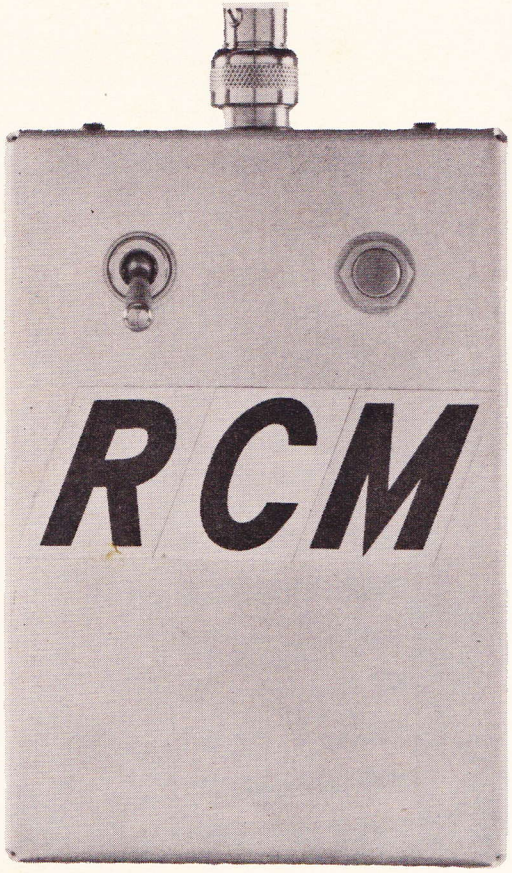


YOU CAN BUILD . . .

RCM's Single Channel Transmitter

Companion unit to the convertible superhet, RCM's Mighty Mite is easy to construct, small and compact, and delivers a half-watt wallop.

By DON MATHES
RCM Technical Editor

This article will describe the construction of an all transistorized single channel transmitter designed to compliment the RCM Convertible Superhet receiver presented in the April issue. This transmitter has several advantages for the single channel flier — among them, size, output power, plus economy and ease of construction. It utilizes and takes advantage of the low-priced General Electric silcone devices now widely available on the commercial market.

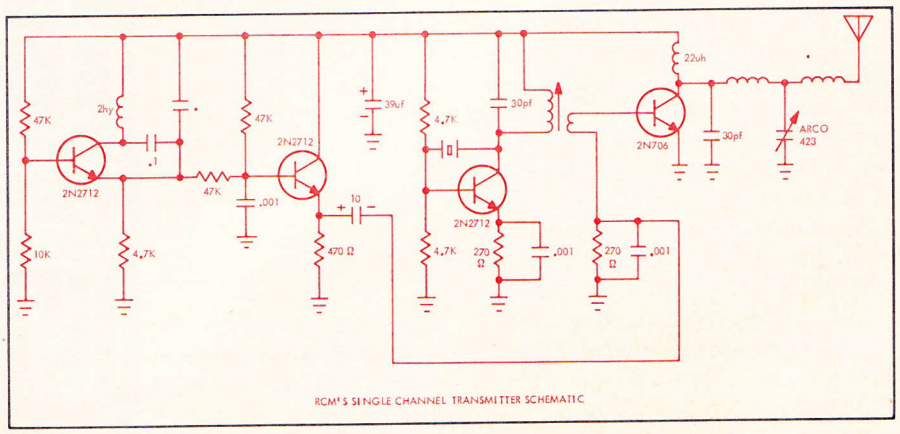
Insofar as a general description is concerned, the oscillator or audio portion of this transmitter, consists of a Colpitts configuration which gives excellent frequency and voltage stability. It can be seen that a tuned circuit in its collector serves to stabilize the audio frequency. The resultant sine wave is taken from this oscillator-emitter and fed by a series resistor to a grounded collector, or so-called "emitter-follower" stage. The latter presents a high input impedance to the oscillator, thus minimizing any load effects on the oscillator.

Audio voltage is extracted from the emitter of the emitter-follower (a low impedance point), and serves to base modulate the transmitter RF section. The RF oscillator is a very straightforward grounded emitter stage with feedback provided by the crystal connected between collector and base.

The collector is tuned by means of tuned circuit L1, and operates a frequency of 27 Mc. This configuration gives excellent frequency stability with respect to collector supply voltage and temperature. Frequency stability, by the way, is well within the .005 percent tolerance allowed by current FCC regulations. The oscillator delivers a minimum of 75 milliwatts of RF power with a 9 volt collector supply.

The transistor used as an RF power amplifier is an RCA 2N706. Several important considerations for this RF power amplifier should be mentioned. The transistor is a natural Class C amplifier because the emitter base contact potential must be overcome before the collector current will flow. A transistor connected as shown in the schematic is automatically biased in the Class C region. Six tenths of a volt must be applied between the base and emitter before collector current begins to flow. A double Pi network in the output provides tuning in this stage along with matching of the antenna. Minimum RF output power with a 9 volt collector supply is approximately .4 watts. The stage is base modulated from the previously described emitter-follower and quite linear modulation is accomplished. Care must be taken, however, to avoid over driving the stage. Such over driving would cause serious negative peak clipping in the RF output with a resultant serious distortion and splatter problem.

Construction is both simple and conventional if the printed circuit



RCM'S SINGLE CHANNEL TRANSMITTER SCHEMATIC

board shown is used by the constructor. All resistors and capacitors are of standard values with the exception of the .1 mylar capacitors. These may be any size capacitors, although this particular board utilizes the ultra miniature type. Conductors L1, L2, L3, and L4 are all specially made wound units, although specifications for these are given if you wish to wind them yourself. L1, for instance, may be commercially available in a 2 henry choke and mounted either on the panel, or on its edge via a bracket on the PC board.

L2 consists of 16 turns of #22 wire on its primary, plus 3 turns of #22 wire on its secondary. L3 and L4 are identical, and consist of 16 turns of #16 wire close wound on a ½" diameter form.

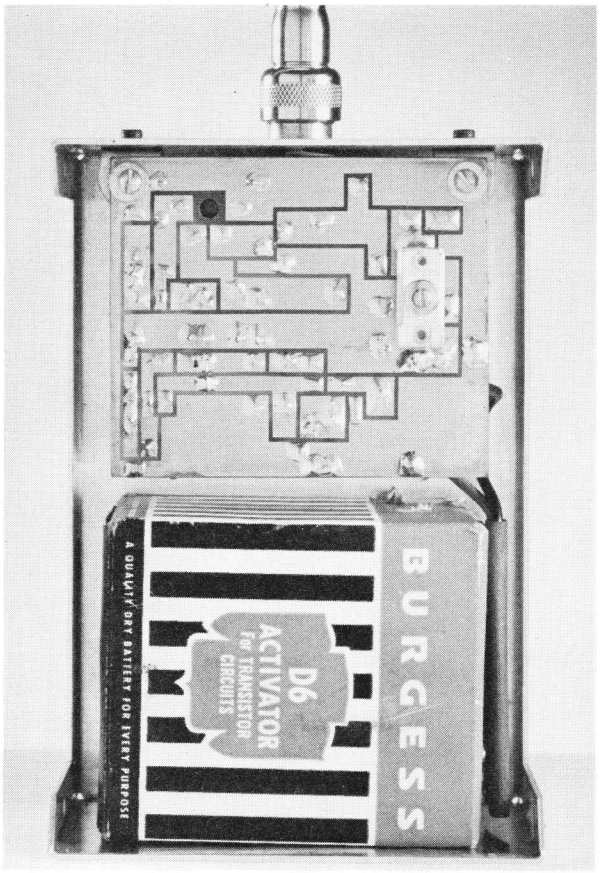
Firing up the transmitter is relatively simple after insuring that all connections have been made and the switch and battery installed. The use of a Field Strength Meter will prove helpful. Tune coil L2 by screwing its slug in until an indication is observed on the FSM. Now tune the air trimmer on the final tank coil for maximum RF output. Follow this step by readjusting coil L1 to be certain that maximum RF output is obtained. Be absolutely certain that when making the final adjustments on L2 the slug is left at the point where the transmitter starts every time the switch is turned on.

There is no tuning, as such, for the audio section. The audio frequency for the RCM transmitter is determined by the tube mylar capacitors and coil L1. Depressing the tone button should produce a clear crisp tone of approximately 600 cycles.

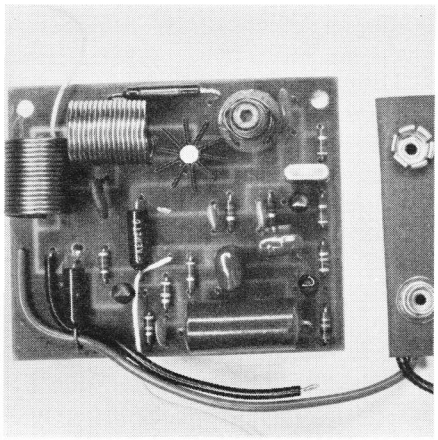
This concludes the two part series covering the construction of R/C Modeler Magazine's Convertible Superhet receiver and single channel transmitter. Properly constructed, both units should provide you with many hours of interference-free and trouble-free operation. Whether you construct these units from the kits that have been made available, or build them from scratch, if you should encounter any difficulty, contact the author c/o RCM.

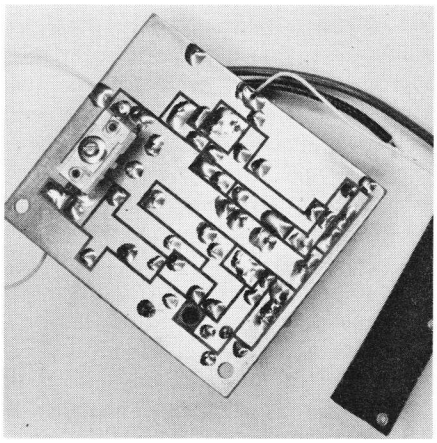
We would also appreciate hearing from you concerning your construction and operation of these units — it will enable us to determine whether or not RCM should present more of this type of electronic construction feature.

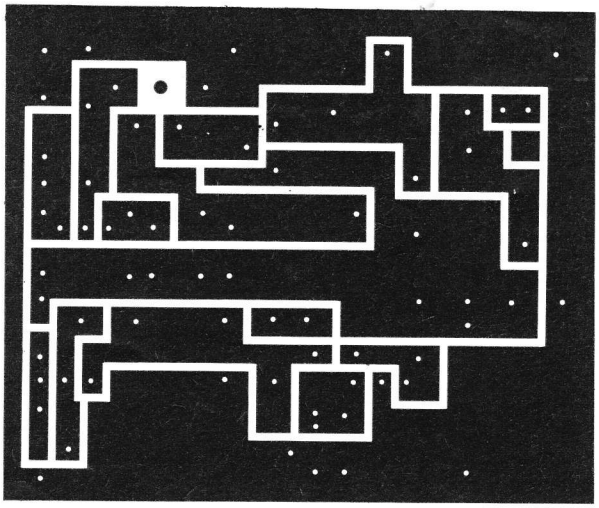
Right: Interior view of transmitter illustrates compact size. Printed circuit board has same dimensions as Burgess D6 9-volt battery. Overall size is just slightly larger than 3" x 5".



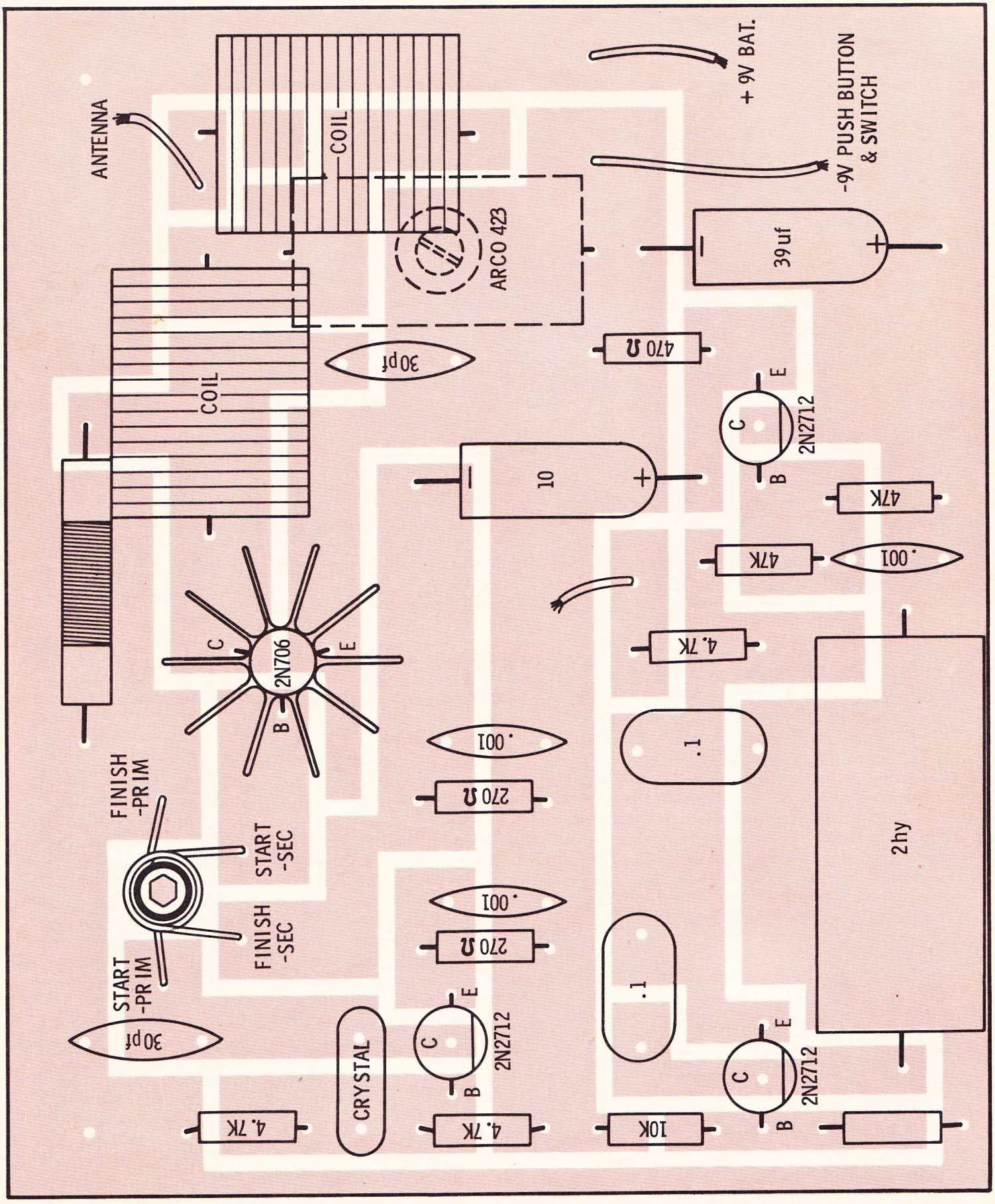
Below: Front and rear view of transmitter printed circuit board. Component layout reference on page 23.

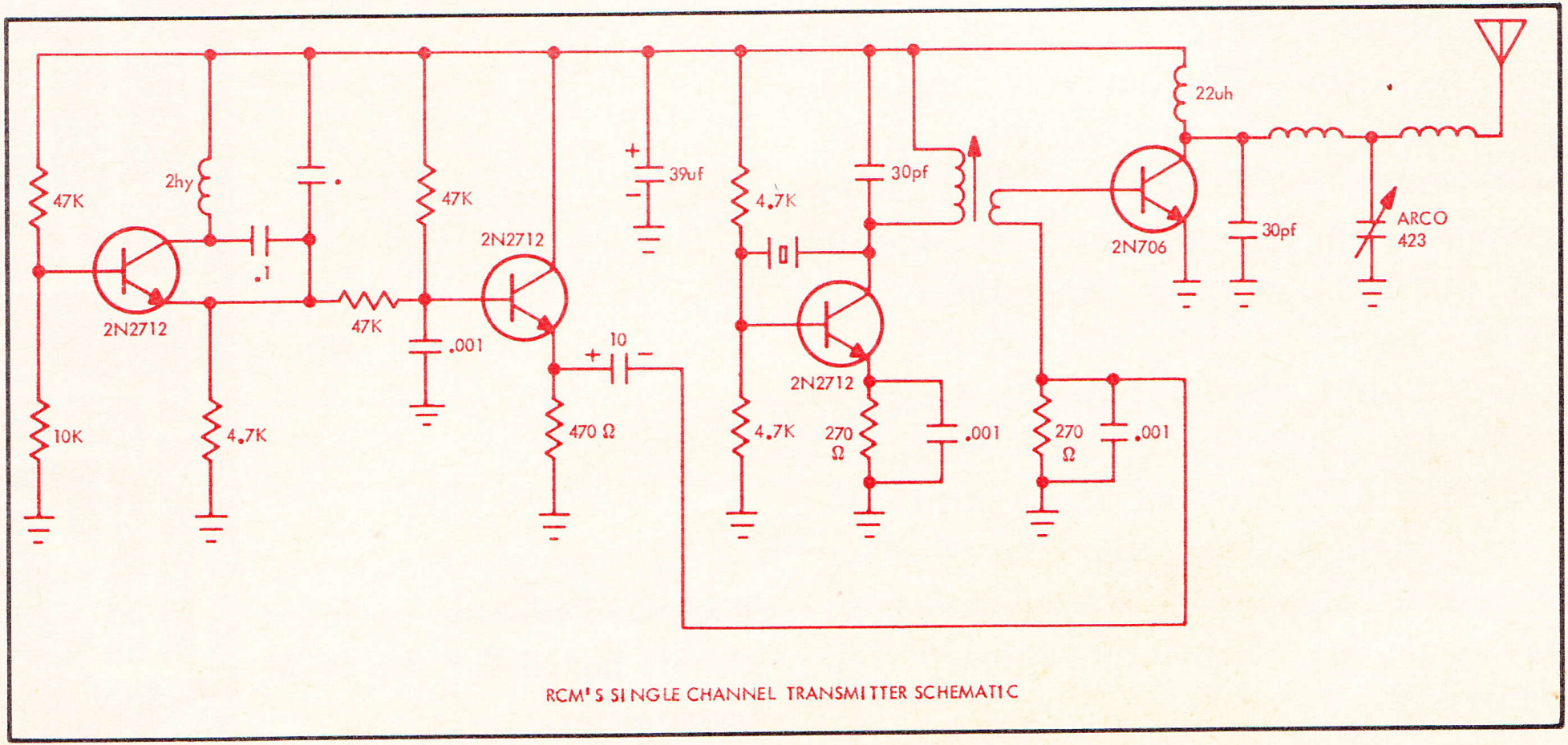






Right: Full-size printed circuit board for the RCM transmitter.


ANTENNA
COIL
ARCO 423
+ 9V BAT.
-9V PUSH BUTTON & SWITCH
39uf
470 Ω
2N2712
C
B
E
10
47K
.001
4.7K
2hy
.1
10K
30pf
COIL
2N706
FINISH -PRIM
START -SEC
FINISH -SEC
START -PRIM
270 Ω
CRYSTAL



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