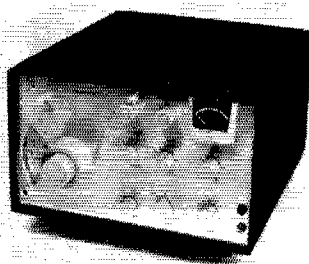


Galaxy III Transceiver



As almost any radio dealer will tell you, transceivers are among the hottest items on the ham market today. With no letup in the demand for the small-packaged stations, manufacturers are bringing out a second generation of transceivers with refinements that hams have asked for. A good example is the Galaxy III, which supersedes the Galaxy 300 transceiver.¹ The Galaxy III is smaller than its predecessor, and has full coverage of the 80-, 40-, and 20-meter bands, with some excess on the latter two. Transistors are used in the receiver audio, a.g.c., and VOX circuits for a saving in power, which is a help when the unit is used for mobile or portable operation.

Transmitter Section

Fig. 1 shows the block diagram of the Galaxy III transmitter, which is rated at 300 watts

¹ "Recent Equipment", *QST*, Oct. 1963.

p.e.p. input on s.s.b. and 300 watts c.w. Since the unit is a transceiver, several of the tubes operate both in transmitting and receiving. These are shown in the block diagram with a star alongside the tube symbol. The transfer from send to receive is accomplished by actuating the push-to-talk circuit or the VOX.

When transmitting, audio from any high impedance microphone is amplified in V_6 and fed to the 12AT7 balanced modulator V_7 . A 6GX6 carrier oscillator furnishes r.f. at either 8.99875 Mc. or 9.00125 Mc., depending upon whether upper or lower sideband is desired, and this signal is fed to the balanced modulator to give a double sideband signal (carrier suppression is rated at 45 db.) at the input of the 9-Mc. crystal filter. After passing through the filter, which has a bandwidth of 2.1 kc. (sideband suppression is rated at 55 db.), the single-sideband signal is amplified in V_3 , a 12BA6, and passed on to the

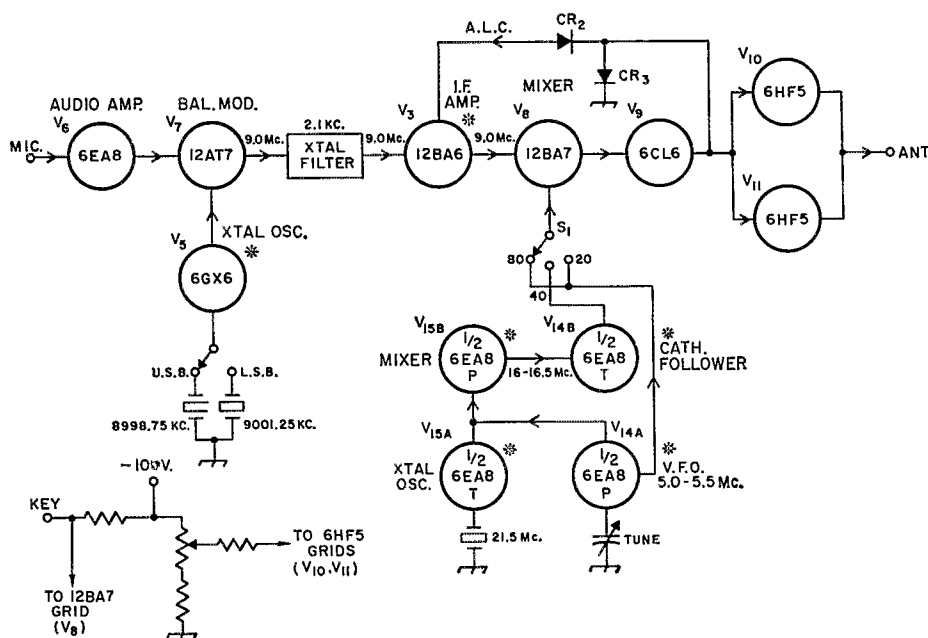


Fig. 1—Block diagram of the transmitter section of the Galaxy III.

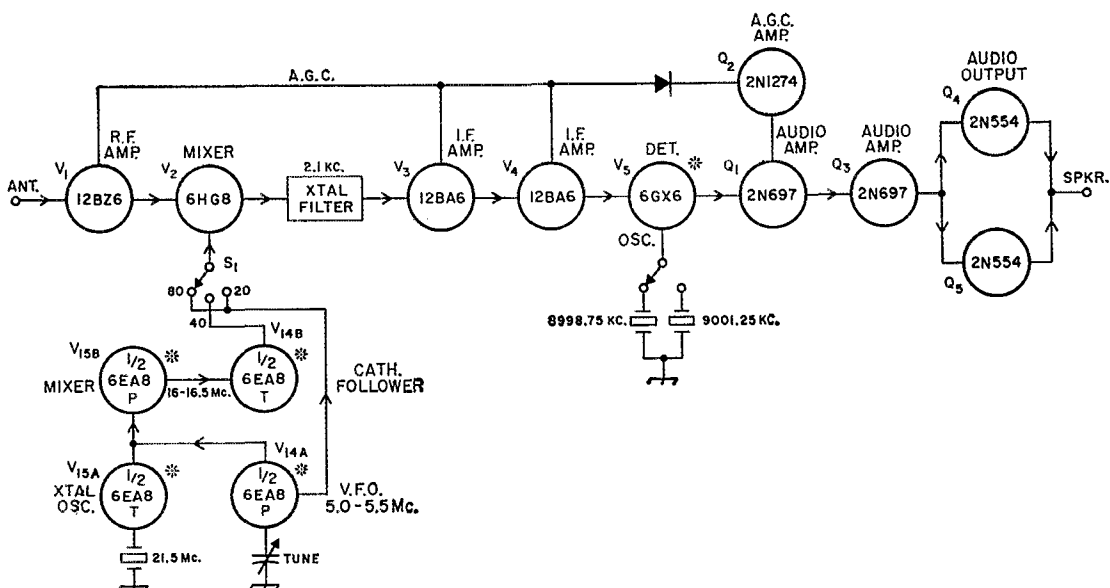


Fig. 2—Block diagram of the receiver section of the Galaxy III.

12BA7 mixer, V_8 . Here the s.s.b. signal is heterodyned to the desired amateur frequency. Injection is furnished by a combination of a mixer and oscillators, V_{14} and V_{15} . The v.f.o., V_{14A} , has a basic tuning range of 5.0 to 5.5 Mc., and when operating on the 80- and 20-meter bands, output from the v.f.o. is passed directly to the 12BA7 mixer, V_8 . On the 7-Mc. band, a second 6EA8 crystal-controlled oscillator, V_{15A} , is combined with the 5-Mc. output from the v.f.o. in the 6EA8 mixer, V_{15B} , to give an output of 16 to 16.5 Mc. This signal goes to a cathode follower, V_{14B} , and then to the 12BA7 mixer, V_8 . Stability of the v.f.o. is rated with drift less than 100 c.p.s. in any 15-minute period after warm-up and with less than 100-cycle frequency change for 10 per cent change in line voltage.

The amateur-band signal from mixer V_8 is amplified in the 6CL6 driver, V_9 , which in turn feeds the 6HF5 parallel-connected r.f. amplifiers. A pi network in the plate circuit is designed for resistive loads between 40 and 100 ohms. Two 1N462 diodes, CR_2 and CR_3 in Fig. 1, are used to detect any 6HF5 grid current. This voltage is used to control the gain of the 12BA6 i.f. amplifier giving an a.l.c. action.

An accessory VOX unit is available for use with the Galaxy III. Audio taken from the audio amplifier, V_6 , is amplified in a transistor stage and then rectified by two 1N54 crystal diodes. This d.c. signal, along with another signal from the anti-VOX circuit, is amplified in a transistor d.c. amplifier which controls the send-receive relay.

On c.w., the Galaxy is grid-block keyed. The key is in a negative bias line that keys the grid of the mixer, V_8 .

Receiver Section

The receiver block diagram is shown in Fig. 2.

Signals coming from the antenna are amplified at V_1 , and then fed to the mixer, V_2 . Also arriving at the mixer is the local-oscillator energy which is generated in the same manner and with the same components as that used in the transmit mode. Output from the mixer, V_2 , passes through the 9-Mc. filter, through two stages of i.f. amplification, and is then detected at V_5 , a 6GX6. The b.f.o. is crystal controlled and is switchable for upper or lower s.s.b. reception.

Output from the detector is amplified in several transistor stages which give sufficient audio (up to 3 watts) to drive a low-impedance loud speaker. In fact, there's plenty of output from the receiver even when the gain control is turned all the way down, which is okay for mobile but is sometimes annoying in the home shack!

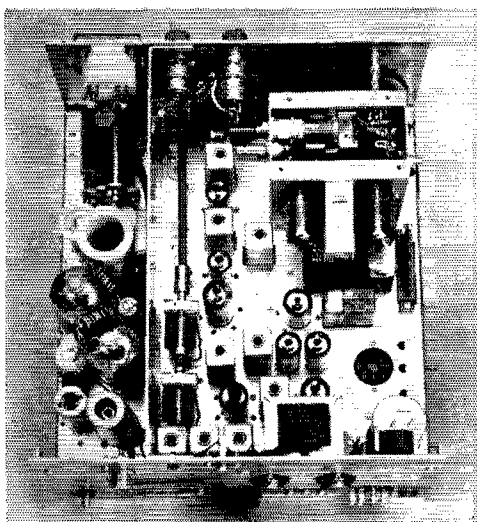
A transistor a.g.c. amplifier and diode rectifier give a negative bias for a.g.c. which is applied to the two i.f. stages, V_3 and V_4 , and to the r.f. amplifier, V_1 . The audio-derived a.g.c. is fast-attack fast-decay for 20-db. variations and slow-attack slow-decay for greater variations.

An accessory crystal calibrator is available for use with the Galaxy III to give 100-kc. calibration markers.

Other Comments

The layout of the Galaxy III is shown in the accompanying photograph. The front panel has a satin chrome finish and the cabinet is done in black wrinkle. The operating controls are: calibration adjust, r.f. and a.f. (these two controls are on concentric shafts), microphone gain, function switch (CAL, PTT, VOX, TUNE, CW) handswitch, exciter tuning, sideband selector, final plate tuning, and final loading. Some of the panel control labels and the tuning dial

The cabinet has been removed in this view of the Galaxy III transceiver. The final amplifier section is to the left of the photograph. The v.f.o. section is at the upper right. The black object just below the v.f.o. compartment is the crystal filter. A transistorized VOX unit, available as an accessory, plugs into the empty octal socket at the lower right of the chassis.



scales are color coded to aid the operator in manipulating and reading the dials. There are two different-colored indicator lamps on the panel to show which sideband is in use.

Speaking of controls, mention should be made of the excellent tuning drive in the Galaxy III. The mechanism has two reduction drives, allowing the operator to use a large-diameter knob to skim across the band in five turns, or a concentric inner small knob which takes 36 turns to cover 500 kc. for slow tuning. The tuning capacitor is driven through a 2:1 gear drive which is spring loaded for antibacklash. This, along with two 6:1 planetary drives connected in cascade, provides the 72:1 slow tuning rate feature. The tuning dial has about 9 inches of band-spread. The dial calibrations are every 5 kc.

Rear chassis connections include a push-to-talk control jack (phono jack), socket for an external v.f.o. (phono jack), key jack (phono jack), extra microphone jack (phono jack), and a phono jack to supply 12 volts a.c. for meter illumination on an accessory console. A stud ground connection is provided.

For better cooling, the two 2N544 audio output transistors are mounted on the rear apron of

the chassis away from internal heat.

Power supplies for a.c. and d.c. operation of the Galaxy III are available from the manufacturer. Other accessories include a speaker console that houses the a.c. power supply, the already mentioned 100-kc. calibrator and transistor VOX unit, and a remote v.f.o. A deluxe console that has speaker, s.w.r. bridge, and VU meter, and a universal mobile bracket for under-dash or transmission-hump mounting of the transceiver is also available. — D.A.B. & E.L.C.

GALAXY III TRANSCEIVER

Height: 6½ inches

Width: 10½ inches

Depth: 11½ inches

Power requirements: 800 volts d.c., 100 ma., 350 volts d.c., 200 ma., —100 volts d.c., 35 ma., 12.6 volts a.c./d.c., 5 amps., 12.6 volts d.c., 1 amp.

Price class: \$350.

Manufacturer: Galaxy Electronics, 10 South 34th Street, Council Bluffs, Iowa.

Strays



An amateur radio exhibition is planned for three weeks in October at the Old Slater Mill Museum at Pawtucket, Rhode Island. The Museum occupies the original but expanded mill built in 1793 by Samuel Slater, which became the first successful enterprise in the U. S. for spinning yarn on water-powered machines.

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Another nonagenarian is W8QP of Findlay, Ohio, active on 80, 40, and 20 meters "Uncle Ed" was born in 1873, became a Morse telegrapher in 1893, and was on the air as a ham "before it was necessary to have a license."