

Simple Auto Keyer

By Ron Troughton, G3SFP*

HERE'S A SIMPLE idea for those who enjoy improvisation and perhaps don't want to bother with keyer ICs or computers. Make an audio tone recording of your CW keying and use it to make repetitive CQ calls when band conditions are marginal.

Assuming that a discarded or unused cassette recorder is to hand this method is economically effective compared to more expensive keyers, which still cannot easily reproduce your own exact keying characteristic (do remember though that this is a 'warts and all' situation, and your keying could serve to either encourage or warn off potential contacts). To obtain the former, happy condition, make sure your call is easily readable and without any off-putting quirks.

TAPE RECORDER

CHOOSE A mains/battery type that can accommodate a small PCB or scrap of strip-board inside its battery compartment. Six to nine volt versions are fine.

As it is necessary to locate three connection points inside the machine, a word of caution is appropriate regarding the danger of electrocution while working with the covers off. A low voltage bench power supply or battery is highly recommended as a temporary power source for the machine while working on the innards!

*4 Owlets, Crabtree Park, Pound Hill, Crawley, W Sussex RH10 7SQ.

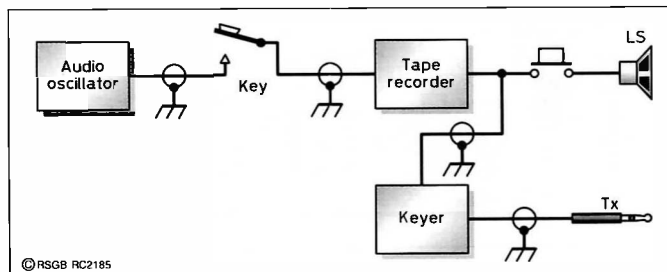


Fig 1: Basic layout. A keyed audio tone may be injected into the 'mic' or 'aux' socket of a cassette recorder.

The general layout is shown in Fig 1 and the circuit diagram in Fig 2.

DESCRIPTION

THE AUDIO frequency keying, a tone at a nominal 1kHz, is rectified by D1, then filtered and integrated by R1, R2, C1, and C2 to provide a positive going DC voltage to the base of TR1, which switches on RLA1. These 'clean' contacts then key your transmitter. D2 prevents inductive voltage spikes from damaging TR1, and C3 has a small additional integrating and filtering effect.

CONSTRUCTION

I USED THE 'ugly bug' wiring method to mount all components on a small piece of scrap PCB which was then fitted inside what was the battery compartment. [A stripboard layout - Fig 3 - is included for those who prefer this construction method - Ed]

COMMISSIONING

APPLY A 6 volt supply to the circuit and, using your key and AF oscillator at around 1kHz, check that the relay contacts are following your keying envelope. It might be useful to note the AF

input level required to give satisfactory operation.

Then fit the PCB [or stripboard] and RLA1 inside the cassette recorder, ensuring that nothing can come into contact with any of the battery connectors. Leave a length of screened wire from D1 and ground, ready to make a connection to the recorder's loud-speaker output terminals.

Having regard for the previous safety recommendation, three points must now be located on the machine.

- (1) The common negative ground connection.
- (2) The main positive low voltage supply rail. (6 to 9V).
- (3) The 'live' side of the loud-speaker connection.

Points 1 and 2 should be readily found by locating the largest electrolytic capacitor, which is most likely to be the internal PSU reservoir.

Connect the inner of the screened cable from D1 to the loudspeaker 'live' connection, the screen itself to ground, then the positive supply to RLA1.

Now double check for correct polarity! While making the loud-speaker connection, improvise a link or switch to silence the internal speaker when keying is in progress if this facility is not provided (some machines will do this if a dummy plug is inserted into an external LS socket).

HINTS

A FEW practical hints may be ►

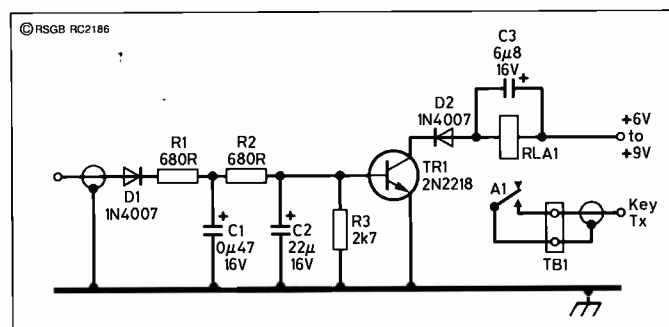


Fig 2: The Simple Auto Keyer rectifies audio and uses it to drive a transistor which operates a relay.

● Sometimes (especially in contests) there can be a problem with close-in stations breaking through into the passband of the receiver. This drives the AGC into operation, masking the weaker (wanted) station. In this case, try switching the AGC 'off' (if you can). Reduce the RF gain and you may well hear the weaker station. In this case the opera-

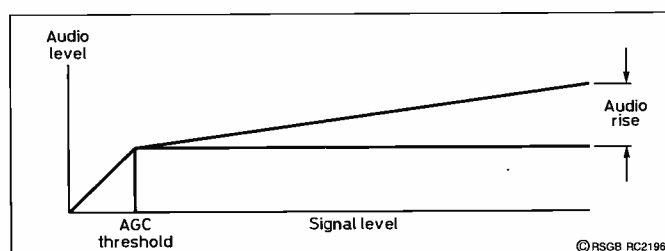


Fig 2: AGC characteristic curve.

tor is acting as a sort of human AGC.

● If you find a situation where the AGC is swamped (the needle hits the end stop), introduce some attenuation. You will find that the audio quality improves quite remarkably, indeed some people keep a little attenuation in all the time when using 40m or 80m - it works quiet well. ♦

◀ useful at this stage:

● I have tried making a short recording on a one minute endless loop tape, as used in telephone answering machines. These cassettes do not stand up to continuous running, so use any standard length cassette.

● If an A to B dubbing machine is to hand only a short length of error-free keying is necessary, since each repeated transfer from A to B can double the length of the recorded message.

● When making recordings, use a fairly high frequency (say 1kHz), and make connections via screened cables to avoid recording 50Hz onto the tape which would result in erratic keying. Remember that this simple circuit has no tone filtering. On replay set the tone control for maximum treble, to also give some 50Hz rejection.

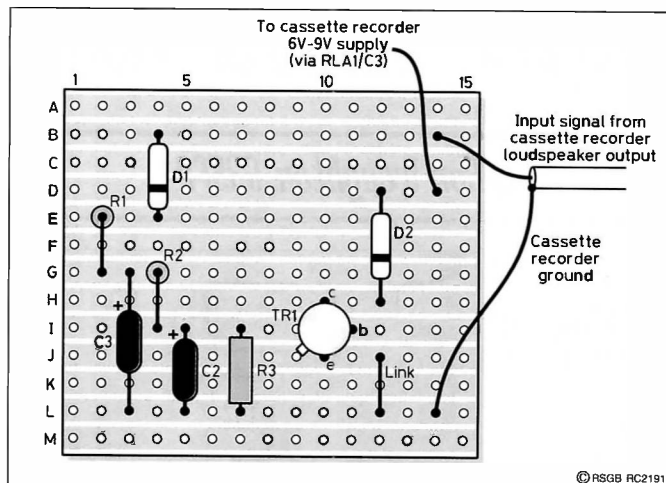


Fig 3: Stripboard layout for the Simple Auto Keyer. The under side of the board is not shown, as no copper removal is required.

● If a microphone/mixer control is fitted, set this for minimum mix to avoid microphone sounds getting onto the tape.

● RF fields inside the shack are best avoided, but we don't

live in a perfect world. In worse case conditions an unscreened/unfiltered recorder will rectify very strong RF voltages and gross keying instability will occur.

● Most recorders have an AGC

system for controlling the record level so, assuming that the minimum input required is applied, there is no adjustment. On replay, the volume control must be set high enough to operate your keying relay. Set it to maximum if necessary, as the circuit is not likely to be overdriven. ♦

COMPONENTS

Resistors, all ¼ watt

R1, R2 680R

R3 2k7

Capacitors (all 16V, tantalum bead if available)

C1 0.47µF

C2 22µF

C3 6µ8

Semiconductors

TR1 2N2218 (or similar)

D1 D2 1N4007 (or similar)

Miscellaneous

TB1 2-way terminal block

RLA 5V model

What Do You Know?

GOING ON THE AIR for the first time can be a nerve racking experience. Almost as nerve racking as taking an exam.

If you're about to sit down and tackle the RAE or NRAE, when you do so remember to read each question and *all* four answers *fully*. Many people then like to read the question and answers a second time, just to be sure they have not misinterpreted what has been asked. If you know the answer to a question, good. Make the appropriate mark on the answer sheet. If you don't know the answer, don't spend too long thinking about it, leave the question and come back to it later.

By RSGB Staff

NRAE QUESTIONS

1. In the International Q Codes, what does 'QRM' stand for?

- a. Low Power.
- b. Interference.
- c. Fading.
- d. Low power.

2. What item of equipment is used to adjust an antenna, so that it matches to a transmitter?

- a. A multimeter.
- b. An SWR meter.
- c. A wavemeter.
- d. An ATU.

3. How many microfarads are there in a Farad?

- a. Ten.
- b. One hundred.
- c. One thousand.
- d. One million.

4. Which of the following would you adjust to alter the pitch of a received Morse code signal?

- a. The BFO.
- b. The RF gain.
- c. The AF gain.
- d. The power supply voltage.

5. Which of the following frequency bands does a Novice B licence entitle the holder to transmit on?

- a. 1.8MHz.
- b. 14MHz.
- c. 144MHz.
- d. 432MHz.

6. Which of these materials is a good conductor of electricity?

- a. Glass.
- b. Gold.
- c. Rubber.
- d. Nylon.

Last month's answers: 1b; 2c; 3d; 4c; 5d

ABBREVIATIONS AND SYMBOLS

AF	Audio Frequency
CQ	General call ('seek you')
CW	Continuous Wave
dB	decibel, one tenth of a Bel
DC	Direct Current
HQ	Headquarters
Hz	Hertz
IF	Intermediate Frequency
kHz	Kilohertz - one thousand Hertz

LS	Loudspeaker
NRAE	Novice Radio Amateurs Exam
PCB	Printed Circuit Board
PSU	Power Supply
QTH	Q code for location

RAE	Radio Amateurs Exam
RC	Resistance-Capacitance
RF	Radio Frequency
RLO	RSGB Liaison Officer
RSGB	Radio Society of Great Britain
SASE	Self Addressed Stamped Envelope
SSB	Single Sideband
µF	Microfarad
V	Volt