The "Iambimatic" Concept

Unique Feature for Relay-Type Electronic Keyer

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onventional electronic keying has greatly improved the ease and precision of c.w. operation for a great many amateurs. The standard "el" key makes it very easy to send letters consisting of strings of dots or dashes. Letters which contain dots alternated with dashes (requiring a back-and-forth motion) have encouraged the use of memories in more complex keyers, such as the Ultimate and Penultimate. The latter keyer recognizes the problem of dropping dots in letters like "k"; the dot memory provides greater reliability, and also eases the timing requirements of the operator. The former keyer adds a dash lever, a dash memory, and automatic spacing.

The "Iambimatic" concept is somewhat different. It works entirely like the conventional electronic keyer when used with a single paddle keying lever; it is self-completing and uses no memories.

The Iambimatic feature comes to light when used with double-paddle keying levers. If both levers are closed for a time (a long "squeeze"), dots alternated with dashes come forth from the keyer (.......). This feature greatly reduces the effort required to send certain letters. A "Q", for example, is sent as follows:

Q: one long squeeze. A little "English" is used to close the dash lever slightly ahead of the dot lever; the squeeze must be released at the end of the letter.

Q: the same as above, except that the dot lever is not actuated until after the first dash has been sent.

Other characters are also simplified (A, L, N, R, AR, SK, etc.). Sending these or a "CQ" on the Iambimatic gives one the funny feeling that the key is sending the letters on its own.

Dot/dash selection is simple. If only one lever is closed, then the dot or dash corresponding to that lever will be sent. If both levers are squeezed at roughly the same time, the first lever closed will determine the dot/dash selection. If both levers are closed from the time of the end of the last dot or dash, then the next dot or dash will be the opposite of the last one sent.

The Iambimatic concept may be applied to practically any keyer. Three examples will be given: Iambimatic modification of the HA-1 ("TO") keyer, a home-brew Iambimatic keyer, and a universal Iambimatic modification design.

HA-1 Adapter

Fig. 1 shows the very simple modification for the Hallcrofters HA-1 keyer; the circuit has been performed perfectly at K5QO for the last two years. Basically the circuit consists of a flip-flop, formed by neon bulbs V1 and V2, and a transistor gate, Q1. One neon bulb will light if the dot contact only is grounded and the other will light if the dash contact only is grounded. If both levers are closed, the bulb corresponding to the lever closed first will light and the other will

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3 I like the tombstone of classical Latin poetry, in which the line would alternate short and long syllables.
remains off; a pulse from the closing of the relay in the HA-1 at the end of the dot or dash will trip the flip-flop and the other lamp will be lighted. Thus the bulbs will alternate at the end of every dot or dash. The gate, \( Q_1 \), is designed to close the dash contact of the HA-1 whenever the dash bulb is lit. Thus a seven-sequence follows when both levers are squeezed.

The components were assembled on a small board which was mounted in the HA-1 keyer next to the relay. Be careful not to place the neon bulbs too close to anything else, or the transistor too close to a heat source. The neon bulbs have to be closely matched; buy a boxful and try various combinations. With both levers closed, plug in a pair of bulbs and rock the 500K variable until the circuit “lambimates” (goes ... ...). When you find a pair of bulbs that “lambimate,” mark the maximum and minimum settings of \( R_1 \) that give reliable “lambimation” across the entire speed range; then leave the resistor set between these two points. Use the bulb combination that gives the greatest difference between the maximum and minimum marks.

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**Fig. 2**—Basic keyer circuit. If side-tone-monitor and/or lambomatic feature of Figs. 3 and 4 are to be added, connect similarly-numbered terminals together. Capacitors are in microfarads and, unless indicated otherwise, resistances are in ohms (\( K = 1000 \)). Capacitors are 10-volt ceramic; fixed resistors are 1/2-watt, Transistors are G.E. types.

- \( K \)—10-mw. 5000-ohm s.p.d.t. miniature d.c. relay (Lafayette 99C6091)
- \( R_1 \), \( R_2 \), \( R_3 \)—linear-taper control
- \( R_4 \)—22,000 ohms, 1/2-watt.
- \( S_1 \)—Miniature rotary switch, 1 section, 2 poles, 5 positions (Centralab PA1003, PA2003, or similar).
- \( T_1 \)—Transistor input transformer: 2000-ohm c.t. primary (d.c. resistance 130 ohms) (Argonne AR-115, or similar). Use primary only.
Fig. 3.—Sidetone monitor circuit. Connect Terminal 3 to Terminal 3 of Fig. 2. Capacitances are in microfarads; resistances are in ohms (K = 1000). C1 is 10-volt ceramic. C2 is miniature electrolytic. Diodes are any silicon; they may be omitted if the circuit of Fig. 4 is not used. Transistor is a G.E. type. T1 is a transistor output transformer, 500 ohms c.t. to voice coil. Speaker used in original unit is 2-in.

A Complete Ommatic Keyer

The circuit of the home-brew Ommatic keyer in the photographs is shown in Figs. 2, 3, and 4. These represent the basic keying unit, monitor, and Ommatic feature. Fig. 2 represents a fully satisfactory conventional keyer which can be used alone or with the other two options. It is basically a transistor version of the "POO-KEY, Jr."4 The very-low-leakage silicon transistors used (GE-10) make this circuit possible, and render the performance independent of temperature and individual transistor characteristics. In the oscillator circuit (at the left in Fig. 2) the transistor gets a positive bias from R2 which also serves as a weight control. Different capacitors (exact values depend on the characteristics of T2) are switched.

Fig. 4.—Circuit of the Ommatic feature for the keyer circuit of Fig. 2, or for other relay-type keyers with negative voltage at the key-lever terminals. When used with the circuits of Figs. 2 and/or 3, similarly-numbered terminals should be connected together. Diodes CR1 and CR2 may be omitted when this circuit is combined with that of Fig. 2. CRs need be used only when this circuit is combined with that of Fig. 3. When used with other relay-type keyers, Terminals 1 and 2 should be connected, respectively, to the dash- and dot-lever terminals of the keyer. Terminal 3 should be connected to ground through a spare set of normally-closed contacts on the output relay of the keyer. Capacitances are in microfarads; resistances are in ohms (K = 1000). Capacitors are 10-volt ceramic; resistors are 1/2-watt. Transistors are G.E. types. Diodes are any silicon. K1 is similar to K1, Fig. 2.

20 QST for
saw blade. Small pieces of foam rubber are used for spacing and to remove contact bounce. The saw blades are soldered to part of a copper-clad circuit board which is bolted (copper removed around bolts to preserve insulation from ground) to a solid piece of steel. This is firmly secured to the bottom of the Minibox.

**Lambmatic Feature for Other Keys**

The circuit of either Fig. 4 or Fig. 5 may be used to convert any keyer with a relay to a lambmatic keyer. It is easy to determine which circuit to use: Simply place a voltmeter from ground to either the dot or dash terminal of your present keyer. If a negative voltage is registered, use the circuit of Fig. 4; if a positive voltage, use the circuit of Fig. 5.

In either case connect Terminal 1 to the former dash terminal of your keyer and Terminal 2 to the former dot terminal. Use a dual-paddle keying lever and connect it to the new key-lever terminals in either Fig. 4 or Fig. 5. Connect Terminal 3 to a spare normally-closed contact to ground on the keying relay. Then connect up the 18 volts (batteries or a voltage doubler from the filament supply). Close both paddles and listen for the "lambmation." Once the lambmatic keyer has been completed, it will take a short time to get used to it. Start with Q1, and then practice your way down the alphabet. After a while you will wonder how you ever managed to get along with a conventional electronic keyer.

[Author's note: Heat from the IIA-1 keyer may cause excessive leakage in Q1, making lambmation impossible. To avoid this, it may be advisable to place Q1 apart from the main circuit, toward the cooler back end of the IIA-1. Also, the lack of light may cause V1 and V2 to become unstable. This trouble may be cured by wiring in a small pilot lamp, placing it close to V1 and V2 to provide illumination.]

Fig. 5—Circuit equivalent to that of Fig. 4 for keyers having positive voltage at the key-lever terminals. Except for this reference to polarity, the content of the caption of Fig. 4 applies here. This version cannot be used with the circuit of Fig. 2.
Fig. 1—Circuit of the 50-kc. frequency standard. Resistors are 1/2 watt, 10% tolerance; 0.047-m. capacitors are Mylar, other fixed capacitors are ceramic.

C₁—3-30-μf. mica trimmer.
C₂, C₃—800-pf. disk ceramic (Centralab CE-801).
L₁—Iron-slug adjustable, 0.5-5 millihenrys (Miller 6313).
S₁—S.p.s.t. toggle.