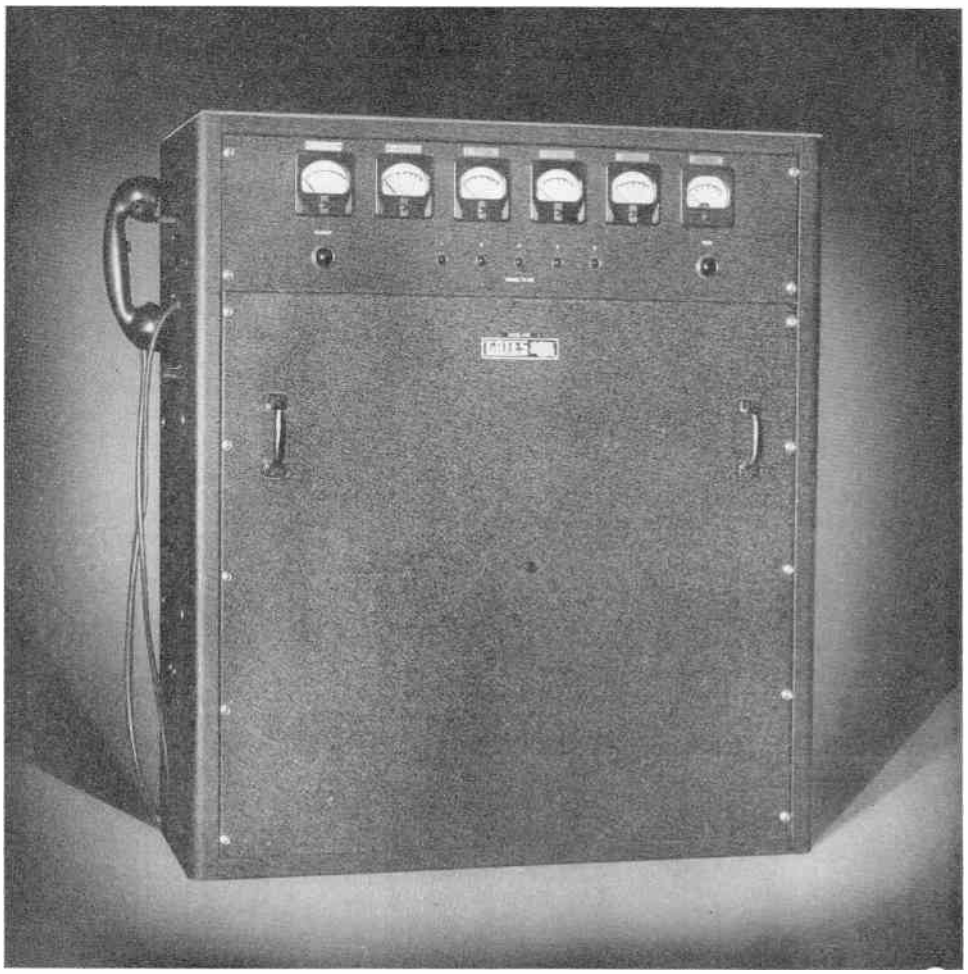
The C-40 Fifty to One Hundred Watt Marine and Communications Transmitter

With High Level Class B Modulation or Continuous Wave Operation

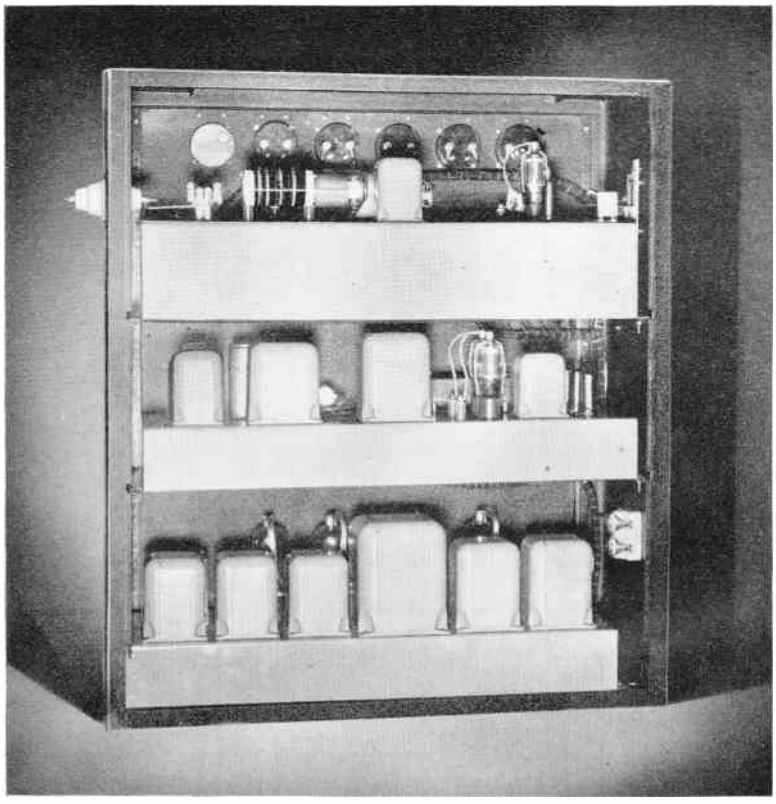
The need in the marine field for both inland and coastal waterways service as well as strictly land type communications service has long been known as a first quality compact and highly efficient transmitting equipment at a price within the reach of the most moderate budget. Gates offers in the Model C-40 communications transmitter a unit that has proper dimensional requirements to fit into the limited space in most smaller type tugs, yachts or small cruisers yet to do this no sacrifice has been made in power or parts quality, in fact results are greatly improved over older more clumsy types of equipment. For strictly ground service (ground service is referred to as any service in the communications field that is not marine) the C-40 transmitter offers a new type of service in moderate priced equipment which especially lends itself to use where third class operators (operators not technically advised) are required to operate the equipment and where the utmost in simplicity is desired.

FOR MARINE SERVICE—The C-40 transmitter is a complete 50 to 100 watt unit which may be used for radio telephone or telegraph service and which requires no added equipment other than receiver and antenna system. So complete is the C-40 that its installation is one of only a few minutes requirements. It is shipped completely assembled and it is only necessary to unpack it, slip it into place, connect antenna and receiver and tune up to place in operation.

The C-40 comes with full size cradle type telephone set with push button in the handle so that after final installation the operation is quite like that of an ordinary telephone. The cradle telephone is connected to the trans-



The Gates C-40 "Radio-Mate"



Rear View C-40 "Radio-Mate"

mitter and likewise is connected through a relay provided to the receiver of your choice to complete the two way push to talk service. When the telephone is on the hook the radio receiving set is automatically connected to your loud speaker for calling purposes.

The size of the C-40 is particularly designed to fit into the pilot house under the side window but, of course, may be located any other place on the boat that is desired. It is thin or not deep (actually 14 inches) so that it will not extend out into the room and become in the way. It has no exposed tuning controls so that novices will not place the transmitter out of adjustment. It has five lights on the front showing which of the five available frequencies are in use. Frequencies are selected by a single knob on the side of the cabinet under the telephone set.

The C-40 is rated with the Federal Communications Commission to have a maximum power of 100 watts for telephone or telegraph service. The power may be reduced however to any amount under this to conform with your license requirements. Truly the C-40 is a bundle of smart styling in both engineering design and construction for present day marine service.

FOR GROUND COMMUNICATIONS

The most used power for strictly ground communications operations such as is commonly found in sections of the country where emergency service demands the use of radio transmission is from 50 to 100 watts. Whether it be in oil fields, public utilities, forest service, police or some other service the C-40 transmitter will be found both in size of power and physical dimensions to be ideal. It likewise is short enough in height to fit into a standard sedan delivery truck or in the back of an ordinary sedan passenger car for field communications where a higher power is required than found in conventional portable systems. The C-40 is low enough in price to allow the use of many transmitters where in other cases the budget would allow the use of only one unit.

FOR POLICE SERVICE the C-40 is excellent, giving good coverage at a minimum of space requirements.

FOR AIRPORT SERVICE the C-40 with its five frequency provisions is outstanding.

FOR UTILITIES EMERGENCY SERVICE the C-40 fits nicely into an office corner with utmost convenience at full power operation. It may be easily adapted to remote control operation where required.

FOR FORESTRY SERVICE the C-40 will fit into cramped lookout stations or spacious headquarters and the same is equally true for lighthouse service.

Technical Description Model C-40 Radio-Mate

The radio frequency portion of the C-40 consists of a type 6F6 oscillator, 807 buffer and 813 final power amplifier. Five frequencies of operation are provided for. Though the standard model is for operation in the 2000-3000 Kc. band any combination of frequencies may be had as required for the type of service the C-40 transmitter is to be used. Frequency shift is by means of a single knob on the side of the cabinet under the telephone set and the frequency being used is indicated by the pilot lamp on the front of the cabinet which are numbered from 1 to 5. Frequency shift is by selected coil taps with individual condensers to tune each frequency which are all located on a recessed panel behind the front panel and locked after initial tuning is completed. Individual crystals are used for each frequency of the low drift type. Complete metering by full sized 3-inch meters in oscillator, buffer and final plates, modulator plate, line voltage and antenna current. Plate voltmeter will be supplied in place of the line voltmeter where required by licensing demands.

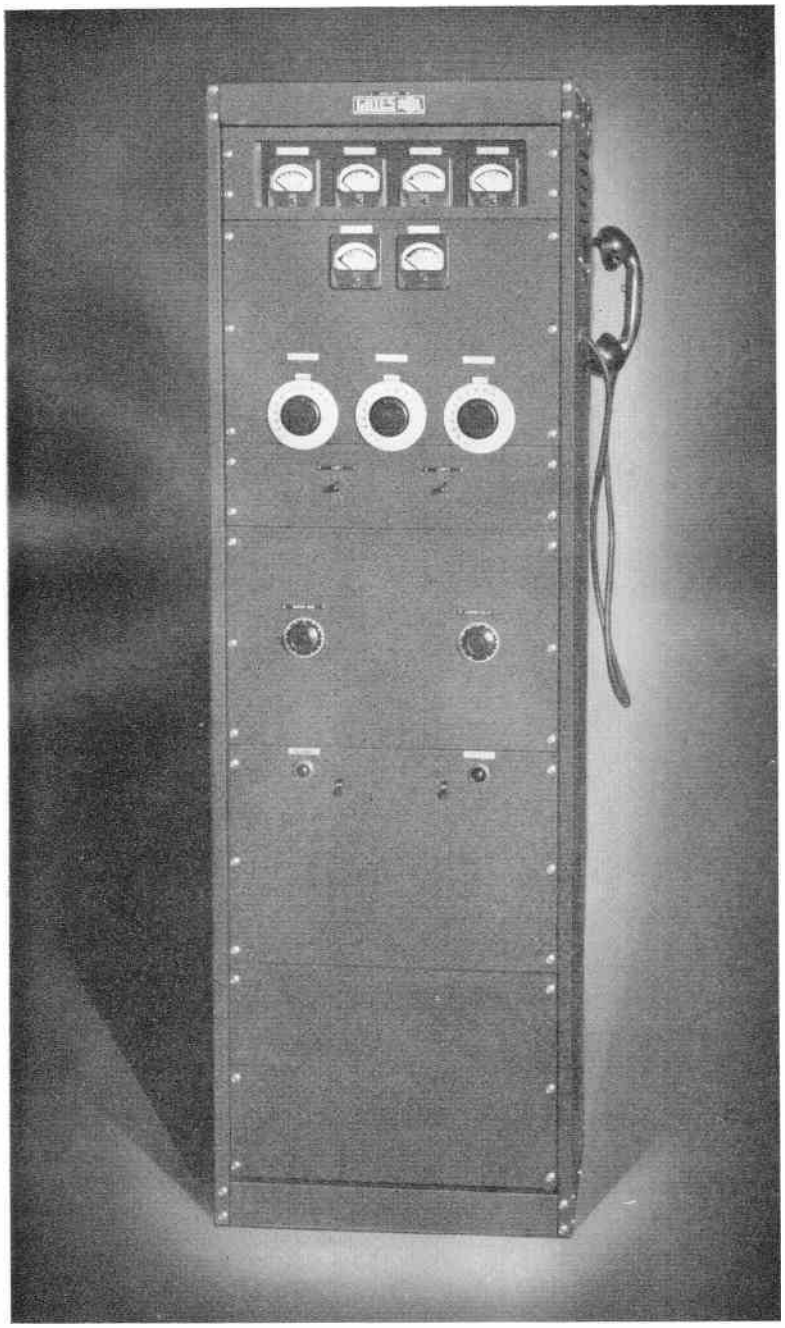
The audio system includes a type 6C5 first audio, 6N7 phase inverter, pair 6F6 audio drivers and pair 807 class B modulators. Master gain control is only audio control. Current for telephone set is supplied internally.

Keying jack is provided where C. W. service is part of the service needs. The C-40 is built on three cold rolled resistance welded steel decks as shown by the rear illustration. The top deck is the radio frequency section complete, the middle deck the audio section complete and the bottom deck the power supply section. The telephone set with associate hook on the side of the cabinet so operates that when radio receiver is connected to terminals provided on the transmitter, the radio receiver is cut off when the push to talk button to turn on the transmitter is pressed. Likewise a relay provided changes the antenna from receive to transmit. When the telephone set is on the hook the radio receiver is disconnected from the telephone receiver in the hand set and connected to the regular radio speaker for calling purposes, thus giving complete privacy in conversation except during original calling period. Time delay and pilot relay equipment are provided.

Dual power supplies are used, both using full wave 866 type tube circuit. One low voltage supply using 5Z3.

SIZE—38 inches high, 34 inches wide, and 14 inches deep.
NOISE LEVEL—42 Db. below 100% modulation.
FREQUENCY RESPONSE—150 to 4000 cycles.
POWER CONSUMPTION—600 watts at 110 volts 50-60 cycles.
HARMONIC CONTENT (radio frequency)—.05% of fundamental at 2nd harmonic.

The C-40 is available in special line voltages or frequency and for use with other types of microphones than supplied with the standard C-40 equipment at reasonable alterations in price.



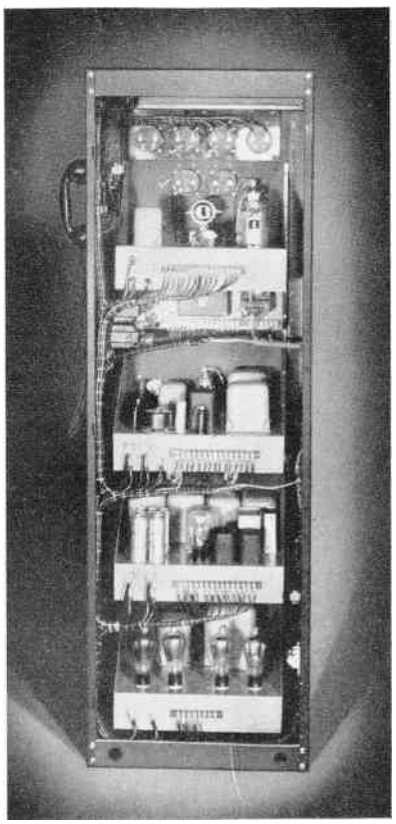
Model C-50 Voice Controlled Communications Transmitter

For most types of marine land station service and for many types of other communications service a voice operated transmitter is very desirable. The voice operated or sometimes called voice controlled station is a transmitter so designed that it turns on automatically without the aid of push buttons or switches of any kind as soon as a sound is made into the microphone or telephone set.

Gates engineers have designed a new type of voice controlled circuit which is not dependent on relays for its action thus becoming much faster in operation than relay operated voice controlled transmitters, making possible the transmission of the very first syllable of the first spoken word, which in most cases is lost with relay controlled equipments. An additional and exclusive Gates development is a time for release control which is variable so that the transmitter may be made to turn off either instantly or at varied delay speeds after the final word is spoken. For example, with most prevailing voice operated equipments if the person talking takes a short breath, the transmitter will turn off. The C-50 transmitter may be adjusted by a control on the front panel to delay from zero to as much as two seconds before turning off after the final word is spoken, making for a better transmission, especially for public service requirements.

The C-50 Radiospatcher is quite the same in technical design as the C-40 Rado-Mate, in fact the tube complement with the exception of the added voice control circuit is the same so that any operator using both Gates ground and boat stations may keep any minimum stock of tubes for spare requirements, thus making upkeep at a low point. The C-50 therefore is fully described as to tube complement, power, etc., by reading the technical matter regarding the C-40 transmitter, other than the C-50 transmitter is so built that by adding additional cabinet, a power of as high as 400 watts may be used.

The Radiospatcher has provision for two telephone line connections with self contained hybrid circuit, so that complete adaption to public service requirements may be employed. Telephone set is part equipment and operates the same as the C-40 model.



The C-50 Radiospatcher is 67 inches high, 22 inches wide, and 16 inches deep. Finished in gray and black, fitting nicely into conservative surroundings.

Though the Gates C-50 Radiospatcher is larger and seemingly more complex, it is actually very simple to install and operate. It meets every requirement for public service radio land station operation and likewise may be operated on ships if desired.

Technical Description C-50

TUBES USED—6C5 first audio, 6N7, second audio inverter, pair 6F6 drivers, pair 807 modulators, 6R7 control tube, 6F6 oscillator. 807 buffer, 813 final amplifier, four 866 rectifiers, 80 rectifier, 5Z3 rectifier.

NOISE LEVEL—42 Db. below 100% modulation. Harmonic content .05% of fundamental (second harmonic).

POWER CONSUMPTION—650 watts at 110 volts 60 cycles.

FOR D.C. OPERATION

All Gates American transmitters are available for D. C. operation at only a slight extra cost by means of a rotary converter unit available to convert D.C. to A.C., for operating both transmitting and receiving equipment.

The Gates CB4 DESK

Many attempts have been made to produce coordinated speech and transcription equipment for the medium and small sized broadcasting station that contain every feature needed in the studio and still maintain a high standard of quality at a price in keeping with most budgets. Now, for the first time in the annals of broadcasting equipment manufacture, such equipment is available in a flexible, complete and moderately priced design also made to provide that most important feature for modern operation—Showmanship. This apparatus is the CB4 Cabinet—the latest addition to the Gates line.

GATES RADIO & SUPPLY CO.

QUINCY, ILLINOIS

NO medium is available that would give a true idea of the beauty of the workmanship and materials that have been put into the CB4 Cabinet. Fine, perfectly grained Phillipine launwood, durably finished and hand rubbed to satiny smoothness is used for the sides, back and front. The top is covered with a heavy piece of battleship linoleum which is practically wear-proof insuring long usage even under most adverse conditions. A stainless steel band around the edge of the top and chromium style strips on the front doors lend a touch of moderism and distinction.

Accessory equipment for the CB4 table runs the gamut from the most economical using low priced turntables and lateral pickups to the most deluxe arrangement employing the best turntables and vertical-lateral combination pickups with compensating filters for all types of records. In addition the popular Gates 30 Series Console may be mounted on top to provide the ultimate in speech facilities. Various standard arrangements all readily obtainable are listed below.

In addition to the standard setups more accessory apparatus can be mounted in the right and left hand compartments as the turntable motor, pickup filter, if any, and the console power supply do not take up nearly all the available space. In all there are 21 inches of standard 19 inch wide panel space in each compartment. Sturdy uprights are provided for mounting the panels by the usual slots and wood screws. Where the relay rack space is not desired partitions may be installed for storage of transcriptions. The front doors are hinged on the outside edge and are held shut by a positive friction catch.

Equipment Selections for CB4 Desk

Selection No. 1: CODE (YUNAZ)
CB4 Desk with 30 Series Console, Two Presto 62A Turntables, Two RCA MI-4875-C Vertical-Lateral Pickups, Booster Amplifiers for Pickups, Complete with tubes and all wiring $1715.50

Selection No. 2: CODE (YUNBE)
Same as selection No. 1 except that Audak Type D-28E pickups are substituted for RCA pickups $1400.00

Selection No. 3: CODE (YUNDO)
Same as selection No. 1 except that Audak D-28E pickups and Presto 11A turntables are used $1213.00

Selection No. 4: CODE (YUNEB)
Same as selection No. 1 except that Presto 11-A turntables are used $1548.00

Selection No. 5: CODE (YUNGY)
CB4 desk only without any accessories $325.00

GATES RADIO & SUPPLY CO.
Quincy, Illinois

THE GATES

CB-50

CONTROL COMBINATION

Probably the majority of broadcast engineers have made some form of control desk at one time or another and have thereby voiced their very candid opinion that such a piece of furniture was an adjunct to the station in a practical manner. Certainly every station owner or manager will agree that such an item is desirable from a showmanship standpoint alone. With these thoughts in mind and having the desire to serve the broadcast industry in a really practical manner Gates has designed a unit known as the CB50 control combination which combines the eye appeal wanted by every station executive and the practicability desired by every engineer.

The CB50 consists of a beautiful Phillipine launwood desk with an exteremely durable battleship linoleum top with a console unit designed to match and sit on top which can be used in a number of ways. This console top has four openings 8¾ inches high and 19 inches long designed to take relay rack mountings of this size. Two practical uses suggest themselves for most stations. For the small station that requires only a small speech unit the CB50 is supplied with the Gates Studioette, an approved modulation monitor, the frequency monitor meter and in the one remaining opening the Gates 25-A Frequency Control Unit. This makes this unit admirably suited to use with any of Gates Transmitters when the transmitter is located in the same room or in a room nearby. Another combination that presents itself is where the studio speech equipment is more elab-

CB50 Combination for use where the transmitter and studios are together. Note that the 51CS Studioette is included as part equipment. The inset shows how the frequency monitor fits into the left hand compartment of the desk.

The illustrations given in this circular are suggestive only. They have worked with success in existing stations but the variations are so wide as to make it impossible to show or mention all the possible combinations. Requests for prices will be based on your particular requirements.

orate. In this case a special limiter amplifier, built along the same design as the Gates 27CG Limiter is installed in the panel where the Studioette is otherwise placed. This combination can be used at the studio with elaborate speech equipment or can just as well be installed at the transmitter location.

In addition to the above equipment there is so much space available in the two compartments on either side of the CB50 that the frequency monitor may be installed on one side of the power supplies for the frequency control unit and the audio equipment on the other. Accessibility is provided by the doors in front or in the rear by removing the panels by taking out a few screws. Ventilation for these lower compartments is provided by strategically located vents in the bottom and top of the rear panel. There is also enough room in the bottom portion where the power supplies are installed to set up a program of transcriptions for all day or at least several hours. This is indeed handy in cases where the operator also announces and plays transcriptions.

In more elaborate installations where it is desired to have the best appearing equipment in each studio it is entirely possible and practical to place the necessary speech equipment in the top console portion and so have a truly deluxe installation for each studio. The bottom compartments in such cases could be used for transcription storage, fitted with patch panels, preamplifiers or any number of other apparatus as they are of standard relay rack width and unit height.

Most important, however, is the setup described for use with the transmitter as it makes a complete, coordinated installation easy to use and pleasing to the eye. This arrangement is available as a standard unit for use with any Gates Transmitter, however, it is also easily adaptable to any installation and arrangements can be made to make the minor modifications that may be necessary. You are therefore cordially invited to present your problem. It will receive the prompt and courteous attention that every Gates inquiry receives.

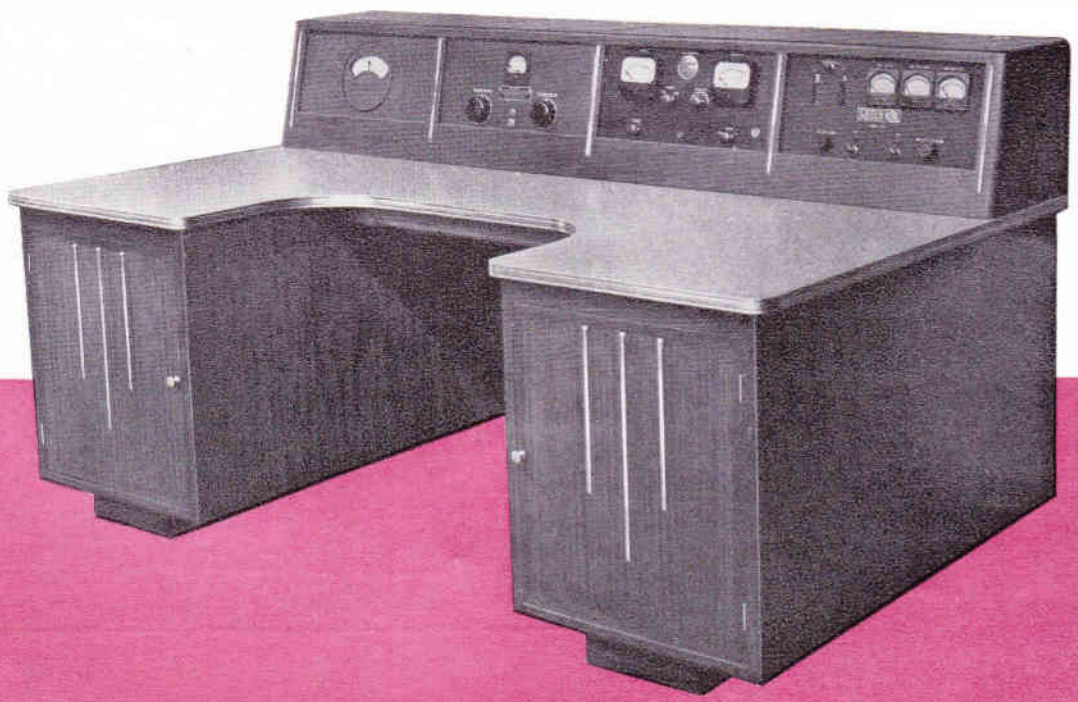
Mechanical Data

DIMENSIONS—(Desk only) 48 inches wide by 80 inches long overall.
(Console top only) 80 inches long by 12¾ inches high.

WEIGHT—Total net, 400 lbs. Total gross, 475 lbs.

PANEL SPACE—Console top, four each 8¾ inches high and 19 inches long.
Compartments, one on each side, each 19 inches wide. 21 inches high.

MATERIAL—Rich brown walnut veneer on five ply base with hand rubbed finish. All corners blocked and glued. Top of first grade tan battleship linoleum, scratch resistant and stainproof.



This illustration of the CB50 Combination shows how it is set up for the station that has the transmitter separate from the studios or control room. Note that a limiter amplifier has been installed in place of the Studioette.

GATES RADIO & SUPPLY CO., QUINCY, ILL.

Transcription Turntable

Model CB-7

Designed for Exceptional Performance for Those That demand the Best.

Features

1—Heavy rugged construction combined with precision in its highest form . . . .

2—Uses 1/20 HP of inside rim drive. Proven choice of discriminating engineers . . . .

3—Inbuilt long life, for years of continuous service with minimum attention . . . .

4—Instantaneous speed change combined with "wow" free accuracy and regulation . . . .

5—Electrical reproducing set supplied for all popular playback requirements, with accentuating and high fidelity response characteristics . . . .

6—Designed for the hardest, most exacting professional usage.

In answer to consistent demands of the broadcasting and recording industry, the Gates Type CB-7 turntable has been developed to deliver the ultimate in true reproduction and recording performance. Into this new transcription turntable has gone the experience of Gates' Engineers which has been continuously accumulating since this company pioneered in the disc talking picture development and almost coincidentally supplied the first five commercial transcription equipments delivered to broadcasting stations.

Basically, the Gates Type CB-7 turntable is a rim drive unit furnished with a 1/20 horsepower motor, convenient speed change from 78 to 33⅓ RPM, with power availability considerably beyond the requirements of recording or playback conditions under any reasonably phase of operation.

The base casting of this unit is a 62 pound gray iron precision casting with smooth surface and is milled completely plane on the lower face to insure positive alignment of all equipment. The turntable is a 10½ pound aluminum unit carefully machined as to concentricity, and both dynamic and static balance, with extreme care exercised to avoid any irregular load conditions on the center bearing. The center shaft is a selected and aged piece of extremely hard, ground and polished shafting.

The center bearing on the Type CB-7 turntable is a 4 pound bronze bearing with oil groove, oiling provision and a ball thrust bearing. Engineering estimates made on the life of this shaft and bearing assembly are that with reasonable care it should provide trouble-free service for approximately 15 years. Oiling is required at approximately 60 day intervals. Every wearing part on this turntable assembly including the main bearings is instantly replaceable should it for any reason become damaged through neglect or abuse.

Power from the motor is transmitted to the rim of the turntable by idler wheels of rubber approximately 40 to 60 Shore hard and designed to be of maximum trouble-free service. These idler wheels are attached to standard bronze bushings at the Gates factory and are readily available for replacement purposes.
All components of this turntable assembly are designed for long trouble-free service in both transcription playback and recording usage.

Specifications of Turntable Chassis

Standard equipment consists of turntable and bearing, motor and driver system completely assembled.
Absolute speed accuracy .4% and speed regulation within a single revolution accurate .2%.
Turntable diameter 17 inches.

Power requirements approximately 100 watts at 115 volts, 60 cycles. Other voltages and frequencies available.

Finish, gray wrinkle enamel on all metal surface excepting turntable top which is felt.
Shipping weight 110 pounds.

Electrical Complement Available With Gates Type CB-7 Turntable

The normal complement of electrical accessories consist of the professional type reproducing arm calibrated with a three position filter assembly (not illustrated) which will produce response curve for the correct reproduction of (1) Orthoacoustic recordings, (2) Worn and acetate recordings, (3) Standard phonograph recordings. A diamond stylus is normally furnished with this reproducer arm but may be quickly replaced in the field by either sapphire or steel styli. The reproducer arm has an offset head effect to minimize distortion due to incorrect angular relationship to the record groove.

The Gates Type CB-7 turntable may also be obtained with a wide variety of accessory equipment suitable for recording or reproducing practically any conventional type of disc. Equipment accompanying the turntable chassis may be selected by the customer and installed on the chassis at the Gates Radio & Supply Company factory. Correspondence is invited for any special electrical setup.

SPECIFICATIONS OF STANDARD LATERAL TRANSCRIPTION ACCESSORIES

RESPONSE—With filter assembly compensated for uniform curve in relation to method of recording from 50 to 9500 cycles.

IMPEDANCE—250 ohms level of approximately -50 DB.

NOISE PICKUP FROM MOTOR THROUGH REPRODUCER HEAD—Not measurable, far below normal groove noise.

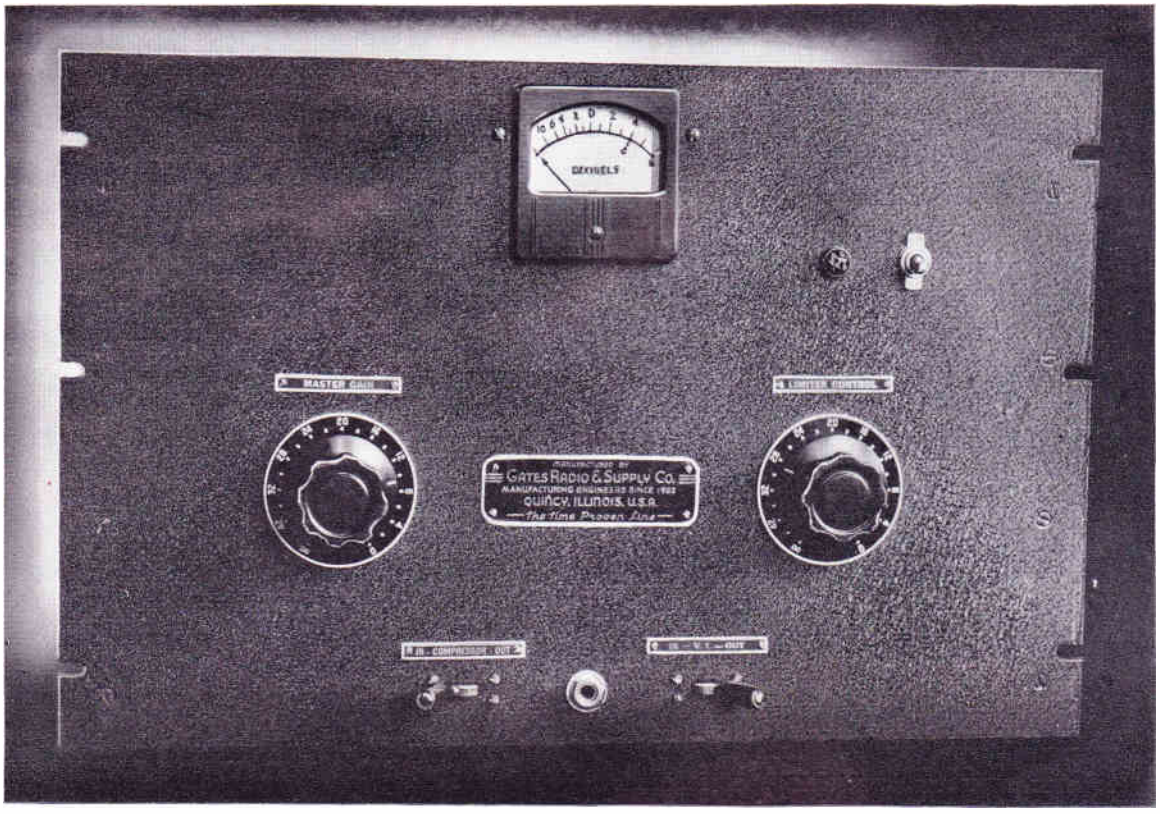
IMPROVED AGAIN

Today's Most Modern

PEAK LIMITING AMPLIFIER

featuring

"Compression Less Distortion"



The 1940 Gates Limiter Offers:

1—Only ½ of one per cent distortion at 4 Db. Compression.

2—Lightning fast effect time.

3—Inverse feed back.

4—Wide variety of models to choose from.

5—Guaranteed flat response, 25 to 15,000 CPS.

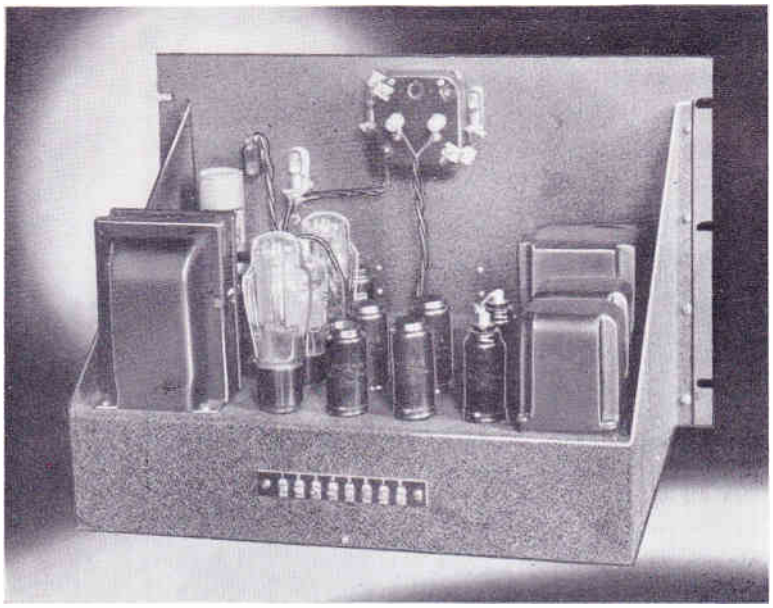
Manufactured by

GATES RADIO & SUPPLY CO. MANUFACTURING ENGINEERS QUINCY, ILL., U.S.A.

A New Gates Limiter in Your Station---*What Will It Do?*

Limiting amplifiers have been on the market now for about three years, in fact they were formally introduced at the N. A. B. Convention in 1937. Like any other new device, the first limiting amplifiers had something left to be desired, and in line with the Gates policy of improving as new developments arise, the new Gates broadcast limiting amplifiers are truly the finest and most modern equipments on the market today. Many improvements have been made which are discussed under individual heading, but the main question is: What will a Gates Peak Limiter do for me?

We believe the general engineering idea of the peak limiter is well known, so we will pass this by saying that audio peaks above a certain point are eliminated or automatically checked. The question then is: Why will a peak limiting amplifier increase my signal? Let's make a simple explanation. If in your car you had no top or cover on your gas tank, to keep the gas from spilling out when you hit a bump, you would fill it about one-third full. That's simple logic. Now in broadcasting, if you want to keep from over modulating, which is an F. C. C. rule, you run the master gain control setting up about one-third that of full modulation to keep the quick peaks from splashing over and over-modulating. Now by adding a cover to your gas tank you can fill it to the top and hold about three times as much. By adding a peak limiter to your transmitting plant you, in the same sense of the word, place a cover on your transmitter; thus you can raise the gain setting, yet the quick peaks can not get out, but you still have a higher gain setting and much more broadcast volume on the air.



Rear View Construction Featuers . . . .

1—Vertical chassis design.

2—Transformer, hum bucking, cast cases, high permeability cores, static shields.

3—Balanced design throughout.

4—Resistance welded all steel chassis of heavy gauge.

5—Ease of servicing (removable base cover to reach all parts).

6—No extra power supply; all one unit and hum free.

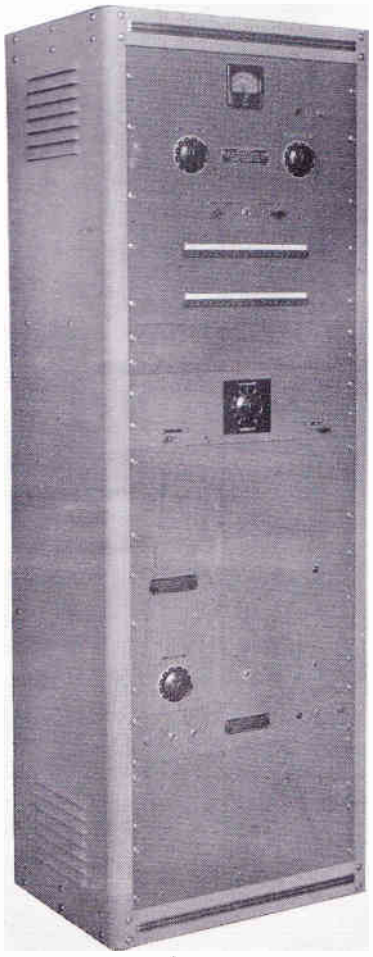
7—First quality parts throughout.

OVER 100 EARLIER MODEL GATES LIMITING AMPLIFIERS ARE IN USE . . . . ASSURING GUARANTEED USER ACCEPTANCE.

The peak limiter will, regardless of what may be thought to the contrary, not only increase your signal strength at least 3 Db. (which is equal to doubling power in every case) but do so with the new improved Gates peak limiter without increased distortion or any other evidence to the ear that limitation of peak signals is taking place.

Why the Gates New Improved Limiter Is Better

Limitation of peak signals is a simple matter, but the big question mark was limiting the signal above a certain amount without excessive distortion. Most limiting amplifiers were perfect until compression point was reached, then distortion, muffled sounds and the like took place, which was evident in the broadcast quality. Gates engineers set about to lick this, and that very thing they did by developing a dual compression or limiting system, a combination of the differential bridge and electronic system in an ingenious circuit that has brought acknowledgment from leading engineers of the superiority of this system. Briefly, the



This is one of three Speech Racks at the new KVAN, Vancouver, Washington. Note 27-CO Limiter as top panel.

differential bridge is purely resistive and thus free from distortion, but it was sluggish, slow to act and slow to release, thus there was added to this a portion of the output rectified and so fed back into the circuit that the electronic system acted as the time control element and yet all of the good features of the differential bridge maintained. Result, immediate time for effect. just the proper release time and low distortion. Note this especially: distortion at 4 Db. of compression is .5% and at 15 Db. of compression 2%. No limiting amplifier can equal this performance as offered on the market today unless this same circuit is used.

Three Models Offered

Three models are offered. They are the same in their ability of peak limitation and differ only in output level. Model 27-C is a low level unit having three stages and an output of +6 Db. maximum. Its purpose is to attach to present line amplifiers. Model 27-CO is a complete self contained high level amplifier having a maximum output of +22 Db. The 27-CG is to feed a pair of class B 250 watt modulator grids direct without additional trans formers.

Technical Design

All audio transformers used are linear standard manufactured for us by the world's largest transformer manufacturer. They are hum bucking design and have two additional shields not found on any stock transformer offered on the market. This accounts for regular run equipments having a noise level as low as 70 Db. below zero Db., also for the perfectly flat curve from 25 to 15,000 cycles. Oil filled filter condensers are used, power transformer and choke coil equipment are at least 25% larger than required, assuring cool operation. A full regulated type power supply is employed using a 5Z3 rectifier, 2A3 regulator, and 6C6 control tube. This assures perfect calibration of the compression curve under all line voltage conditions. Meter is of high speed type, rectifier design with rear scale illumination assuring no shadows. Controls are of best grade with main limiter control wiping contact design.

Push pull is employed throughout along with inverse feed back which in itself guarantees low distortion and noise level. Keys are provided so that the input may be passed through the limiting amplifier in case of tube failure, thus allowing tubes to be replaced without changing a wire or waiting until an off-the-air period. A key is also provided for switching the meter over to read input level to the limiter as well as compression level. The vertical type of rear chassis construction is employed, making possible much easier mounting, servicing and less panel space on the rack, 19x12¼ inch panel size, and 14½ inches deep from front to back.

MODEL 27C has three stages using 6J7 tubes in first stage, 6F6 tubes in second, and 6C5 tubes in third. Output +6 Db. maximum. Input required not less than −25 Db. designed to attach to present amplifier equipment. Input and output 500 ohms.

MODEL 27-CO has four stages with maximum output of +22 Db. Uses two 6J7's, three 6C5's, four 6F6's, one 2A3, one 5Z3 and one 6C6. Designed as a complete self contained limiting type program amplifier. Input and output 500 ohms. Input level —25 Db.

MODEL 27GG has four stages using two 6J7's, two 6F6's, two 6N7's, two 6A5G's, one 6C5, one 2A3, one 5Z3 and one 6C6. This model is designed to drive two 838, 805 or similar tubes in class B, and is high level emplifier. Input level —25 Db.

Technical Detail

It should be noted that in a limiting amplifier the rated over all gain is given as a limiting amplifier with compression action. For example, the gain of the Model 27-C is rated at 35 Db. as this is the rating at com-

Would you give less than 75c a day for one year to add many times the crowd shown above to your audience? A Gates Limiter will do it by increased coverage.

pression point. Actually, however, the amplifier will have 15 Db. more over-all gain than rated, but the first 15 Db. is not under compression, thus it is not mentioned.

GAIN OVER ALL—Model 27-C, 35 Db.
Model 27-CO, 47 Db.
Model 27-GG, 52 Db.

TUBES USED—See Model referred to under "Technical Design."

FREQUENCY RESPONSE—All models guaranteed flat within one decibel from 25 to 15,000 cycles.

DISTORTION CONTENT—At no compression .4%. At 4 Db. compression .5%. At 15 Db. compression 2%.

NOISE OR HUM LEVEL—Guaranteed 62 Db. below zero Db. or better.

IMPEDANCES—Models 27-C and 27-CO are 500 ohms in and out, but input is variable and may be changed to either 50 or 200 ohms. Model 27-GG is 500 ohms input and to push pull class B 250 watt grids. (Input class B transformer supplied but separate).

LINE VOLTAGE AND FREQUENCY—As standard equipment supplied for 110 volts 50-60 cycles. However, all commonly used odd voltages or frequencies may be had at only $5.00 additional cost. Line wattage Model 27-C is 100, 27-CO is 135, and 27-GG is 150.

TIME FOR EFFECT—20 to 30 milliseconds.

TIME FOR RELEASE—300 milliseconds.

Prices

Model 27-C Limiting Amplifier—Complete with tubes and ready to operate **$289.00**
Code Word (YUFRE)

Model 27-CO Limiting Amplifier—Complete with tubes and ready to operate **$319.00**
Code Word (YUFTO)

Model 27-GG Limiting Amplifier—Complete with tubes and class B driver transformer ready to operate **$325.00**
Code Word (YUHTE)

Gates manufactures a less expensive limiting amplifier for the communications industry to be used in airport, police, point to point and similar voice transmission. Your local police, airport or similar communications equipment user should be advised to investigate this.

Gates Is the Oldest Independent Broadcast Equipment Manufacturer
Established in 1922

Gates PRESENTS

A New

Communications Transmitter—

Type MO-2535

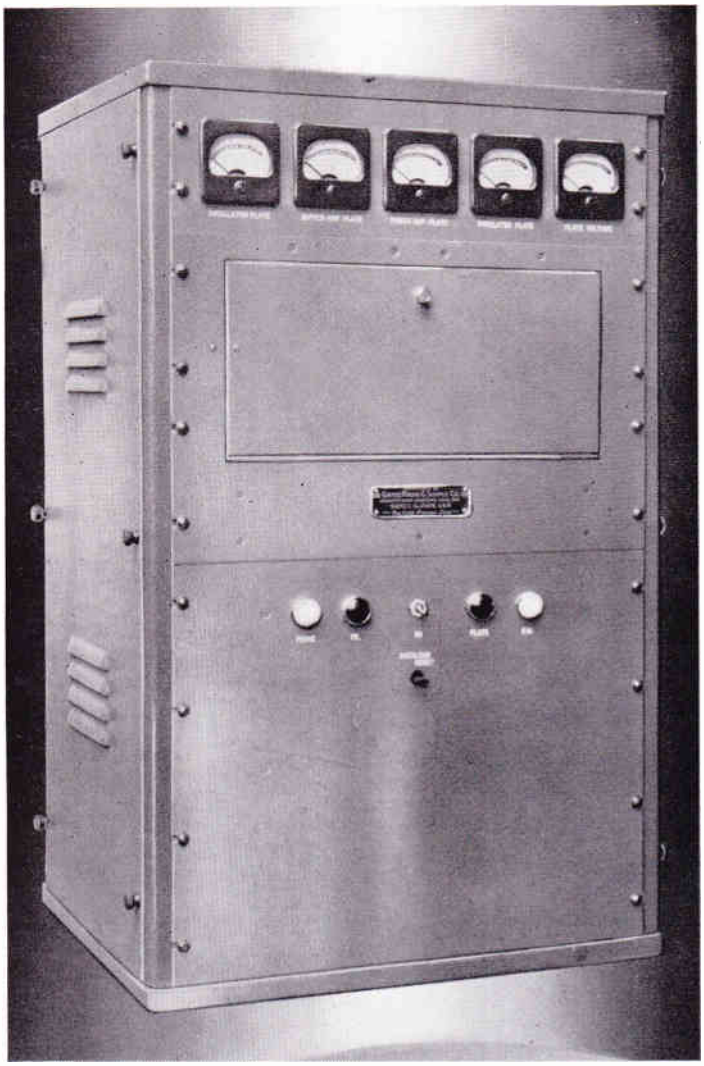
200-150 Watts
Phone CW
2-20 Mgs.

for...

MILITARY
AERONAUTICAL
POINT TO POINT
EMERGENCY
COASTAL HARBOR
RELAY BROADCAST
FORESTRY
AND OTHER SERVICES

featuring...

- **Advanced Engineering, Reliability, Simplicity, Efficiency, and Serviceability**
- **Maximum Compactness**
- **Factory Preset Tuning**
- **Quick, Easy Change of Operating Frequency**
- **Complete Metering and Protective Circuits**
- **5 Spot Frequencies**



FRONT VIEW—TRANSMITTER CABINET, TYPE MO-2535

GATES RADIO & SUPPLY CO. MANUFACTURING ENGINEERS QUINCY, ILL., U.S.A.

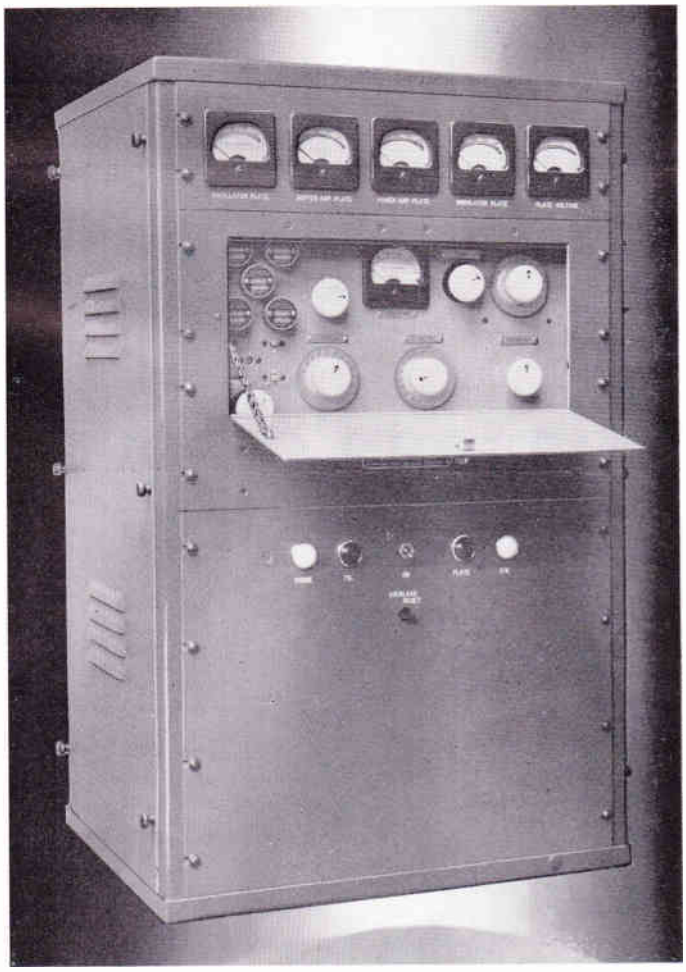
Introduction

The Gates type MO-2535 communications transmitter was designed to satisfy the need for a medium power unit having utmost reliability and incorporating rapid frequency shifting ability over wide limits and instantaneous changing of phone to CW mode of operation. The entire transmitter has been engineered to assure maximum reliability, ease of operation, simplicity of servicing, and performance at maximum efficiency even though operated by inexperienced personnel.

Compactness is the keynote in the design of the MO-2535 transmitter. It is believed that for space and weight this transmitter offers more power output, convenient features, and servieability than any other commercially offered equipment. While extremely compact, in no way has serviceability been slighted, as any section of the transmitter may quickly be reached by removing any one of the three sides of the transmitter cabinet.

The various operating frequencies are preset at the factory by means of locked tuning controls together with calibrated dial positions. The basic operational characteristics of the type MO-2535 communications transmitter are:

1. POWER RATING—200 watts on CW or ordinary phone operation; 150 watts on heavy duty phone operation.
2. CARRIER FREQUENCY RANGE—Any 5 frequencies in range from 2-20 megacycles. (See note under tuning.)
3. AUDIO FIDELITY—100-6000 CPS, low distortion.
4. KEYING SPEED—60 WPM (Higher on special order).
5. MODULATION CAPABILITY—100% with safety factor allowance for normal overloads.
6. POWER SUPPLY—110 volts AC, 60 cycles per second. (Special voltage and frequencies available.)
7. POWER CONSUMPTION—250 watts, idling. 750 watts, CW output—key down, 875 watts phone output.
8. DIMENSIONS—Transmitter Cabinet—36″ high, 21″ wide, 19″ deep. Weight 350 lbs.
   Control & Audio Cabinet—21″ wide, 11″ high, 14″ deep. Weight, approximately 30 lbs.



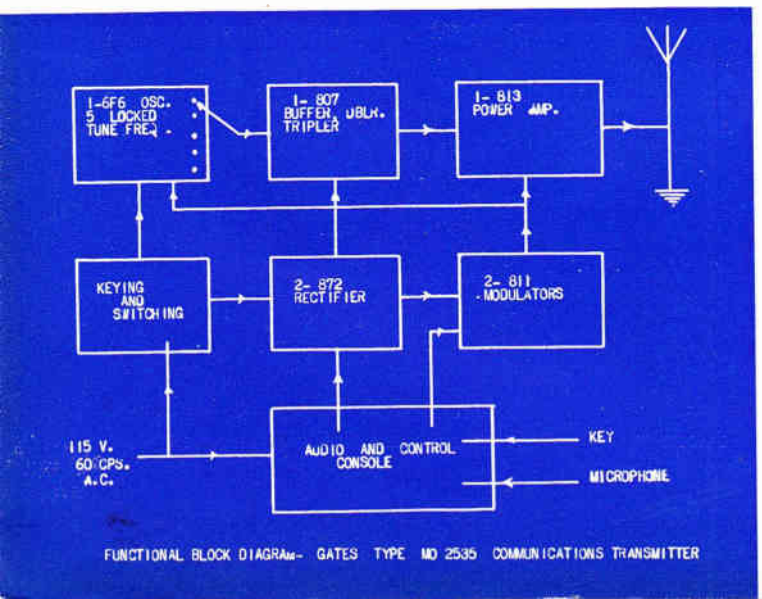
MO-2535 TRANSMITTER WITH TUNING DOOR OPEN

Fundamental Design

The Gates MO-2535 communications transmitter consists of two units, the main transmitter cabinet and the audio frequency switching console.

The transmitter proper is designed so that both sides and the rear panel may be quickly removed for convenient servicing. Controls on the transmitter circuits, other than the Power Switch, Pilot Lights and meters are located behind an access door. Simplicity of electrical and mechanical design have been achieved by adhering to fundamental circuits. The output frequency of the transmitter may be charged to any channel of five selected in approximately three seconds. Operation may be either on phone or CW by switch control on the console.

FUNCTIONAL BLOCK DIAGRAM



FUNCTIONAL BLOCK DIAGRAM- GATES TYPE MO 2535 COMMUNICATIONS TRANSMITTER

Vacuum Tube Circuits

The tube line-up of the Gates type MO-2535 transmitter embodies conventional circuits as follows:

Type of Tube	Use	Frequency Range	Characteristics
1—6F6	Oscillator	2-10 mcs	Lock tuned to crystals selected. May be changed at will by customer.
1—807	Buffer, Doubler,	2-20 mcs	Factory Calibrated tuning.
1—813	Output Amp.	2-20 mcs	Factory Calibrated tuning.
2—811	Modulators	100-6000 cps	Class "B"
2—872	Rectifier		For Transmitter Cabinet
2—2A3	Speech Amp.		Class "A"
1—6C5	Speech Amp.		"
1—6J7	Speech Amp.		"
1—5Z3	Rectifier		For Console

Control Circuits

The control circuits on the type MO-2535 transmitters are as simple as possible observing at the same time requirements of safe and convenient operation. The transmitter is operated by a principle Off-On main power switch on the transmitter cabinet which turns on the filaments and starts a sequence which turns on the filaments, bias voltages, console, keying and control circuits. This main power switches also energizes a time delay relay which withholds application of plate voltage until sufficient heating time has elapsed for the rectifier tubes.

After this one switch has been thrown at the beginning of any operation period, a transmitter is totally controlled, other than frequency changes, by the switching facilities on the console. When the mode of operation is by phone the press-to-talk switch on the microphone controls the carrier Off-On as desired.

The press-to-talk microphone switch operates a relay which is arranged to provide receiver cut-off facilities. An additional relay is provided on the transmitter to be used for receiver cut-off purposes when CW is the mode of operation. These relays may be used singly or together.

When operation is by CW, suitable relays disconnect the modulators from the circuit and exchange the reactive elements in the last radio stage plate circuit so that perfect keying is achieved. Keying is done in the oscilator cathode thus allowing simplex and break-in operations. There is no radio frequency emitted from any portion of the transmitter when the key is open.

The microphone supplied is a CAA approved instrument of dynamic type of durable design.

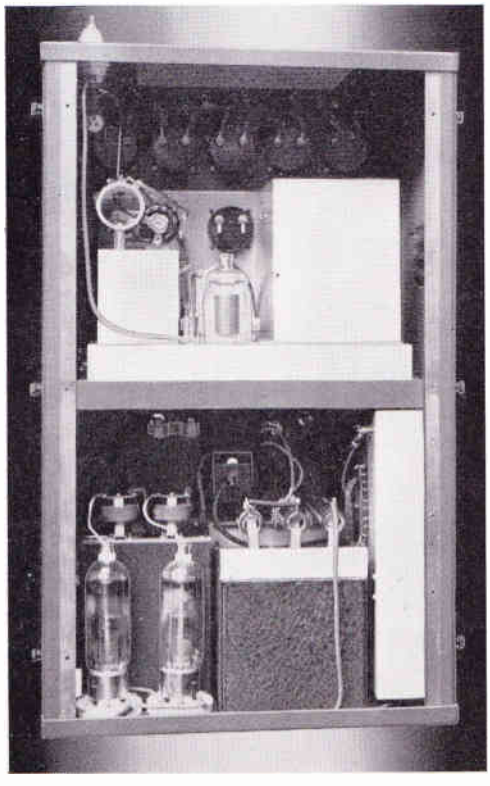
MICROPHONE AND INTERCONNECTING CABLES

CONTROL AND AUDIO CONSOLE REAR VIEW

The keying is accomplished in the type MO-2535 transmitter by using a special Leach keying relay energized by a self-contained 12-volt DC source. Keying impacts both in the primary DC relay circuit and the circuit keyed are minimized.

The transmitter is protected against overload by manual reset relay which is conveniently located on the front panel.

A special 16 conductor cable is supplied for wiring the control console to the transmitter cabinet. The cable is 16 feet long. It is possible, however, to operate the transmitter at considerable greater distance from the control console if the purchaser so desires. If the distance between the two units is more than can be handled with a 16 foot connecting cable, the installation should be made so that interconnecting circuits have minimum resistance and capacity.



REAR VIEW

Metering Facilities

The metering facilities on the type MO-2535 transmitter consists of six meters which measure at all times the following circuit conditions:

- Oscillator plate current
- Buffer Amplifier plate current
- Last radio stage plate voltage
- Last radio stage plate current
- Last radio stage grid current and Modulator current

These meters allow continuous observation on all fundamental circuit conditions and will allow operating personnel to quickly check tuning, modulation, and overload.

Output Coupling Circuit

The output coupling circuit of the Gates type MO-2535 communications transmitter is completely self-contained and may be calibrated for any antenna equipment to be used by the purchaser.

The inductive relationship of this coupling circuit to the power amplifier tank circut is fixed, and impedance match and amount of coupling controlled by variable capacity and inductive elements. These may be preset for positive and correct coupling into practically any value of impedance.

Tuning

Tuning the Gates type MO-2535 transmitter may be had with three different tuning ranges. These are as follows:

Range Set-Up:

A. The oscillator and amplifier circuits may be arranged at the factory to cover any continuous band of frequencies over a 7 to 1 frequency range inside of 2 to 20 megacycles. (i.e., 2 to 14 megacycles or 3 to 20 megacycles).

B. Under this coil and capacitor set-up the frequency range of the transmitter would extend from 2 to 20 megacycles and be set up for any 5 frequencies in that range but would not necessarily constitute complete band coverage of all frequencies between the two limits.

C. Under this operational mode the transmitter is equipped with band switching coils that would cover continuously all frequencies between 2-20 megacycles. It should be noted that this transmitter is supplied with crystal control, having positions for five selected crystals. If desired, an electronic master oscillator may be used with this equipment thus allowing continuous frequency variation throughout the entire spectrum.

General Features

All components subject to overload through heat dissipation are conservatively rated and operated well under maximum conditions. The modulator spectrum is capable of considerably more audio frequency output than called for in actual use.

Operating tests over long periods indicate complete reliability of the tuning stability and ease of operation for exceeding previous concepts of excellence.

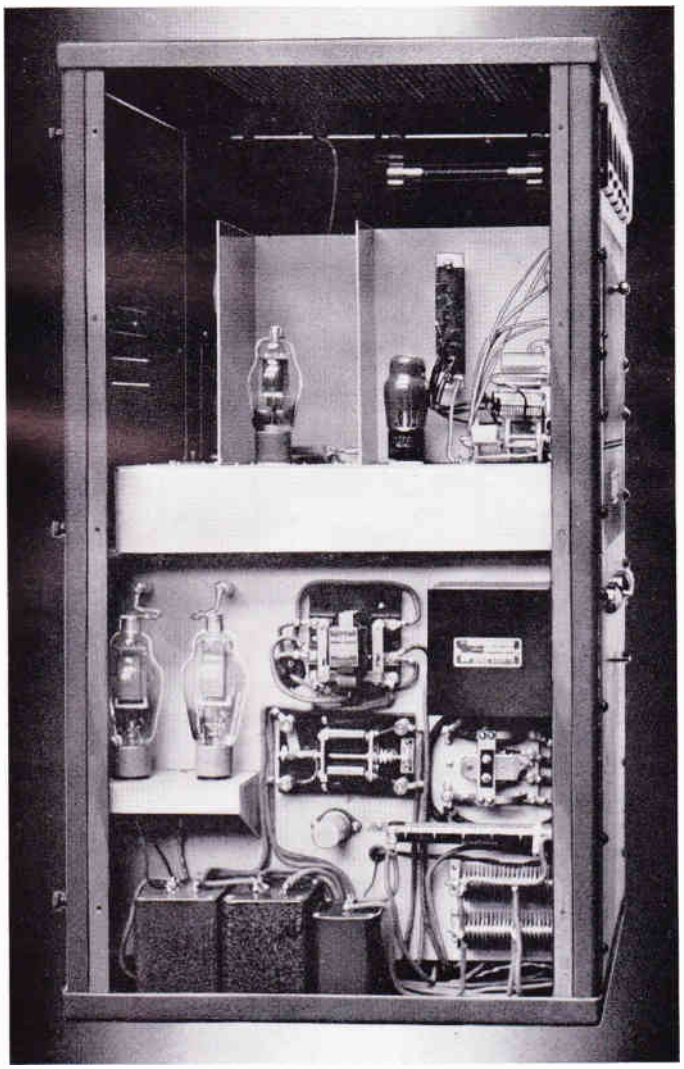
★

Equipment Supplied

The normal delivery of material comprising one type MO-2535 consists of the following:

1. Main Transmitter Cabinet
2. One set of 5 Piezo Quartz Crystals, ground to customer's frequency requirements
3. Audio frequency and control cabinet
4. One Push-to-Talk microphone with stand
5. One complete set of tubes for operation
6. One set of spare tubes
7. One kit of miscellaneous hardware
8. One interconnecting cable

★



VIEW OF MO-2535 TRANSMITTER SHOWING RELAY PANEL, MODULATOR TUBES, AND OSCILLATOR DOUBLER SECTION

Ordering Information

The Gates type MO-2535 communications transmitter is available as follows:

Type MO-2535A—Continuous Tuning over any 7 to 1 frequency range inside of 2-20 megacycles
Code Word (YUNOD)

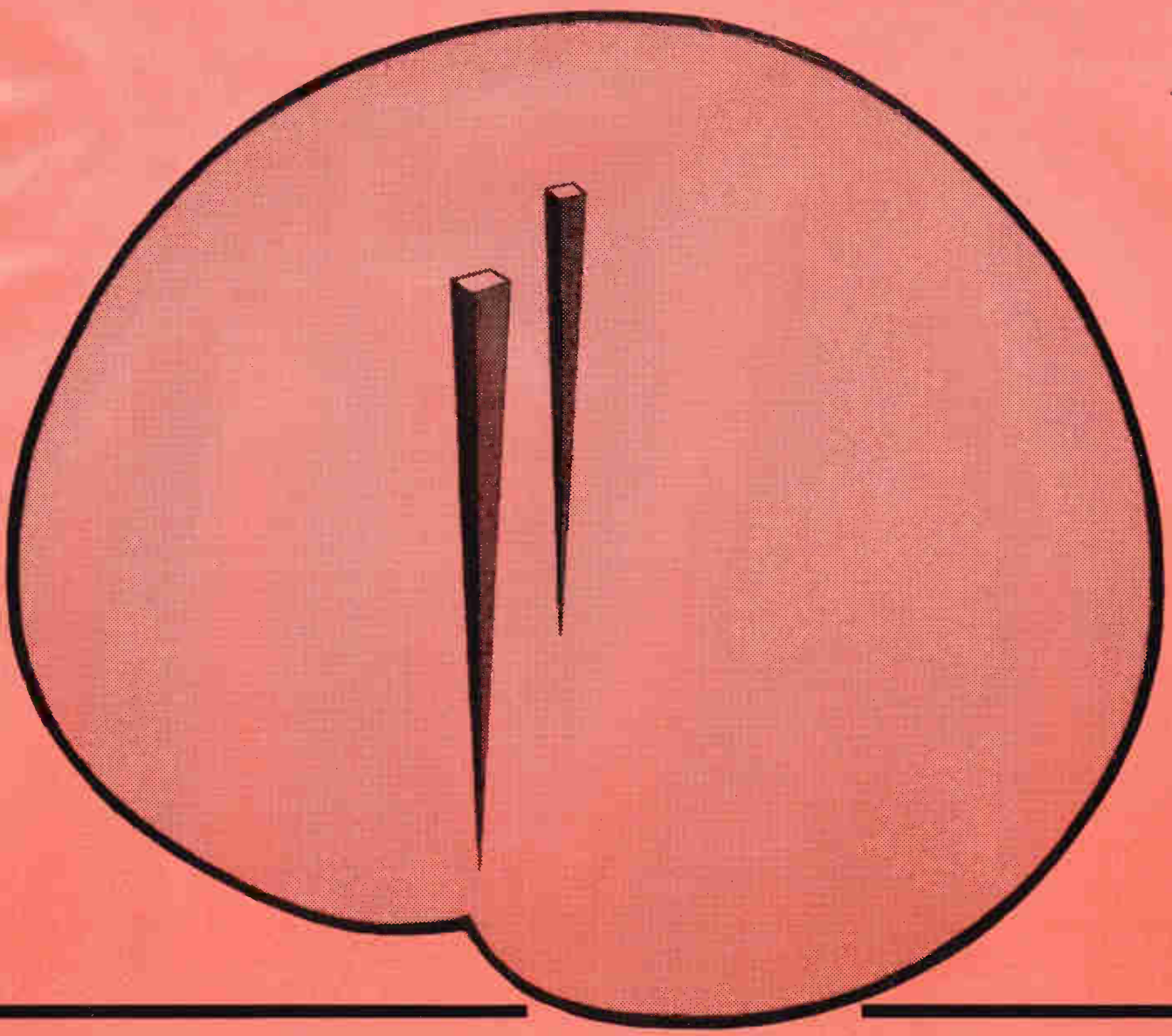
Type MO-2535B—Tuning Set-Up for Five Spot Frequency in the range of 2-20 megacycles
Code Word (YUNUF)

Type MO-2535C—Continuous Tuning from 2-20 megacycles
Code Word (YUNYG)

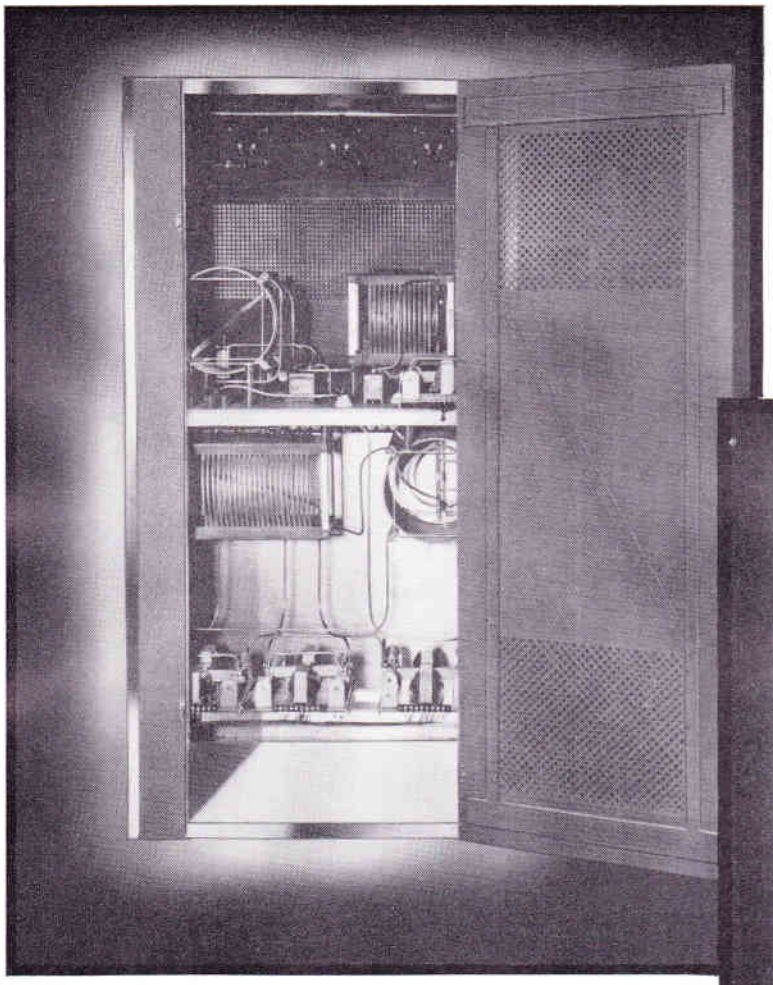
Prices on Application

All transmitting equipments are manufactured by Gates Radio & Supply Company and are licensed under all applying patents for use in the services to which they are sold.

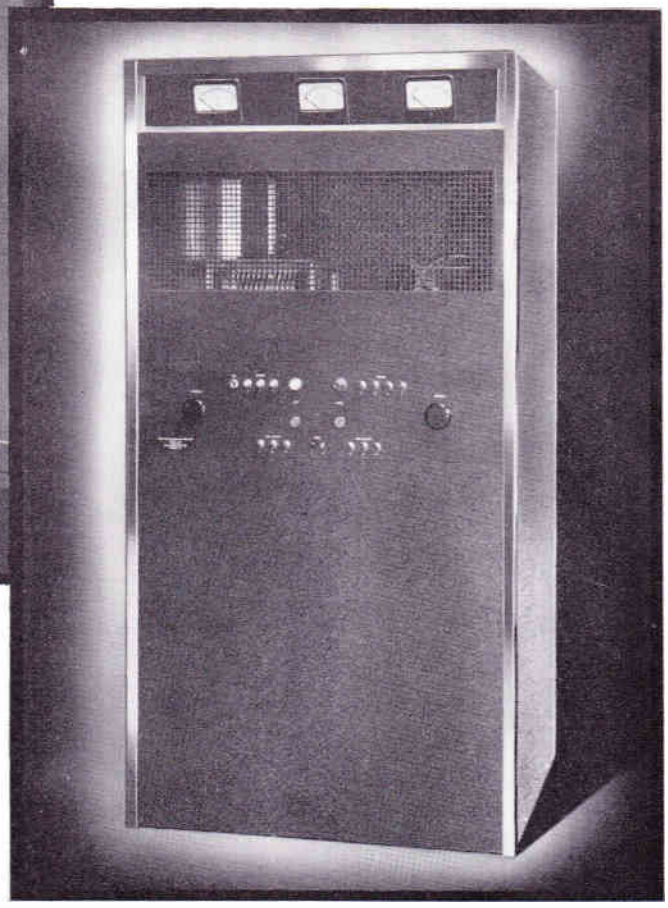
DIRECTIONAL ANTENNA PHASERS and COUPLERS



GATES AMERICAN CORP.
QUINCY ILLINOIS



"Behind and Before"—the appearance of this special phaser for WTAD shows good engineering practice with an eye for good appearance and ease of operation.



WTAD, the "home-town" station at Quincy, Illinois, has installed this new phasing unit. Power rating, 5 Kw.

In General . . . .

As each phasing and coupling system is specially designed for each installation standard specifications are only set up for materials used and methods of construction. The units shown herein illustrate clearly these two points but for the sake of adaptability any special features desired which alter our standard structural designs may be incorporated without adding materially to costs.

The description on the following pages explain fully the types of material which are used in the construction of Gates Antenna Phasing and Coupling Equipment. The exceptionally high standards for materials and workmanship have proved themselves time after time in actual service and have obtained the unqualified approval of prominent engineering consultants, station owners and their engineers.

Insulation

Guide strips for holding the coil turns in position in Gates phasers and coupling units are Mycalex; the well known low loss, high strength insulator. Spacing for the turns is obtained by grooving each strip to fit the diameter of the tubing or thickness of the edgewise wound copper strip, which ever material is employed, thus assuring a good mechanical job of supporting the coil.

Each inductance is mounted on Lucite insulators, the well known low power factor material for R. F. insulation where extremely low loss is necessary. Ceramic insulation, commonly called high tension electrical porcelain, is used throughout the construction of the solenoid type R. F. relays. The same material is used for feed-thru of the incoming and outgoing R. F. lines in both phasing and coupling systems.

Inductances

Inductance material may be either edgewise wound copper strip or seamless copper tubing. In either case a heavy coat of cadmium is plated on to assure non-corrosive characteristics, even in the most critical conditions of tropical salt sea atmosphere. Each type of coil is supported on Mycalex bars rigidly supported on the ends by strips of steel.

Cabinets

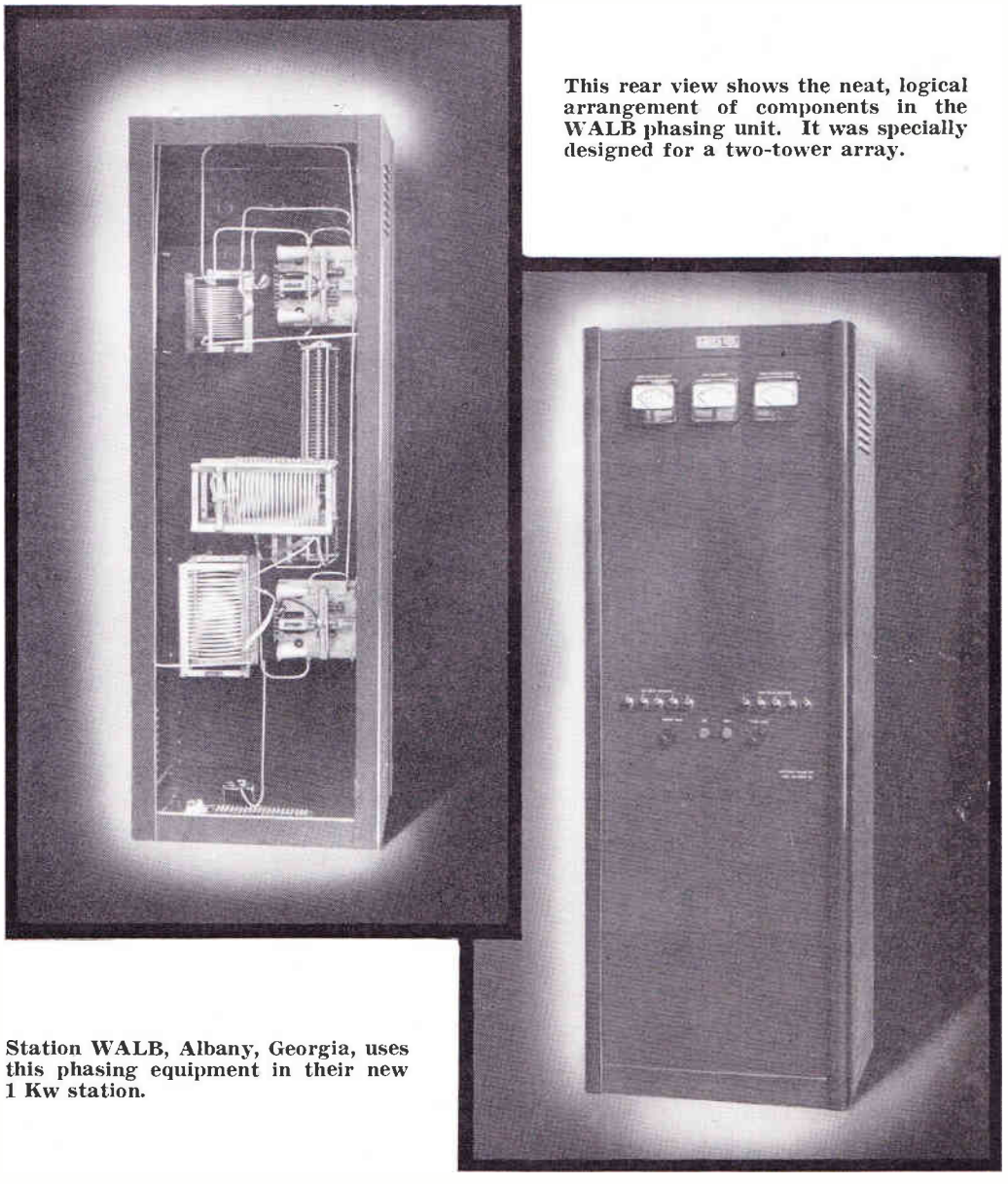
Wherever sufficient data is available on color, finish and construction details, cabinets for the phasing systems are made to match those of equipment already in use in the station. Our own finishing plant is equipped to supply any wrinkle or flat enamel color combination with out additional charge —another example of Gates versatility in special services.

Meters

The standard meter complement in the phasing unit consists of R. F. thermocouple ammeters for indicating total R. F. current from the transmitter, and current to each transmission line. R. F. line current and antenna current meters are also supplied with each antenna coupling unit. Remote reading antenna current meters are supplied for use with Gates current transformers which are included as part each antenna coupling unit.

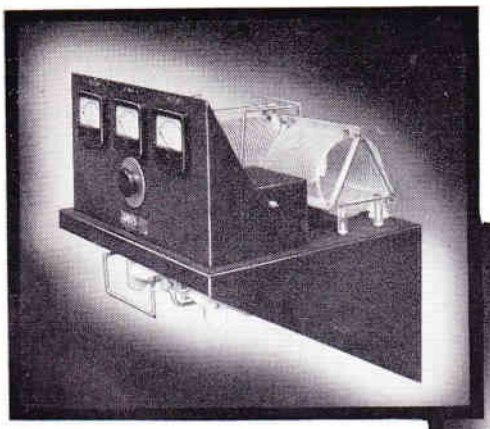
Assembly

All Gates equipment is constructed of the finest materials available with particular care given to finishes and assembly practices that will withstand every climatic condition no matter how severe. To obtain this high standard of workmanship corrosive

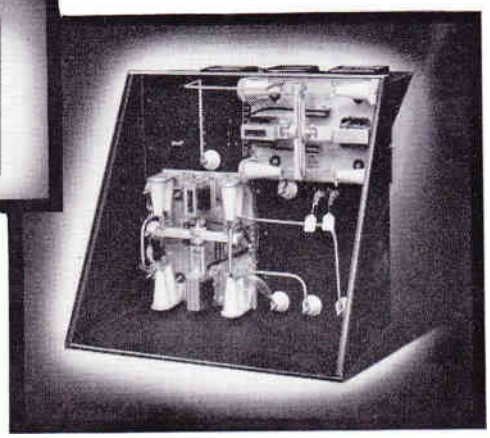


This rear view shows the neat, logical arrangement of components in the WALB phasing unit. It was specially designed for a two-tower array.

Station WALB, Albany, Georgia, uses this phasing equipment in their new 1 Kw station.



This bottom view of the coupling units show the switches used to change patterns for day and night service.



Coupling units for directional systems are also specially designed for each installation. This front view shows the meter arrangement. A water proof cover is provided for protection from the elements.

metals are heavily cadmium plated, cabinets are weatherproofed and particular attention is given to placement of parts and proper shielding so that no interaction is obtained.

Controls

Each antenna coupling unit has its own tuning condenser control on the front panel and a slotted shaft adjustment for the current transformer. Connections to inductances both in the phasing equipment and the coupling units and the phasing system are made by clips which slip onto any turn in the inductance with exception of permanent connections. These are soldered in all cases.

The control panel on the phasing unit contains the tuning adjustment for each branch of the phasing network, two pushbuttons for "day" and "night" switching and pilot lights which indicate when every R. F. relay is making proper contact.

Dual Pattern Arrays

For stations using different patterns for day and night service Gates has developed a phasing system, the heart of which is a switching arrangement. This switching system is so designed that the tap connections of inductances can be changed, condensers added or taken from tuned circuits, towers connected or disconnected, and many other functions common to directional systems performed merely by operating push-buttons on the front panel on the phasing equipment cabinet.

The switch is clearly shown on the bottom view of the antenna coupling unit on Page 4. It operates fundamentally as a double solenoid and plunger arrangement. A ceramic cross bar mounted on the plunger carries the moving contacts which are forcefully engaged with fixed contacts located and aligned for smooth engagement with the movable contacts. These solenoid switches are available in any contact arrangement necessary for the application and are supplied for carring as much as 50 amperes of R. F. current.

When Asking For Prices

It is well to remember that every directional system must be specially built. Therefore we will appreciate complete engineering information on your proposed directional system when asking for prices. With each inquiry give, if possible, the:

Resistance of each element.

Spacing between elements.

Phase angle for each element.

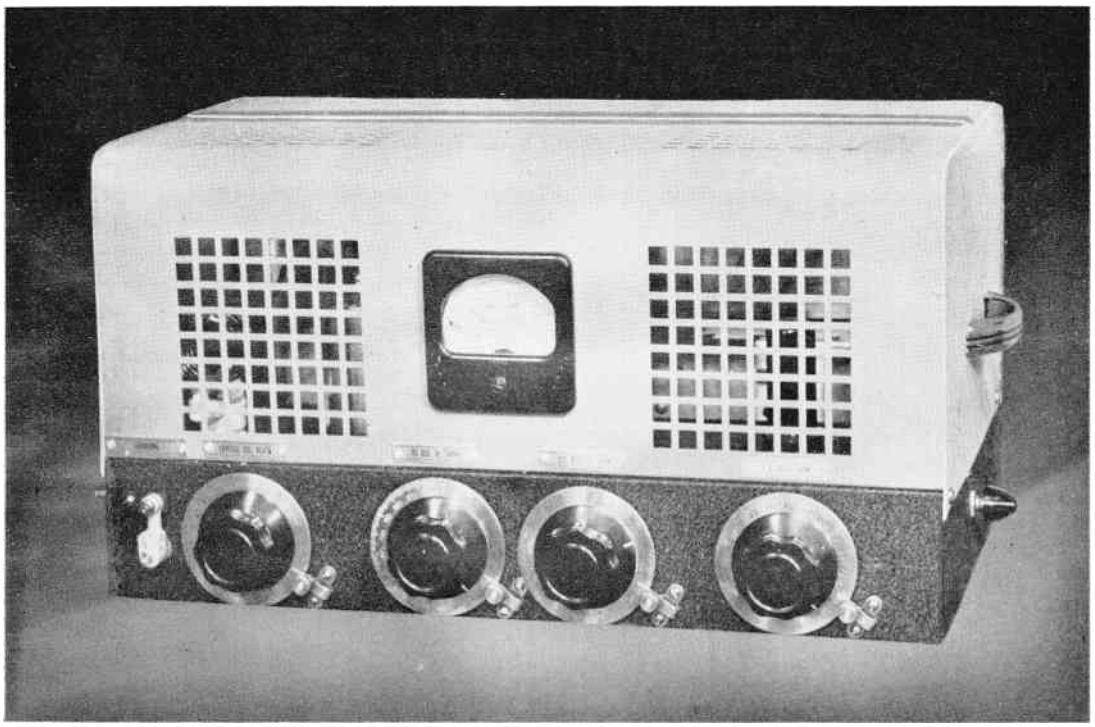
Reference element.

Power.

Frequency.

We are always glad to make quotations and will submit a proposal giving full details.

The Gates American
PORTO-TRANSMITTER



For

--Relay Broadcasting

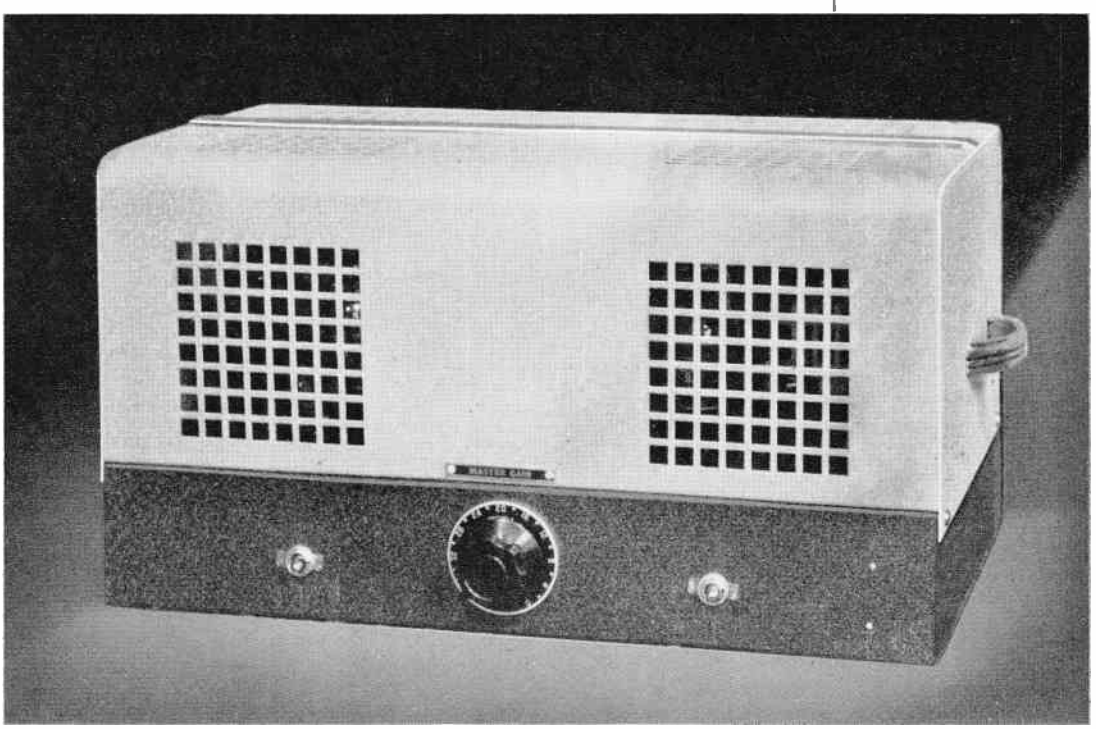
--Emergency Portable Transmitter

--Oil Field Operators

--Police Service

--Fire Service

Designed for the Broadcasting Station for High Quality Relay Service in the 30-40 Megacycle Band.



Operates from Six or 110 Volts, Delivering a 25 Watt Carrier

Consider These Features Before Buying a Portable Transmitter:

1---Universal 6 or 110 Volt Operation.

2---Full 25 Watt High Level Modulated Carrier.
(20 Watts for Six Volts).

3---Complete Audio System. No Other Amplifiers Required.

4---Two Unit Design, Dividing Weight Into Two Easily Handled Units.

5---Extra Heavy Construction.

In the rear of a Standard Sedan Automobile the Gates Porto-Transmitter fits perfectly, requiring only battery and antenna connections to complete the set up.

The Gates Porto-Transmitter Offers A Full 25 Watts Carrier

When operated on 110 volts, the Porto-Transmitter delivers a full 25 watts of carrier completely high level modulated, assuring a strong clean noise free transmission over greater distances than with earlier types of relay transmitters of less power and modulator capacity. On six volts or from the car battery a full carrier output of 20 watts can be expected and likewise fully modulated. Whether used with a small bumper type vertical antenna or a larger pre-erected antenna, results are quickly noticeable as approaching a direct wire broadcast in quality and directly out of the novelty class.

Porto-Transmitter Antenna Coupling Flexibility

Antenna coupling to the Porto-Transmitter is a simple vertical or horizontal type antenna working against ground. For short distance transmission the bumper type of vertical antenna is suggested. For greater distances a single wire of greater length operating on the harmonic of the antenna may be used and of course as high as possible. As especially in portable work, different locations offer varied antenna problems both as to radiating efficiency and erection the flexibility of connecting arrangements for antennas is highly desirable.

Tuning Is Simple, Locked and Retuning Requirements Infrequent

The only circuit that requires tuning for each different location is, of course, the antenna coupling. The balance of the tuning is done once and locked by means of the dial locks provided and requires only infrequent checking. For portable equipment, complicated tuning is not proper and the Gates Porto-Transmitter is the height of simplicity in this respect.

No Other Equipment Required But the Microphone

The Porto-Transmitter is complete. It is supplied for 30 or 250 ohm microphone and after this and the antenna connection is made, you are ready for transmitting. Ample gain is provided in the audio amplifier for other than close to the microphone pickups. Complete shielding of the radio frequency portion assures minimum trouble from radio frequency pick up in microphone cables or associate equipment.

Everything Plugs Into the Porto-Transmitter

110 volt line, battery line, microphone, in fact everything but the antenna plugs in, making for an almost immediate set up for emergency broadcasts. Joiner cable with double plug heavy duty connectors joins the two units of the Porto-Transmitter.

Why the Porto-Transmitter Is In Two Units.

Its Size and Weight

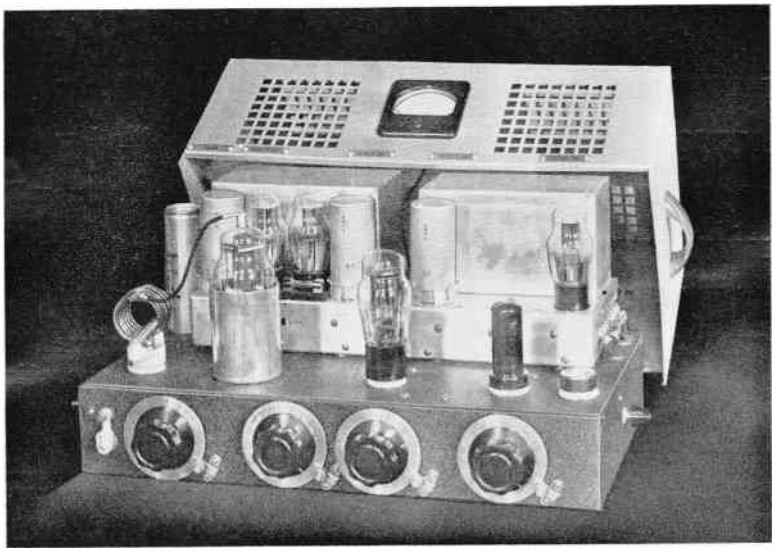
Every engineer will agree that to obtain a full 25 watts, high level modulated, so much equipment must be used, which means weight, plus the fact that the Porto-Transmitter operates on both 110 volts and 6 volts, which requires two heavy duty type vibrator units. Thus two light weight units are employed rather than one heavy bulky equipment. The R. F. unit, which also contains the two vibrator units, weighs 36 pounds. The modulator unit which includes all of the audio equipment, weighs only 24 pounds. Both units are the same in size, standing 17¼ inches long, 11½ inches wide and 9½ inches high. Top and bottom are removable by simple self-tapping screws.

Six Volts or 110 Volts--- It Works On Either

When in 110 volt areas, of course use the light line without battery worries; but when in non-power line areas, you need no longer turn down this business, as the Porto-Transmitter does a swell job from the six volt battery by means of two specially built, heavy duty, noise free vibrators, one delivering current for the radio frequency, and the other for the audio section. By this it can be seen why a fully modulated carrier can be expected as there has been no shaving on the power supply, for either light line or battery operation. Emergency broadcasts, such as fires, floods or quickly arising special events, do not often offer light line or telephone line facilities. The large power output from the Gates Porto-Transmitter operating on the six volt battery will certainly be appreciated in this case.

Other Applications

The Porto-Transmitter offers a new type of communication to many other fields besides relay radio broadcasting. Oil field operators will find the Porto-Transmitter ideal for location to headquarters emergency transmissions. High frequency ship to shore, forest service, police service and many other services will find the Gates Porto-Transmitter a time saver where the elements make other types of communication impractical and, in many cases, impossible.



Above, Inside view of R. F. and Power Section of Gates Porto-Transmitter. Note Dual Power Pack for 6 or 110 Volt Operation.

Open view of Audio-Modulator Section. Plenty of Audio Gain Well Shielded.

TECHNICAL INFORMATION

TUBES—6F6 oscillator, 6N7G dual triode first and second buffers doublers, 807 final amplifier, 6SF5 first audio, 6C5 second audio, P.P. 6F6G class AB modulators.

OSCILLATOR FREQUENCY—7½ to 10 megacycles.

CARRIER FREQUENCY—30 to 40 megacycles (others on special order).

TUNED CIRCUITS—Crystal plate, 1st buffer doubler, second buffer doubler, final amplifier tank, antenna coupling.

METERING—Single milliameter switchable to all circuits.

AUDIO INPUT—For any standard 30 or 250 ohm low level microphone.

CURRENT DRAIN—At 110 volts, 175 watts. At six volts, 24 amperes.

NOISE LEVEL—Negative 50 Db. at either six or 110 volt operation.

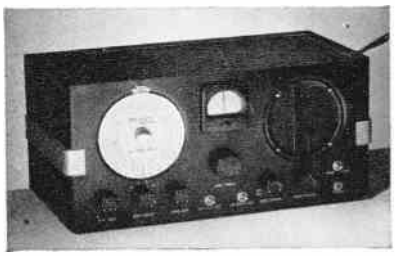
RESPONSE—Flat within 2 Db. from 50 to 8000 cycles.

VIBRATOR DESIGN—Special dual heavy duty designed for long service. Replacement parts all standard material. Change from 110 volts to six volts operation by means of two switches and relay control. Oversize filter assures complete elimination of vibrator noise.

Ordering Information

When ordering be sure to specify frequency of carrier operation. Every effort is made to keep these equipments in stock, but about three days' time is required for grinding crystal and complete check of equipment on operating frequency.

30-40 MEGACYCLE RECEIVER



This receiver has been selected and is recommended by Gates American as an excellent medium priced 30-40 megacycle studio or base receiver. Actually tunes from 27 mc. to 68 mc. in 2 bands with a degree of sensitivity and selectivity that is unparralleled. Band 1 from 27 mc. to 42 mc. Band 2 from 40 mc. to 68 mc. Sensitivity is better than 1 microvolt. Socket on chassis for 6 volt mobile operation with addition of vibrapack or other suitable power supply. IF amplification 1600 Kc. Tubes used, one each 1852, 6L7, 6J5, 6K7, 6P7G, 6H6 noise silencer and type 80. Built in speaker and extra 500 ohm connection for feeding direct to speech input. Meter shown is optional and terminals are provided for it if not purchased originally but added later. As supplied for 110 volts 50-60 cycles only. Size 18½ inches long, 9¼ inches deep and 8½ inches high.

Manufactured By

GATES
QUINCY, ILLINOIS, U.S.A.

AMERICAN
CORPORATION

Laboratory and Production Test A.C. and D.C. Power Supplies

For

Production Line Testing

Radio Instruction

Laboratory

College Class Room

Repair Department

Measurements

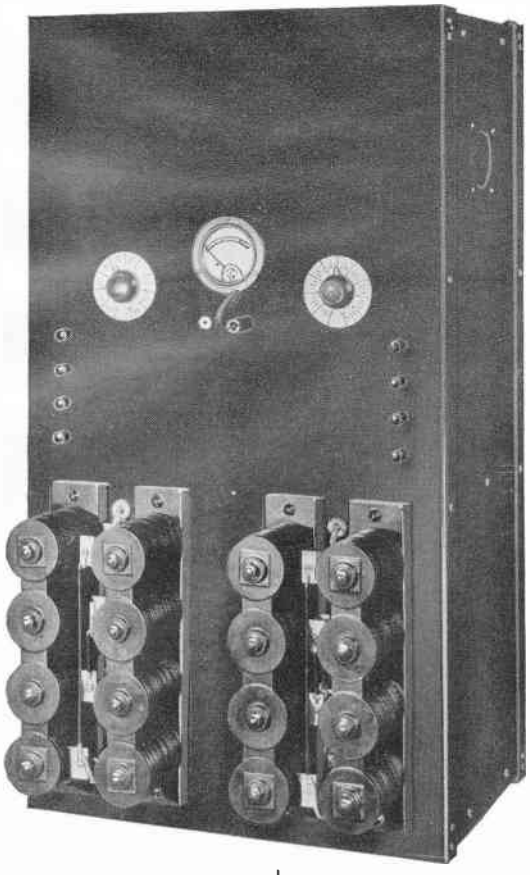
Signalling

R. R. Telegraph and Telephone

Transmitter and Receiver Testing

Above is illustrated the SC4 power unit which is available in numerous AC and DC voltages. The unit illustrated developed 450 volts at 150 Ma. D. C. at less than .25% ripple content and is variable from 0 to maximum voltage by means of an auto transformer. A. C. voltage is 7.5 volts maximum with exact center tap and is variable also from 0 to full voltage providing tests on common tube voltages of 1.1, 2, 2.5, 5, 6.3 and 7.5 volts. An extremely handy unit for production or test bench service.

SC Series Power Supply Units



Above is shown a typical selenium type DC rectifier. The unit illustrated is two complete 15 volt 10 ampere rectifiers with complete filter for lower than .25% ripple content. These may be parralled to obtain 20 amperes or series to obtain 30 volts. Voltage may be lowered to as low as 8 volts by means of rheostats provided. Other voltages and amperages available in this unit.

This line of power supplies has been specifically designed for use in experimental laboratories, educational laboratories and other general laboratory work. It is the first line that has been offered comprising units that will supply completely variable voltages at high or low current either AC or DC.

Low Voltage SC Series

Several different SC Power Supplies are described in this circular. However, these are merely representative of the many different types that can be furnished and are not to be interpreted as the only types available by any means. In order to simplify the explanation of the various types available they are divided into three major classifications of Low Voltage, High Voltage and High and Low Voltage.

High Voltage SC Series

The types that make up this classification of SC power supplies have output voltages ranging from two to two hundred and twenty volts with current ratings from a fraction of an ampere to several hundred amperes depending upon individual requirements. These ratings represent the range of maximums that can be provided. The output voltage may be adjusted either by a variac or a switch. In the former case the voltage may be varied from zero to the maximum and the full current rating obtained at all times. The variation is smooth and continuous and is not subjected to sudden jumps or variations beyond those inflicted by power line changes. Switching is provided on those units where voltage changing is permissable in steps of a predetermined amount. All voltage changing adjustments, whether continuous or in steps, are made in the primary side of the power transformer.

Either DC or AC output units are available or a combination of both. In the combination units a switch is provided to change the output to the kind of current desired.

The SC Power Supplies having DC output are provided with or without filter. The filter will reduce the ripple to less than .5% of the output voltage. It consists of a two section choke input arrangement of very low resistance which reduces voltage loss in this part of the apparatus.

High Voltage SC Series

These Power Supplies are primarily designed to provide high voltage and low current to devices such as vacuum tubes. The output may be either AC or DC but in most cases is DC. The rectifier tubes are of the high vacuum types which are capable of operating at very low voltages. In fact it is entirely practical to operate the power supply at any voltage down to zero at full current output. Standard designs give maximum voltages as high as a thousand volts. Higher ratings are practical, being limited to the requirements of the customer. This statement also applies to the current rating, this being at present a maximum of

SC Power Units For Every Application

.5 amperes. All supplies are standard with a swinging choke input in the filter circuit so that they are satisfactory for use with Class "B" or "C" amplifier supplies with exception of those having an output of 250 volts or less. These may also be designed in this manner on order. In any case the DC supplies have a hum ripple content of less than .1% of the output.

Combination High and Low Voltage SC Series

The same general information given above for the low and high voltage SC power units applies to the combination units. Both outputs are separate so that, for example, the low voltage portion may be used for filament power and the high voltage section for supplying power to the other elements of the tubes.

General Construction Features

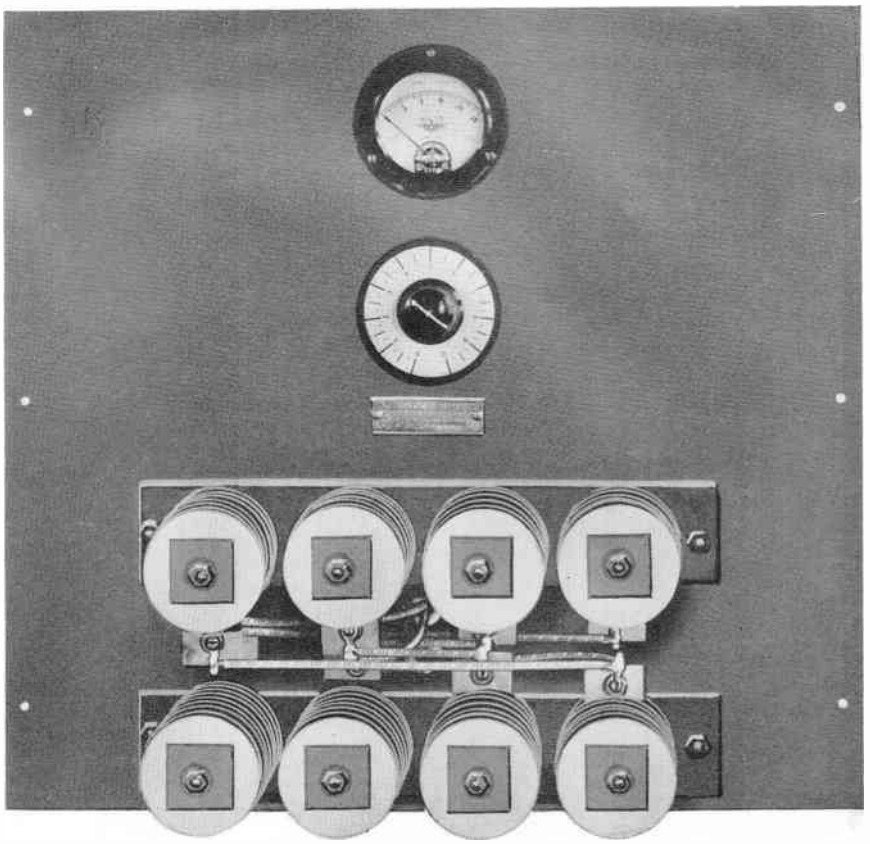
Steel chassis and cabinets are used for mounting the parts and enclosing the complete apparatus. Black wrinkle enamel is used as the standard finish except that grey wrinkle may be had at the option of the customer. All controls are suitably designated as to function adjacent to the control so that operation is clear without resorting to complicated instructions. A schematic diagram of the complete unit is located at an easily accessible place on the equipment so that service and maintenance may be easily accomplished in most cases without referring to any other source.

In general the small power supplies are made for portable use having carrying handles on the case. They are also available for relay rack mounting on standard 19-inch racks. The larger models which are too heavy for strictly portable use are made up in cabinets varying in size to accomodate the apparatus and ordinarily are installed in a permanent location or can be installed on a dolly in case it is desirable to move them about.

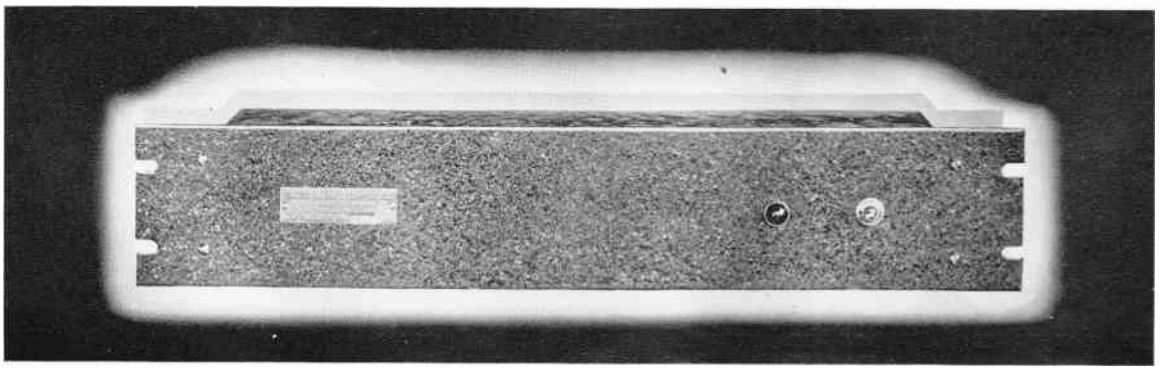
Power input in most cases is from the usual 115 volt 60 cyle AC line and a sturdy conventional two blade plug and cord is furnished as part of the equipment. The output is brought to screw type terminals on the front of the unit and suitable designations are placed next to each terminal to indicate its use.

SC Power Supplies To Order

As mentioned in the first part of this circular, power supplies listed on page 4 do not represent all the types available. In cases where a special type of unit is desirable please address your correspondence to the Engineering Department, Gates Radio & Supply Company, Quincy, Illinois. Give as complete information as possible regarding current and voltage requirements and any other special information. A power unit to fit your exact needs can be furnished quickly and economically.



The rectifier shown above is another typical selenium type rectifier for all purposes. The unit shown provides 12 to 15 volts at 10 amperes. Is completely filtered for equal to battery operation. Rheostat and meter provide means and indication for varied voltages. This unit may be had with less filter for applications requiring only a medium or rough grade of direct current.



Smaller supplies are often times desirable for rack or open bench operation. This compact unit on a 3½" by 19" panel provides 6.3 volts at 3 amperes and 250 to 300 volts at 50 Ma. D. C. is pure and may be used for all applications that would be required of batteries. Banks of these may be installed on racks to operate large setups of multiple units.

Standard SC Series Power Supplies — Combination High and Low Voltage Models

TYPE SC-1—250 volt DC at 50 milliamperes, 6.3 volts AC at 3 amperes. Both voltages are fixed. Relay rack mounting 3½ times 19 inch panel. Tube used is Type 80. Toggle switch and pilot light on front.

TLPE SC-2—Same as Type SC-1 except that high voltage DC is 400 volts at 100 milliamperes and low voltage AC is 6.3 volts at 5 amperes. Tube used one 5Z3.

TYPE SC-3—Same as Type SC-1 except voltage is completely variable from zero to maximum at full current and unit is for portable use. Case has carrying handles on ends. Type of case is shown under illustration of Type SC-4. Size—6 inches wide, 14 inches long and 12 inches high.

TYPE SC-4—Same as Type SC-3 except maximum DC voltage and current is 500 volts at 150 milliamperes. Maximum AC voltage and current is 7.5 volts at 5 amperes.

TYPE SC-5—350 volts DC at 100 milliamperes, 5 volts at 2 amperes, 6.3 volts AC at 5 amperes. All voltages are fixed. Portable mounting with cover. Tube used, Type 5Z3. Portable type case with handles on each end. All output connections brought out to terminal strips on the front panel. Toggle switch and pilot light also on front panel. Size 9" wide, 17" long, 9" high.

TYPE SC-6—Same as SC-5 except high voltage DC output is 300 volts.

TYPE SC-7—500 volts at 500 milliamperes DC, 7.5 volts at 10 amperes AC adjustable to 1.1, 2.5, 5, 6.3, 7.5, volts by means of a tap switch on the front panel. DC voltage compltely variable from zero to maximum by means of variac on the front panel. Size 10" wide, 17" long, 12" high. Tubes used, two 5Z3's.

TYPE SC-8—Same as SC-7 except low AC voltage completely variable from zero to maximum.

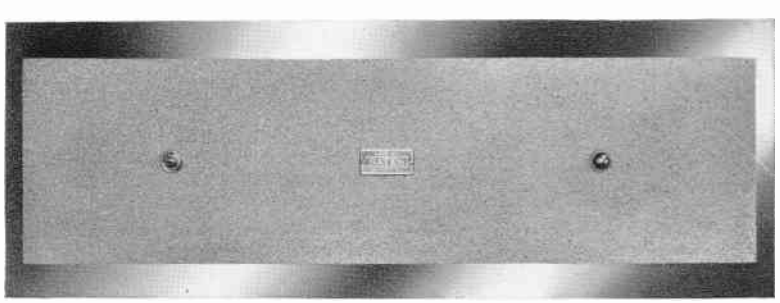
TYPE SC-10—Same as SC-8 except low voltage maximum is 26 volts and is either AC or DC by a switch on the front panel. Case size 13" wide, 17" long, and 12" high.

TYPE SC-11—1000 volts at 500 milliamperes DC and 30 volts at 15 amperes AC or DC. Either type of low voltage current may be selected by a switch on the front panel. Both low and high voltage are completly variable by means of variacs on the front panel. Toggle switch and pilot light for both sources on the front panel. Tubes used are four Type 836. Meters are 1500 volts DC, 750 milliamperes DC, 50 volts AC or DC and 20 amperes AC or DC. Cabinet is relay rack type 21" wide, 36¼" high and 15" deep.

DC SC Series Units

TYPE SC-1D—30 volts DC at 30 amperes completely variable at full current rating down to zero voltage. Toggle switch and pilot light on front panel. Housed in relay rack cabinet 21" wide, 28" high and 15" deep.

TYPE SC-2D—Same as SC-1D except that voltage is variable in two volt steps from 22 to 30 volts.



Where low voltage, low amperage DC is required, this small rack unit on a 5¼" by 19" panel will deliver either 6 or 12 volts at 2.5 amperes. Uses a small selenium rectifier into a modrate filter or if desired complete filter for battery quality supply. Ideal for relays, amplifier filament supply or similar applications.

November 8, 1944.

TO OUR CUSTOMERS

The equipment represented herein is pre-war in many respects as we, like other companies, in cooperation with the government, have devoted our entire efforts to the successful prosecution of the war. However, Gates has made many developments and new products which do not show in this catalog. Moroover the Gates Company will be happy to discuss with you any new products not listed herein.

PRICE LIST---GATES CATALOG

ITEM	DESCRIPTION	PRICE
1.	Transmitter Model 250-C less Limiting amplifier, with 25A frequency control unit, one crystal and oven and one set operating tubes.	$2500.00
2.	Same as above but with 27CG Limiting amplifier	2750.00
3.	Transmitter 250-A with 25A frequency control unit, one crystal and oven and one set of operating tubes.	2500.00
4.	21A Antenna Tuning unit	117.50
5.	21B Antenna Tuning unit	147.50
6.	21C Antenna Tuning unit	82.50
7.	21D Antenna Tuning unit	132.50
8.	25A Frequency control unit with one crystal and oven	323.00
9.	25A frequency control unit with two crystals and two ovens.	373.00
10.	Model C-40 Communications Transmitter less crystals and tubes.	750.00
11.	Crystals in holder for item 10 ea.	18.00
12.	C-50 Voice Controlled transmitter less tubes and crystals.	1200.00
13.	1A Transmitter less tubes and crystal.	950.00
14.	350CP Transmitter	discontinued
15.	AP4 Transmitter	discontinued
16.	MO-2535 Telephone and telegraph Transmitter without tubes and crystals but with control cabinet.	1285.00
17.	Same as above only telegraph only	785.00
18.	Porto-Transmitter with tubes and crystal	395.00
19.	Directional phasers	prices on submission of engineering data.
20.	Studioette with tubes and power supply	395.00

PRICE LIST---GATES CATALOG

ITEM	DESCRIPTION	PRICE
21.	CB4 Desk Sel. No. 1	discontinued
	CB4 Desk Sel. No. 2	1400.00
	CB4 Desk only	325.00
	NOTE--All CB4 equipments now include Gates Turntables. Selections not listed are discontinued	
22.	CB50 Control Combination	price subject to equipment selection
23.	Model 5C Speech system less tubes.	1450.00
24.	CB-7 Turntable as listed with professional pick up and diamond stylus.	375.00
25.	Turntable and cabinet less pick up or filters.	225.00
26.	CB-7C Turntable chassis only.	175.00
	NOTE--If cast iron platter desired for recording purposes add 10.00	
27.	Limiting Amplifier 27C	275.00
	Limiting amplifier 27CO	319.00
	Limiting amplifier 27CG	325.00
28.	10D Amplifier	135.00
	10E Amplifier	155.00
29.	106C Program amplifier	185.00
30.	P2 Power Supply	27.50
31.	A5 Rectifier	45.00
	A5A Rectifier	55.00
32.	56B Pre-amplifier with tubes	44.50
	57B Pre-Amplifier with tubes	45.50
33.	9K Volume indicator	discontinued
34.	Patch Panels	
	A-130	34.00
	A-1300	54.00
	A-1301	74.00
	B-140	39.00
	B-1401	89.00
	Patch Cables	5.00
35.	Trio-Pre Model B	175.00

PRICE LIST---GATES CATALOG

ITEM	DESCRIPTION	PRICE
36.	Trio-Pre Model C	193.00
37.	Model 50A, 50B amplifier	discontinued
38.	Model 51 Utility Amplifier	150.00
39.	Model 10C Equalizer	discontinued
40.	Model 30 Deluxe Console, with tubes and power supply.	830.00
41.	58B Turntable Pre-amplifier designed for fitting into end of Model 30 Console.	42.50
42.	Dynamote with tubes, power supply, case, cannon connectors and option of VU or decibel meter. Customer should state whether 30 or 250 ohms input impedance.	208.00
43.	Battery case for Dynamote	9.75
44.	Remote Conditioner	69.50
45.	Remote compact less meter	89.50
46.	Remote compact with meter.	125.75
47.	AP440 Laboratory power supply	1760.00 ~~1775.00~~
48.	SC Power Supplies	prices on application.
49.	1D Radio Transmitter, 1000 watts with 25A frequency control unit, one crystal, oven and operating tubes.	6500.00

REQUEST AUTHORITY BE OBTAINED FROM CHIEF SIGNAL OFFICER FOR PURCHASE OF EQUIPMENT NECESSARY FOR RADIO CONTROL BOOTH AND STUDIO IN NEW WAR DEPARTMENT THEATER. DESIRE TO PURCHASE FOLLOWING ITEMS OR EQUIVALENT FROM NON-APPROPRIATED FUNDS: GATES CB4 CONTROL DESK WITH 30 SERIES MIXING CONSOLE; TWO TURNTABLES AND TWO AUDAK TRANSCRIPTION PICKUP ARMS, ALSO SIX PROFESSIONAL BROADCAST TYPE MICROPHONES WITH STANDS AND GATES DYNAMOTE REMOTE AMPLIFIER. AUTHORITY IS REQUESTED TO ISSUE AA-1 PRIORITY FOR EQUIPMENT LISTED. BROADCAST FACILITIES AT THIS CONVALESCENT HOSPITAL WILL MAKE POSSIBLE BOOKING OF MAJOR HOLLYWOOD STARS NOT OTHERWISE AVAILABLE FOR RECONDITIONING RECREATIONAL PROGRAM. EQUIPMENT WILL BE INSTALLED IN EXISTING CONTROL BOOTH AT OUTDOOR AMPHITHEATER PENDING COMPLETION OF NEW THEATER AND IS THEREFORE DESIRED IMMEDIATELY. PRESENT CIRCUITS TO SAN DIEGO AND EL CENTRO MEET BROADCAST REQUIREMENTS.

Gates Remote Broadcasting Equipment...

"Dynamote" Amplifier Chassis

The Gates Dynamote

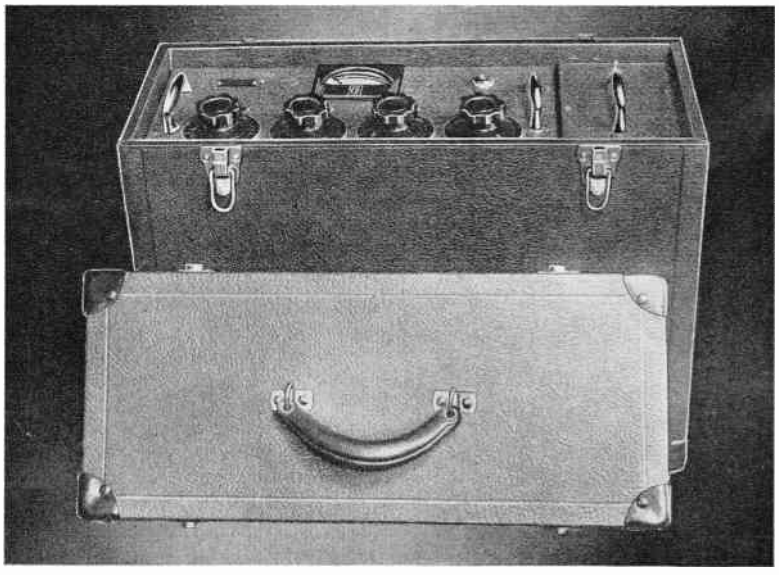
FOR SEVERAL YEARS Gates has offered a line of remote broadcasting equipment that has merited the unqualified acceptance of broadcasters all over the world. One of the most important items of this line has been and is the Dynamote; today the most popular deluxe remote multi-channel unit in use.

The widespread application of the Dynamote justifies the claim that the facilities, materials and workmanship are the best and most flexible of any remote amplifier manufactured. Particular attention has also been given to the appearance of this equipment so that even on the largest and most impressive remote jobs the Dynamote will maintain the showmanship idea desired on remotes which after all are the most public contacts of any station.

CONSTRUCTION OF THE DYNAMOTE

Compactness is the keynote in the construction of the Dynamote. The amplifier and power supply are separate units which slip into a modern aeroplane luggage type carrying case, weather resistant and sturdily constructed. The amplifier and power supply fit into the top of the carrying case leaving room in the false bottom for microphone cables, batteries if necessary and other accessories. All hardware is heavily plated to prevent rust and the inside of the case is covered with grey felt to prevent marring the equipment.

The amplifier proper measures 14½ inches long, 7 inches high and 8 inches deep. It contains a four stage high gain amplifier, mixing system, VI or VU meter at the option of the customer and all the other parts associated with the amplifiier. Microphone connections, output terminations and the power supply plug are at the back and are easily accessible when the amplifier is out of the carrying case.



"Dynamote" with Power Supply in Carrying Case

Standard equipment for supplying the filament and plate voltages to the amplifier section is 110 volt 60 cycle unit (odd cycle or voltage available on special order) measuring 7 x 4 by 8 inches. It connects to the amplifier through a 3 foot joiner cable supplied as part of the equipment. Standard batteries may be used instead of the power supply where no light current is available.

Front panel design on the amplifier unit has received much consideration to make it adaptable to practically every operating condition. The designations adjacent to each control are etched on aluminum which is impervious to wear and creates a white on black combination adding to the visability. This makes it easy to read every designation even under adverse lighting conditions.

MIXING CIRCUIT

Three mixing positions are provided allowing three microphones to be mixed simultaneously. The controls are genuine Davens having wiping contacts, low insertion loss and a noise level below –130 Db. The knobs are of the full size skirted type which are easy to grip and give positive operation. Input impedance may be either 30-50 ohms or 200-250 ohms depending on the type of microphones to be employed. Microphones are connected by heavy duty Hubble twist lock connectors.

AMPLIFIER

Every stage in the Dynamote operates as a triode. The tubes used are one 6J7, two 6C5 and one 6F6. Gain from this tube combination is unusually high and the hum level is very low (guaranteed below –60 Db. when used with type Dynamote AC power supply.) Frequency response is flat within one decibel from 30 to 12,000 cycles. Distortion output at plus 8 Db. is less than 7%. The output terminates at the back of the chassis to the telephone line terminals, headphone jack and the volume level meter.

VOLUME LEVEL INDICATOR

A standard high speed decibel meter with a range switch is normally supplied with the Dynamote. The normal meter reading is from –10 to plus 6 decibels which can be padded to indicate 5 decibels higher by the range switch. The meter is one of the square case style having a transparent scale fully illuminated from the rear. If the newer VU type of volume level indicator is desired it can be supplied.

POWER SUPPLY

An indirect heater type 84 rectifier tube is used in the power supply in a conventional full wave circuit. (Voltage doubler circuits are not employed in Gates bult equipments.) The power supply is considerably oversize so that there is no possibility of overheating even on long schedules. Hum has been eliminated by a well engineered filter system. A cable is supplied for connecting the power supply to the amplifier unit and an AC cord is attached for connecting to the light line.

TECHNICAL SPECIFICATIONS

A. C. Operation

TUBES—One each 6J7, 6F6, 84, two 6C5.
FREQUENCY RESPONSE—Flat within one decibel from 40 to 12,000 cycles.
DISTORTION CONTENT—.7% as measured at plus 8 Db.*
OVERALL GAIN—From input of mixer to line terminals 91 Db.
HUM LEVEL—60 Db. below program level using standard AC power supply.
INPUT IMPEDANCE—Available for either 30-50 or 200-250 ohms.
(Specify when Ordering.)
OUTPUT IMPEDANCE—500-600 ohms.
MAXIMUM CAPABLE OUTPUT—Plus 20 Db. at 1% distortion or less.*
POWER CONSUMPTION—35 watts at 110 volts 60 cycles line voltage.

* As measured on General Radio Noise and Distortion Meter.

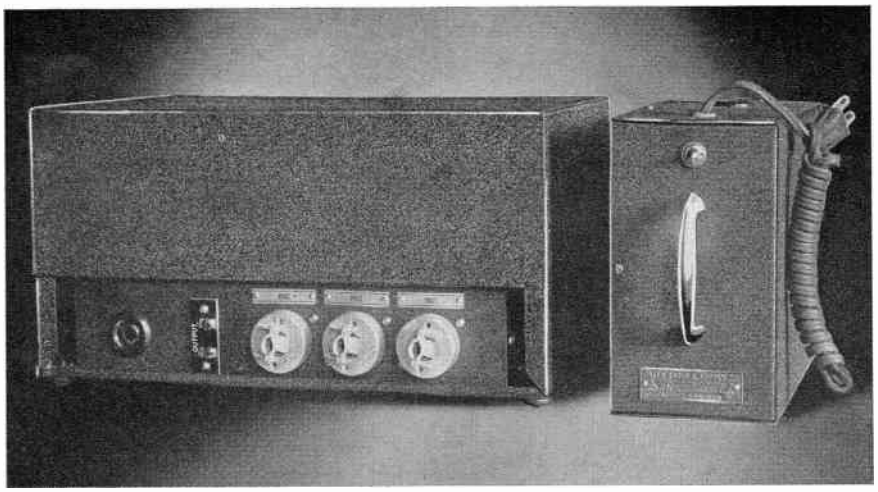
BATTERY OPERATION

The conditions above noted for AC operation are the same for battery operation with the exception of gain. The following information is merely given in addition as a guide to the selection of batteries.

PLATE CURRENT DRAIN—22 ma. at 180 volts.
RECOMMENDED PLATE VOLTAGE—180.
FILAMENT VOLTAGE—6.
FILAMENT DRAIN—1.5 Amperes without meter light.
OVERALL GAIN—With 180 volts on the plates, 86 Db.
WEIGHT PACKED—37 lbs.
SIZE PACKED—19¼ inches long, 8 inches wide, 12 inches high.

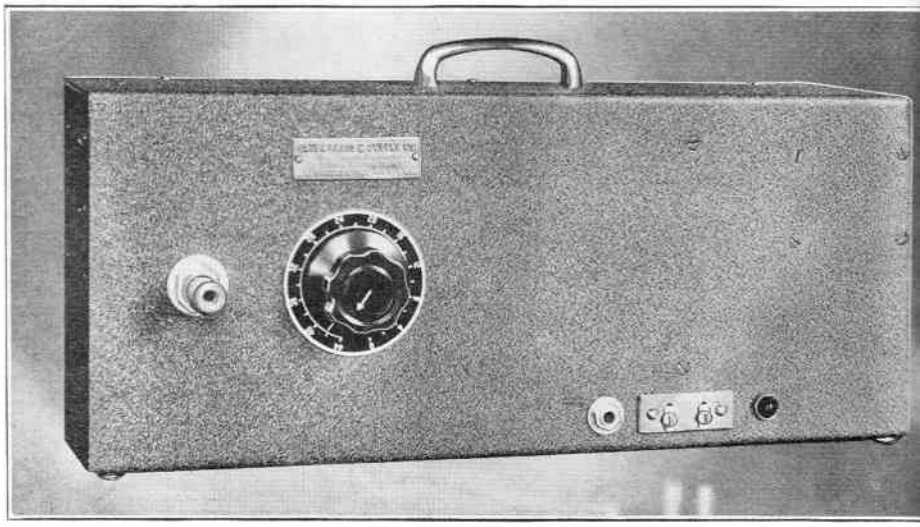
WHEN ORDERING

Be sure to specify input impedance and power supply frequency.



Rear View of "Dynamote" and Power Supply out of carrying case showing microphone and output connections

The Gates Remote Conditioner



The Remote Conditioner needs no further proof of its usefulness and reliability than the long list of users built up through the years since its first introduction.

The long list of Remote Conditioner users attest to the fact that here is one item of remote equipment, even though of single unit construction, that successfully eliminates the hum problem.

It is the only unit of this kind that can make proper claim to that assertion.

Originally the Conditioner was introduced as a replacement for the older types of remote equipment in use. The immediate response showed and has continued to show that the majority of these units were being used in the new remote programs and consequently deserved much more credit for quality than was claimed. Now with the improvements that have been made in its components and the use of modern manufacturing methods the Remote Conditioner is truly worth its price twice over.

Structurally the Remote Conditioner is a three stage amplifier complete with power supply housed in one cabinet and built on one power supply. This in itself is an accomplishment in audio amplifier design as it was thought impossible to do this successfully until recently. Of course, the technical refinements in the Conditioner were not obtained without diligent design, research and experimentation. The important thing is, however, that the correct results are obtained. The power supply, for instance, is of the full wave transformer type. No voltage doubler or AC-DC power supplies are used in any Gates equipment. Additional improvement was obtained by careful placement of the audio transformers and chokes with respect to the power transformer so that the net result was hum reduction to a guaranteed low level of –55 Db. below program level.

Operating the Remote Conditioner is exceptionally easy, too. The only controls are the on-off switch and the gain rontrol. Provision is made for connecting the telephone line to a two terminal strip on the front. The headphone jack is on one side of this strip and a jeweled power supply pilot light is on the other. Microphone connections are made through the Amphenol connector.

Two models of the Conditioner are available so that all types of microphones may be accomodated. The 6L is for use with microphones requiring 30 ohms input for dynamic microphones and the 6R has universal input connections for use with velocity or inductor microphones.* The size of either model is the same. being 17 inches long, 7 inches high and 4 inches deep. A chrome handle is provided for portability.

* Those desiring to use 30 ohm microphones should purchase Model 6L even though 6R has 50 ohm input provisions as only 250 and 500 ohm windings on 6R are balanced. Conditioners for operation on 110 volts 25 cycles can be furnished on request.

TECHNICAL DETAIL

TUBES—One each 6F5, 6C5, 6F6, 84.
GAIN—89 Db.
HUM LEVEL—55 Db. lelow program level with microphone of –60 Db.
POWER CONSUMPTION—50 watts from 110 volt 60 cycle line.
INPUT IMPEDANCE—6L, 30 ohms; 6R, variable 50 to 500 ohms.
OUTPUT IMPEDANCE—500 ohms.
FREQUENCY RESPONSE—Flat within 2 Db. from 45 to 10,000 cycles.
DISTORTION CONTENT—Not over .5% at plus 10 Db., less at lower levels.

The Gates Remote Compact

This is another item in the Gates line that has had its worth proven by the test of time and has come through with flying colors as shown by the fact that it is used in some of the largest stations in the country. As advancements in the art of remote construction have come along they have been incorporated in the Remote Compact with the result that it is without question the outstanding single channel remote unit on the market today.

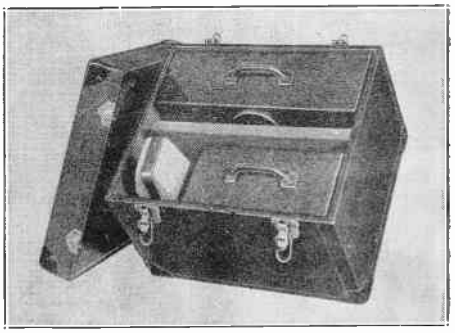
The Remote Compact was so named because of its small size and consequent light weight. Together with its power supply and carrying case the entire bulk compares with a small hand satchel. There is still room when both the amplifier and power supply are in the carrying case to put in a microphone or pair of headphones. The Remote Compact is provided in two models, the GR70 without volume indicator meter and the GR80 with fast action volume indicator meter.

MODEL GR70

Power supply and amplifier are separate units in the "Compact" remotes so that the ultimate in hum reduction and noise is realized. Three high gain stages are used to give a maximum output level of plus 10 Db. where velocity or inductor microphones are used. Master gain, locking type microphone connector, jewel pilot light, headset jack and screw type output terminal strip are all part of the design. The size of the amplifier is 12 inches long, 7 inches high and 4 inches deep.

MODEL GR80

This is the same fundamental equipment as the GR70 but as added equipment it has a fast action square case decibel meter with scale reading from –10 to plus 6 Db. An additional switch is provided which inserts a 10 Db. loss in the meter circuit which gives an actual meter reading from –10 to plus 16 Db. All other equipment as mentioned under Model GR70 prevails in the GR80. Model GR80 can also be provided with the VU style of meter if desired.



Remote Compact and Power Supply in carrying case. Note additional room available for microphone.

POWER SUPPLY

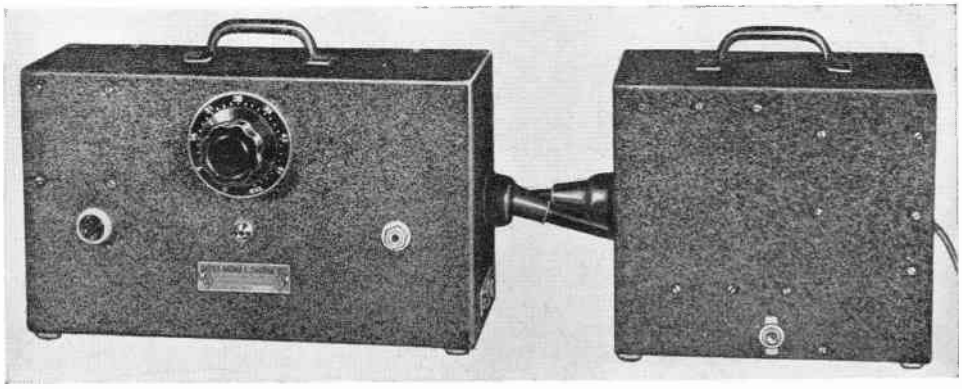
This is identical for both models and is supplied as part of the entire Remote Compact unit. Full wave rectification of the transformer type is employed (not voltage doubler) followed by a full size filter for producing essentially pure DC. The tube used is the indirect heater type 84. Filter condenser is of the plug-in type. Connection to the amplifier unit is made through a connecting cable supplied. Overall size is 7 inches by 4 inches by 4 inches.

GENERAL FEATURES

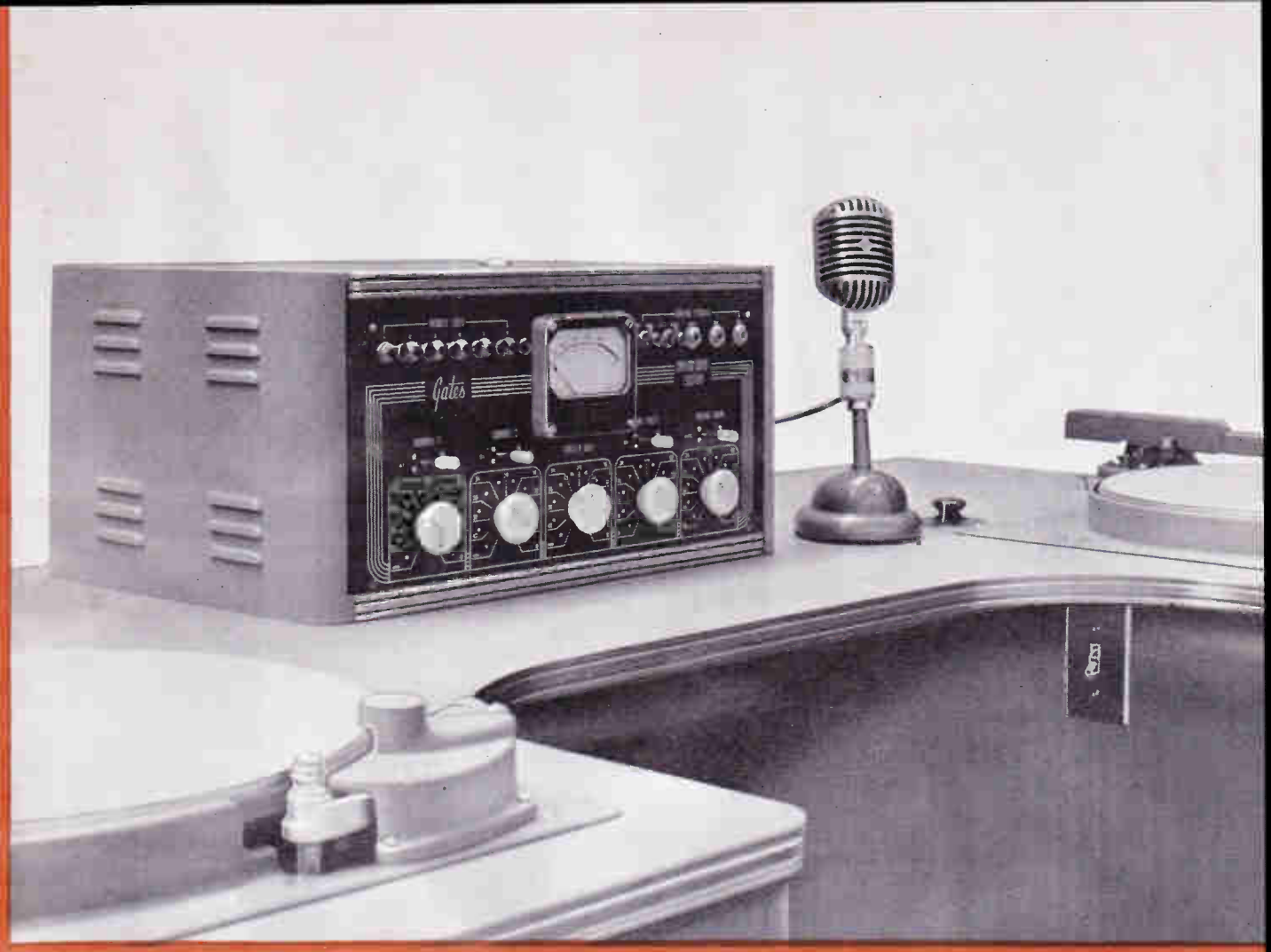
Multiple terminal connections on the input transformer make the input impedance to the Remote Compact variable over a range from 30 to 500 ohms. All transformers have high permeability cores, low distributed capacity and balanced windings. Output impedance is standard at 500 ohms, but can be furnished at 200 or 50 ohms at no extra cost. Extreme low hum level in this unit is secured by the use of carefully selected and placed components, balanced windings on all the audio transformers, heavy cast cases, selected hum-free tubes and oversize filtering in the power supply. The equipment when properly connected is guaranteed to be free from all hum.

TECHNICAL DETAIL

TUBES—One each, 6F5, 6C5, 6F6, 84.
OVERALL GAIN—85 Db.
HUM LEVEL—55 Db. below program level.
DISTORTION CONTENT—.5% at plus 10 Db. Less at lower levels.
INPUT IMPEDANCE—Variable.
OUTPUT IMPEDANCE—500 ohms.
POWER CONSUMPTION—50 watts from 110 volt 60 cycle source.
FILAMENT DRAIN (Batteries)—1.2 amp., pilot disconnected.
"B" BATTERY DRAIN (Batteries)—22 ma. at 180 volts, 17 ma. at 135 volts.
BIAS—Internal.



Remote Compact and Power Supply showing connection cables



Presenting... the *Gates* "STUDIOETTE"

HERE is the console type of studio programing equipment that the small broadcaster has been waiting for to fill the need of a speech system that will take care of his every requirement. In the Studioette the customer gets a unit complete in itself that has the flexibility of most larger and more expensive consoles and at the same time has appearance that will add to the "showmanship" angle. It is ideally suited to use as a single studio unit in the large station and has ample facilities to care for the programing requirements in most small stations.

And On The Inside . . .

Microphone Channels

Two mixing channels are available for microphones, each one having a switch above it so that two microphones can be used on each mixer. Input impedances map be of any standard value from 30 to 500 ohms.

Transcription Controls

Two pickups may be fed into the single fader provided for this purpose. The first half of the rotation controls the volume of one pickup and the other half controls the other pickup. A switch is provided directly above the control to disconnect the pickups entirely. Input impedance may be varied in order to suit the pickups to be employed.

Remote Channel

Provision is made for six remote lines, each one of which is selected by a pushbutton at the top left hand end of the panel. Gain is controlled by a separate mixer at the extreme right hand end of the bottom row of controls. This mixer may also be switched to an announce microphone, the output of which may be fed to the remote line if desired for cueing purposes. The microphone and turntable channels may also be used for cueing.

Master Gain Control

This control regulates the gain of the program going to the transmitter and consequently is used to govern the maximum output of the entire Studioette. The big VU meter on the front panel is connected in the output of the Studioette and is always in the transmitter line. Its action is governed by the master gain control and shows accurately what audio level is being fed to the transmitter.

Monitoring

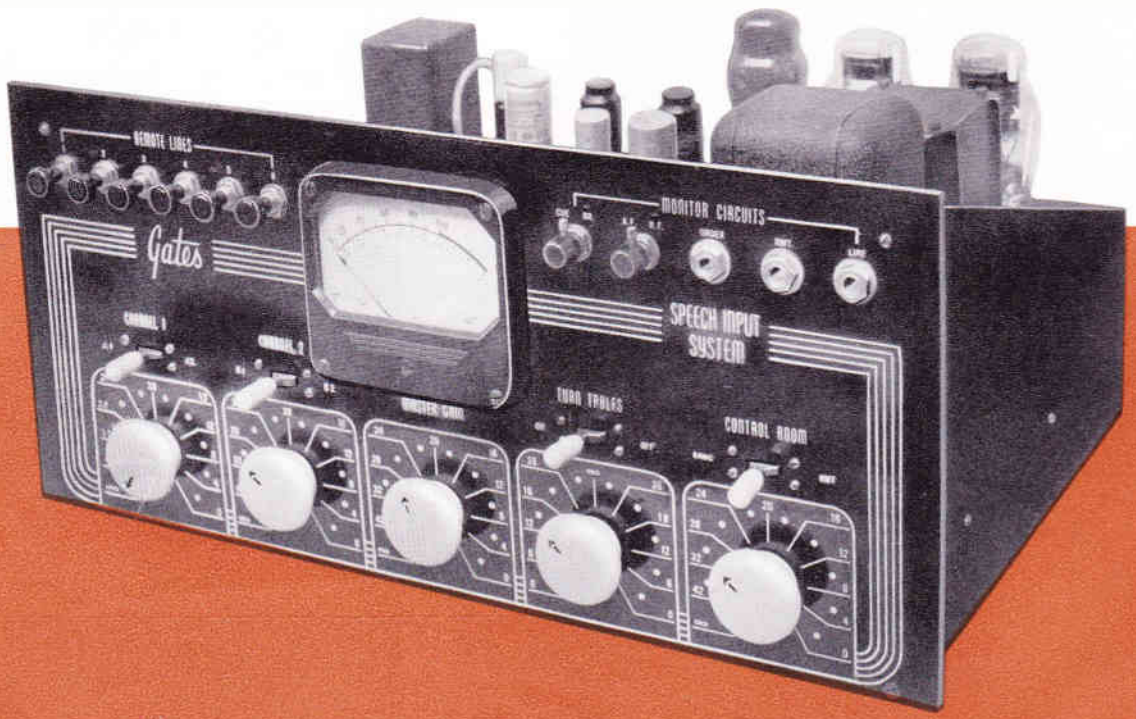
A two position switch and three phone jacks are mounted on the upper right hand portion of the front panel. The switch is marked "A.F.-R.F." which designates that the monitoring amplifier, which is integral with the Studioette, may be switched to the output of the program amplifier or the output of the transmitter merely by placing the switch in the proper position. The jack marked "Order Phone" is used to connect an order phone in the conventional manner. Next is the jack marked "remote" which permits monitoring the remote line with headphones. Headphones are also used to monitor the program line by pluging into the jack marked "line".

Monitor Amplifier

Two 2A3 tubes in pushpull are used in this amplifier thus providing high quality with more than enough power to drive four to six eight-inch speakers. They may be switched to the transmitter output or program output by throwing the switch marked A.F.-R.F. to the A.F. position to monitor direct from the program amplifier or to the R.F. position to monitor the output direct from the transmitter.

Appearance

The front panel of the Studioette is finished in flat black trimmed in fine-lined stripes of ivory which give it a very distinguished modern appearance indeed. Knobs are of ivory and all scales and operational designations are in ivory to match the trim. The cabinet is supplied standard in gray luster wrinkle but black wrinkle may be had on special order.



Program Amplifier

This is a four stage unit consisting of one 6J7 tube, two 6C5 tubes, and one 6F6 tube, the latter triode connected. The circuit is conventional in every respect to take advantage of the good performance characteristics of well proven designs. Feedback has been incorproated to insure flat response from 30 to 10,000 cycles. The first stage is shock mounted to do away with any possibility of microphonics. Triode connection of the last stage, which uses the 6F6 tube, provides an output circuit with practically no distortion; in any event less than one per cent at plus 2 Db.

Specifications

TUBE COMPLEMENT—1-6J7, 2-6C5, 1-6F6.

INPUT IMPEDANCE—Variable 30 to 500 ohms for microphones, 250 ohms for turntables, 500 ohms for remote circuit.

OUTPUT IMPEDANCES—500-600 ohms.

OVERALL GAIN—91 Db., microphone to program line.

DISTORTION—.7 of 1% measured at plus 8 Db. output.

FREQUENCY RESPONSE—Flat within 1 Db. from 30 to 12,000 cycles.

NOISE LEVEL—60 Db. below program level.

POWER SUPPLY MODEL P3

Although primarily designed for use with the Studioette the P-3 Power Supply is ideally suited for use with other audio equipment. It consists of a 5Z3 tube operating as a full wave rectifier supplying current to a three section filter. The DC output from the P-3 supply is 150 milliamperes at 300 volts total. The total output may be taken from the output connection after the first filter choke or the output may be divided so that 100 milliamperes is taken from the above connection and the remainder taken at the output of the three section filter for operation of several preamplifiers.

Filament power is also available from two windings, one being 2½ volts at 10 amperes, the other 6.3 volts at 5 amperes.

The P-3 power supply is universal in application for furnishing plate and filament power to preamplifiers, program amplifiers, small console equipments such as the Gates Studioette and for other general purpose audio amplifying equipment. Both plate and filament supply connections are made to a numbered terminal strip at the back of the unit. Ordinarily the P-3 power supply is furnished as shown for mounting under a table, in a desk drawer or any other convenient spot. Relay rack mounting may be had if desired at slight extra cost.

The entire unit is finished in black wrinkle enamel. When supplied for rack mounting the panel may be either black or grey wrinkle finish.

Specifications

FILTER—Three section.

RECTIFIER TUBE—Type 80.

PLATE VOLTAGE AND CURRENT—300 volts at 150 MA from output of first filter section; 300 volts at 40 MA from output of all three sections of filter.

DIMENSIONS—15 in. long, 7 in. high, 5½ in. wide. For relay rack mounting the panel is 5½ in. wide and 19 in. long with 7 in. depth behind the panel.

WEIGHT—Net. 18½ lbs.

ORDERING INFORMATION

When placing your order for a 51CS Studioette be sure to specify the impedance of the microphones and the type (high level or low level) of pickups that will be used. This information is very important as the circuits are arranged to operate with the type of pickups and microphones that you are using if we receive the information. Otherwise standard impedance of 250 ohms for both microphones and pickups will be provided.

GATES RADIO & SUPPLY CO.
MANUFACTURING ENGINEERS SINCE 1922
QUINCY (Cable Address Gatesradio) ILL., U. S. A.