

# Super-Power FM (546 Kw ERP) At WBRC-FM

THE DEVELOPMENT of high-gain antennas has afforded unusually high *erp's*. An interesting example of the extremely high powers which can be obtained was indicated recently when WBRC-FM, in Birmingham, Alabama, went on the air with its 50-kw job on 102.5 mc. Feeding into an eight-bay pylon<sup>2</sup> with a power gain of 12, an *erp* of 546 kw was secured.

The antenna was mounted atop Red Mountain, over a thousand feet above the metropolitan area of Birmingham.

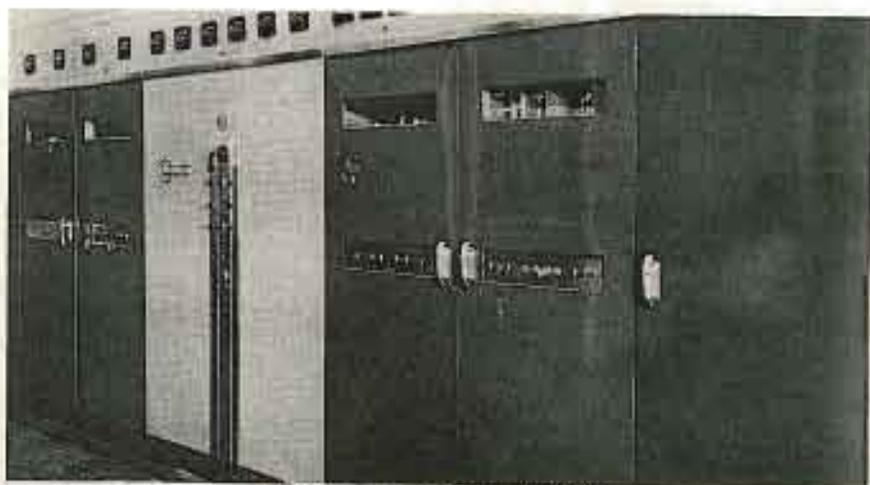
The 50-kw transmitter<sup>3</sup> at WBRC-FM features a concentric-line tank assembly which provides shielding of the driver and power amplifier grounded-grid circuits. The driver amplifier feeds two parallel-connected final sections. Electrically and mechanically, each one of these concentric-line tanks forms an integral part of the grounded-grid circuit. Thus, one unit that eliminates neutralization, radiation, and *rf* pickup in adjacent *rf* circuits is provided. Each section is similar in design and uses a 5592 forced-air-cooled triode in a grounded-grid circuit. The base of the concentric-line units form a plenum chamber for cooling air and contains the control wiring and high voltage bus. Front-panel tuning of the plate line is provided by shorting bars (with contact fingers) which move vertically along the center conductor by means of motor-driven lead screws. Input tuning is accomplished by two flat plate air-capacitors, one motor driven and the other manually operated.

Output coupling is accomplished by motor-driven rotatable loops which are reactance tuned by series capacitors.

The supervisory console supplied with the transmitter has many interesting features. Essential operational controls and indicator lamps are duplicated on an *rf* turret. The audio turret has all the controls needed for program handling. Complete switching, mixing and control-circuit metering facilities are provided. Im-

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<sup>1</sup> RCA. <sup>2</sup> RCA BTP-50A.

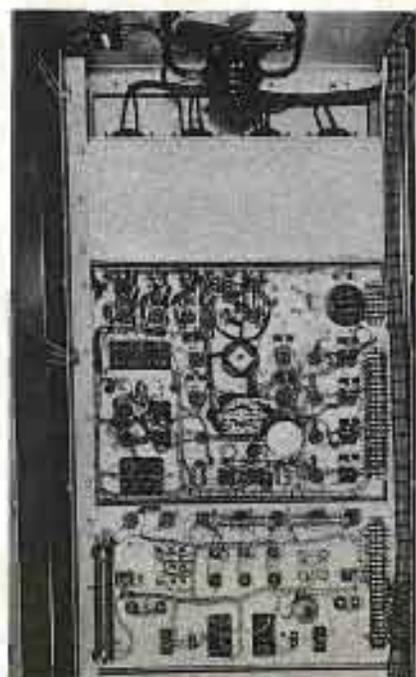


The 50-kw FM transmitter at WBRC-FM.



(D)

(B) Closeup view of pylon showing trombone impedance arrangement and two-stub matches.



(B, left; C, above)

(B)

(C)

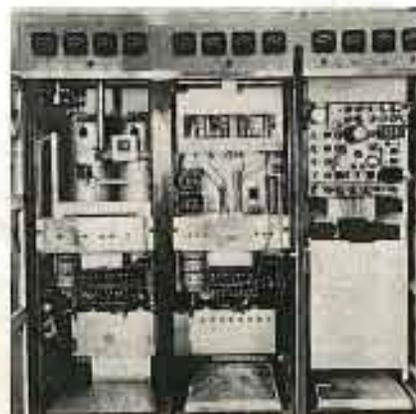
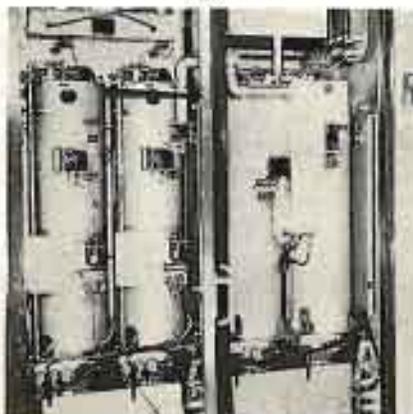
Rear view of the direct FM exciter cabinet. Vertical construction is used to provide accessibility to wiring and components.

(D)

Rear view of low power grounded-grid *rf* amplifiers showing concentric-line construction employed. All four units use 7C24s. Left to right: 1 kw, 3 kw and 10 kw amplifiers.

(E)

Open door view of, left to right: 10 kw *rf* amplifier with parallel 7C24 concentric-line tanks visible, 250 w *rf* amplifier (with 1 and 3-kw amplifier as rear, not visible), and direct FM exciter, at far right.



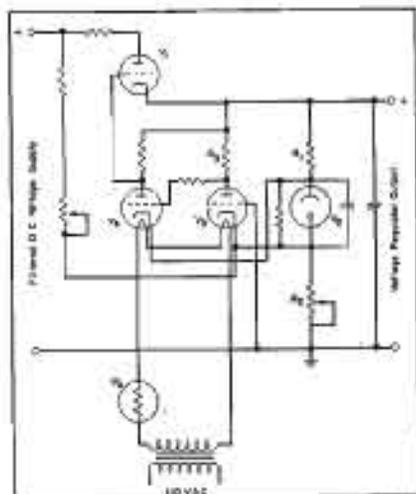


Figure 1

Voltage regulation circuit used in monitor.

age divider circuit were used. Instead of  $V_2$  we would have a resistor whose resistance would be three times that of  $R_2$  to give the same cathode bias. When the 5 volts increase occurred, the voltage increased across  $R_2$  would only be 1.25 volts. Obviously the sensitivity of the circuit is thereby reduced.

To reduce the ripple voltage to a minimum of ripple a feedback circuit is utilized. This circuit, feeding from the cathode of  $V_1$  to plate of  $V_2$ , presents a high impedance to slow changes in the  $dc$  output but is virtually a short circuit for ripple voltage frequencies. As before changes in the  $dc$  output are reflected across the  $V_1$  cathode bias, but now these fluctuations are fed back directly into the plate circuit,  $180^\circ$  out of phase with the original ripple.

## WBRC-FM

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portant control-circuit keys such as transmitter on, studio and local switches are protected from accidental tripping by chromium-plated guards.

Antenna cutback equipment consisting of triple-latch transmission line switches is provided. Electrical switching is accomplished by utilizing impedance characteristics of shorted, quarter-wave transmission line sections.

A single control switch transfers the antenna to the 10-kw stage, and at the same time isolates the final amplifier, driver, and high-power blower. Final and driver tube changes or maintenance are thus possible in safety while program continuity is maintained.

A harmonic attenuator is provided to insure maximum suppression of harmonic radiation. A self-contained unit, it consists of a pre-tuned low-pass filter capable of 38 db attenuation. Use of generous size line elements assures low-insertion loss. A transmission line monitor acts as a watch dog over the antenna and transmission line. Any unwarranted change in signal intensity actuates the monitor and shuts down the transmitter. A reclosing mechanism returns the transmitter to air, if the fault is cleared. If fault persists, process is repeated and locks out on third attempt.



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