

First issued under CG label, Venus is F&M's 1-channel tone xmtr.

## SUPER-HET SET-UP BY F&M FEATURES MATED RECEIVER & TRANSMITTER

■ Super-heterodyne receivers are of special interest to modelers plagued by Citizen's Band Class D radiophones—or by other R/Cers on nearby frequencies. The Mercury single channel superhet has been developed by F&M (formerly CG) Electronics (Albuquerque, N. M.) to operate on any of the five R/C "spot frequencies" from 26.995 to 27.195 mc. Due to congestion on 27.255 mc. there are no plans to include this frequency at present. Encased in a sturdy 2-piece blue-anodized aluminum case, the Mercury is a tiny thing no bigger or heavier than many of the more common super-regen receivers now in use. Because of its very sharp tuning this receiver is guaranteed only when used with the F&M's Venus (single channel) or Hercules transmitters.

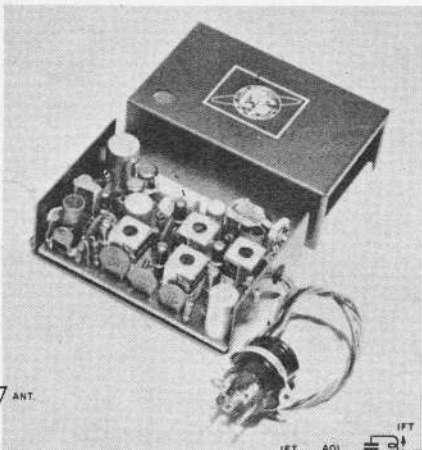
This 8-transistor receiver includes three IF stages, a transistor (rather than a diode) as the second detector and a direct-connected pair of transistors to operate the low resistance relay. The mixer and HF oscillator stages utilize special high frequency transistors; the oscillator is, of course, crystal controlled. Though there are four IF adjustments

and one for RF, normally it will never be necessary to retune any of the five, even when a different crystal is installed. Retuning instructions are included with the set, however.

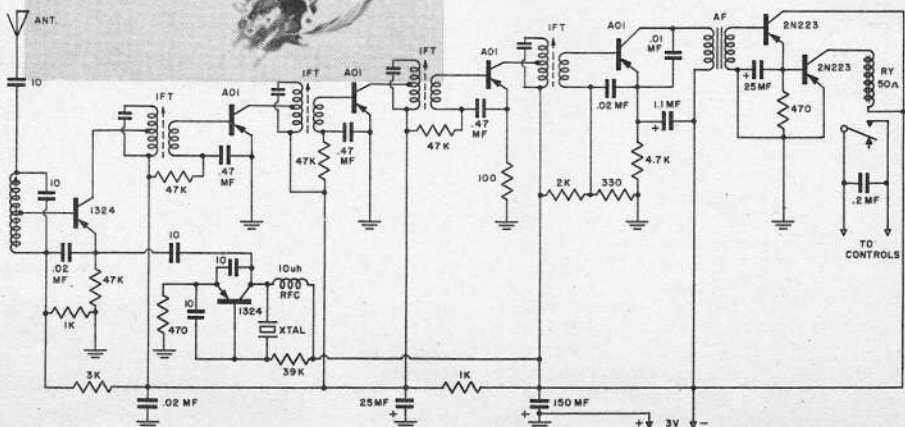
All parts mount on an epoxy fiberglass printed circuit plate. This includes the tiny crystal and its socket; the crystal is little larger than some types of "flat" transistors, and while a bit more costly than the size used in most transmitters it enables F/M to produce a more compact receiver. Satisfactory operation can only be had if the specified F/M receiving and transmitting crystals for the desired spot frequency are used together.

Receiver "blocking" (non-operation) with the transmitter close by is prevented by an automatic volume control system. Antenna length is not critical, any length from 18 to 36" is satisfactory. Makers emphasize that antenna should be run as far from servo motors and their battery leads as possible—a smart precaution when using any superhet. With an escapement the same power supply can be used both for escapement and receiver; with motor-driven servos it is wise to use separate power supplies.

New F.C.C. specs require considerably more stable transmitters than in the past, which were okay when used with super-regen receivers. To go with the Mercury—also with other single channel tone receivers in the F&M line, and some other makes as well—F&M has developed a compact hand-held transmitter named the Venus. Only two tubes are used, and while the RF section looks like the usual "power oscillator," such is really not the case. Clever circuitry make the single



Mercury superhet receiver shown is latest version of CG-F&M offering.



3A4 tube act as "fundamental" 9 mc oscillator, also as a tripler to the desired output frequency in the 27 mc range. The arrangement is such that tuning the output circuit (which is coupled to the antenna) has no effect on the radiated frequency, nor does grabbing the antenna; the latter action will naturally greatly lower RF output, but there is no danger of stopping crystal oscillation or shifting frequency.

Because of the unusual circuit, normal 27 mc R/C crystals will not produce the desired frequency in this transmitter; F&M crystals are of the fundamental type (our regular R/C crystals are mostly of the so-called third overtone style)

and are so-marked; output signal from the transmitter is *exactly* three times the frequency marked on the crystals. As with the Mercury receiver, when you replace the crystal in the Venus with one of the correct F&M units there is no need to retune, though the Instructions do give tuning details. A 27.255 mc output crystal for use with F&M receivers other than the Mercury, and for use with other makes, is available.

The transmitter printed circuit plate includes tripler plate inductance, antenna coupling inductance and antenna loading coil. In order not to put unwanted physical strain on the PC plate, the iron-core modulator transformer is

attached directly to the case. Screen grid modulation is used and the apparent RF power output of the transmitter drops (as checked on an FSM) when the key button is depressed, while B current drain increases somewhat . . . this is entirely normal. Modulation is at approximately 500 cycles and 95%, and the transmitter (also the Mercury receiver) will function satisfactorily at pulse rates above 15 pulses per second.

While the Venus will operate normally (but with much reduced RF output) on the proper frequency with as low as 30 volts "B" supply, the makers recommend B replacement when these batteries drop to 105 volts (checked with

power switch ON); the "A" cell should be replaced at 1.15 volts, also measured with switch ON.

**SPECIFICATIONS:** F&M MERCURY single channel tone receiver for 26.995 to 27.195 mc use. Guaranteed temperature operation range—zero to 130 deg. F. AF tone range, 300 to 1000 cycles, optimum 500 cycles. Crystal-controlled 8-transistor superhet, with output feeding 50 ohm Deans sub-miniature relay. Sensitivity range, 2 to 4 microvolts. Selectivity as follows: 3 kc nominal (6 db); 16 db at 10 kc, 80 db at 50 kc. Overall size of case, 3 x 1-15/16" x 1-1/32". Weight with power cord and plug, 3-3/4 oz.

**BATTERY REQUIREMENTS:** Will operate satisfactorily within range of 3.1 down to 2.0 volts. Two pen cells in series or two VO ni-cad cells are recommended. Current drain with no signal or with CW only, 4 ma. With tone signal, 60 ma maximum.

Relay set to operate at 22 ma max., open at 13 ma minimum.

**F&M VENUS TRANSMITTER,** single channel tone type for 26.995 to 27.255 mc. Type 3A4 RF tube operates as 9 mc fundamental oscillator and as a tripler. Single 1L4 as AF oscillator and modulator. No external tuning controls. Case front has only ON-OFF switch and Tone button. 3-section collapsible chromed antenna extends 51" above case top when extended, 22" when collapsed; it is removable. Special 9 mc fundamental crystals required. Sturdy two piece aluminum case, blue anodized. Overall size, 8-3/4 x 4-5/8 x 3-3/32" deep.

**BATTERY REQUIREMENTS:** One D size flashlight cell for A (Burgess #2 or equivalent). Filament drain 250 ma. B supply, two 67-1/2 volt batteries (Burgess XX45 or equiv.). B drain is 10 ma with key up, 14 ma with key closed.