THE PROPAGATOR

MONTHLY NEWSLETTER OF THE ILLAWARRA AMATEUR RADIO SOCIETY

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DECEMBER 1981

MEETINGS ARE HELD ON THE SECOND MONDAY OF EACH MONTH (EXCEPT JANUARY) AT 7.30 P.M. IN THE CONGREGATIONAL HALL, CORNER OF COOMBE AND MARKET STREETS, WOLLONGONG. VISITORS ARE WELCOME TO ATTEND MEETINGS.

DECEMBER MEETING: Monday 14th December, 1981.

The evening will feature an introduction to the State Emergency Services. Members interested in inspecting the Illawarra Divisional Headquarters of the S.E.S. are asked to meet at 6.30 p.m. at the Headquarters building on the corner of Auburn and Swan Streets.

The inspection will be followed at 7.30 p.m. by the regular monthly meeting in the Congregational Hall, Coombe Street, Wollongong, which will include a film and talk about the work of S.E.S.

S.E.S. is always on the lookout for volunteers who are interested and able to operate radio and telex equipment, and who in times of energency are ready to set up communications links and handle messages. This is one way in which experience gained through the hobby of amateur radio can be put to practical community use.

FIRST MEETING IN 1982:

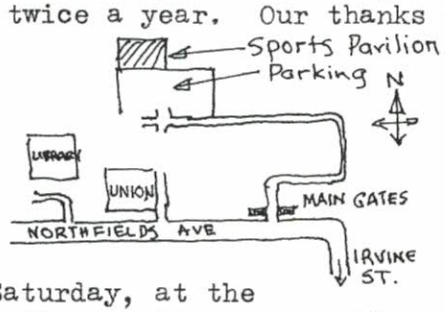
Note that there will be no meeting in January (and no January "Propagator"). The first meeting for 1982 will be on Monday 8th February at 7.30 p.m. Guest speaker will be Roger Harrison VK2ZTB, editor of "ETI". His topic will be "The Amateur experimenter is dead".

NOVEMBER MEETING:

The meeting was well attended, and the remaining Collins plate transformers (2000 volt, $\frac{1}{2}$ amp) sold like hot cakes. Bill Chadburn VK2DXY won the raffle prize of a Husky 4 amp battery charger, which was donated by Ferguson Electric Transformers of Chatswood.

Jeff Pages VK2BYY and Roger Henley VK2ZIG presented a talk and slides on the W.I.A. transmitting facilities at Dural. Technical details concerning the number of transmitters used in a broadcast (eleven!), the antenna arrays, the audio switching needed, and the high-power AM transmitters were most interesting. As with all amateur projects, the efforts of a few people have provided a valuable service for many. An invitation was extended to Illawarra amateurs to participate in the Sunday broadcast roster, possibly once or twice a year. Our thanks to Jeff and Roger for a most informative evening.

CHRISTMAS FAMILY BARBECUE - To be held on Sunday 20th December, 11 am onwards, at the Wollongong University Sports Pavilion - plenty of parking and barbecue facilities. Bring all your own eats, and the family!



CLUB AUCTION: The Auction, held this year on a Saturday, at the Fernhill Auction Rooms, turned out to be the most financially successful auction yet, grossing $1200, from which the society gained $120 commission. A number of brisk Sydney buyers were present, including Sam VK2BVS and his all-band portable station (which was rather less portable when he staggered out with a heap of 160 metre AM gear). Dave VK2YKQ/VAV led the domestic buyers once again with some very soundly seated bids.

SEASONS GREETINGS: Best wishes for Christmas and the new year to all members of the society; and many thanks to those who in one way or another have contributed to the running of their society through the year.

TS-820 SUPER

Dave Henderson VK2YKQ/VAV

I have recently installed several modifications on my Kenwood TS-820S and I am pleased to report on the results.

The 820S had an excellent receiver already, but for the price of these mods kits from S-F Radio I thought it was worth a try. Prior to installing the mods, I checked the performance of the set with a signal generator, and also on air in order to gain an idea of any improvements. I then performed the following mods:

(a) Installed the Receiver Mod Kit, which involved replacing one MOSFET in the receiver RF-amp, re-biasing it, and installing back to back diodes on the input.

This is claimed to:-

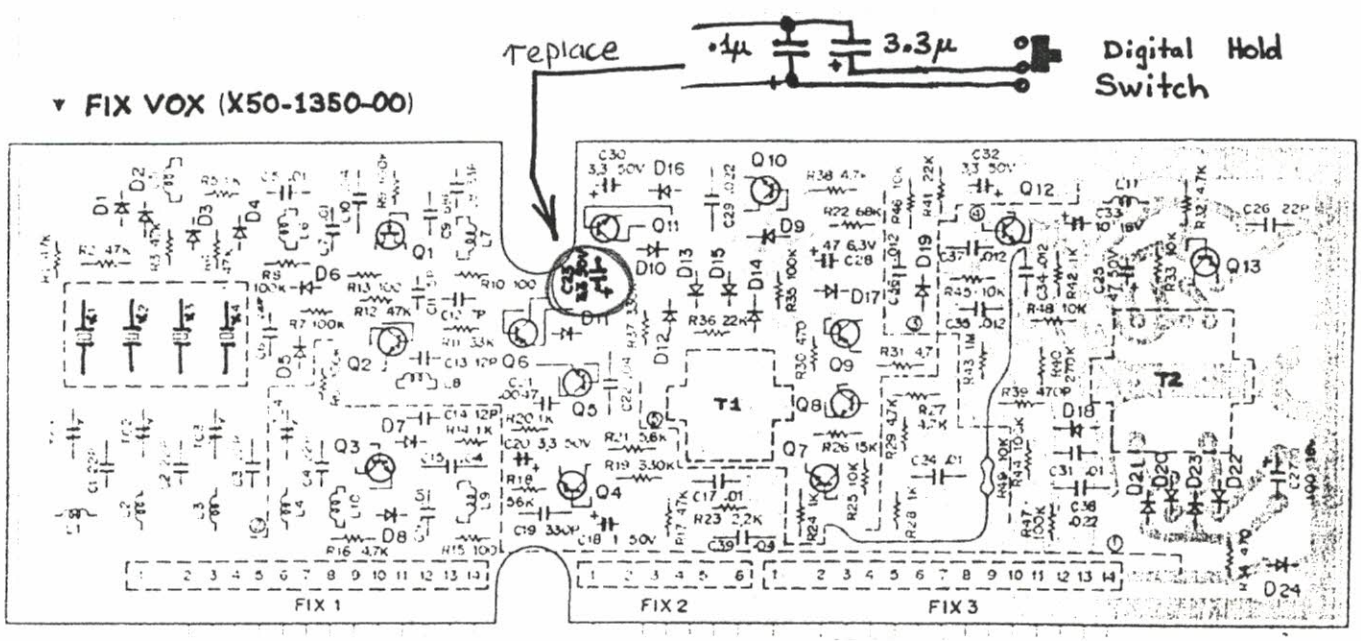
(i) increase selectivity
(ii) improve sensitivity by up to 6dB
(iii) lower receiver noise by 3dB
(iv) prevent blocking by strong signals

(b) Installed the Balanced Mixer Mod Kit. This involved replacing the 3SK41 MOSFETS in the balanced mixer stage and re-biasing the replacements. This is claimed to:-

(i) Eliminate front-end overload
(ii) Reduce internal noise by at least 6dB
(iii) Reduce Cross-Modulation

After completing these two mods, and re-tuning the set, an AMAZING drop in background noise was realised - most noticeable on 10 meters, and an increase in sensitivity of about 6dB. Also, I can no longer tell which band VK2FE is on - it used to be so easy - the 820 is definitely behaving better with regard to front-end overload. To follow up on these mods, I installed a CW filter - the YK-88CN 270Hz filter, designed for the TS-120, 130, 180, 830 series - but not for the 820. However, the price was right. This filter has the same IF - 8830kHz and with a little physical re-arrangement on the IF-Unit, in it went. Results from this were tremendous for receiving CW. Interference is a thing of the past.

The next modification was to replace the time constant capacitor in the VOX circuit to give QSK (see Gio's article several months ago). This required adapting Gio's mod for the 820 - a very simple task. The 1uF value was found to be a bit large, and full QSK could only be achieved at slow speeds, so I lowered the value of the cap to 0.1uF, and wired the 3.3uF cap in parallel across it via a switch, so that normal VOX operation was still possible. The Digital Hold button on the 820 is DPST, and only one side is used, so I wired the 3.3uF cap via this, allowing normal VOX operation in the normal mode and Full QSK in the Digital Hold Mode.



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TS-820 mods - contd.

Lastly, I installed the "Magicom" RF Processor module, which is simply wired onto the IF Board, and replaces the Kenwood RF Compressor with a RF Clipper which gives superior speech quality, as well as up to 6dB increase in average power.

There is another mod for the power crazy, but I prefer to use low power, and get the most out of it, so I didn't purchase this kit.

In summary then, the kits seem to perform as claimed, as far as I can measure - certainly there is a great drop in receiver noise, and occurances of overload, with a definite increase in sensitivity - well worth the money.

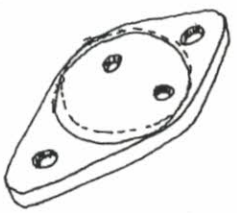
A HELPFUL HINT

Walter Bagnarol VK2YWJ

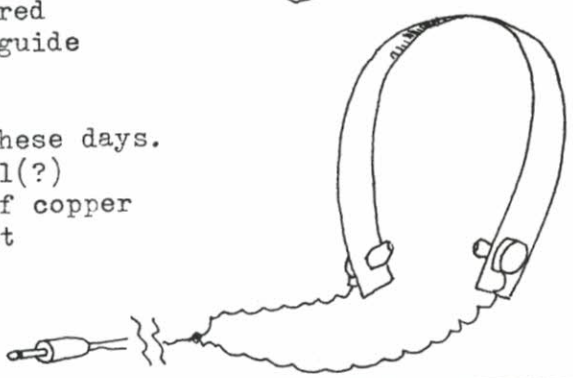
How often have you misdrilled holes of TO3 type transistor cases? A simple solution is to remove the cover of a TO3 transistor (preferably blown) as shown and drill the base and emitter terminals out. This then serves as a template.

First drill one of the mounting holes in its approximate position.

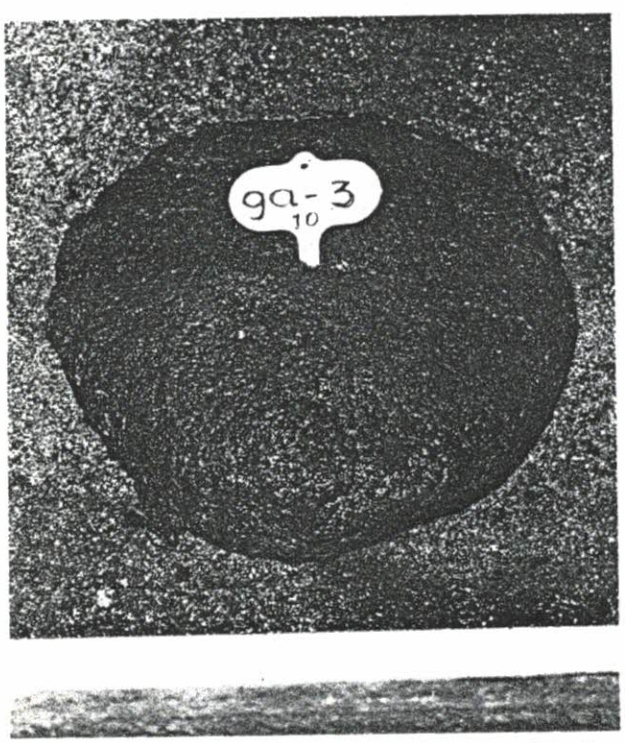
Second bolt the template in the required position, which serves as a very accurate guide for the other three holes .

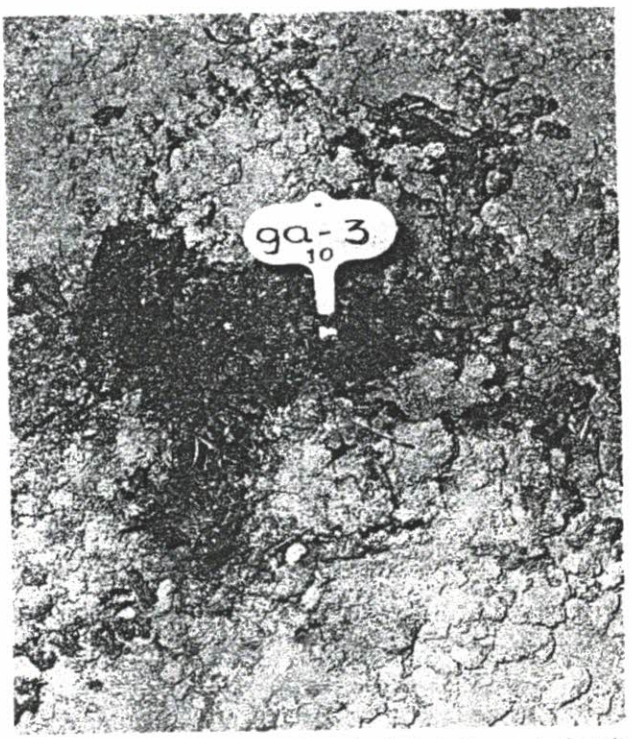


High impedance headphones seem rare these days. A simple substitute is to mount two crystal(?) earphones on the end of a suitable strap of copper of aluminium as shown. This is a crude but effective solution.



Science at play





The Division of Macrobiotic Confectionery has upstaged the dung beetle with a totally new approach to the biological control of cattle dung. A slow-release pellet of photo-reactive gallium-arsenide-3 is coated with a palatable gel containing an ultra-violet inhibitor, and scattered on pastures. Eaten by a cow, the pellet lodges in the rumen and gallium-arsenide is released into the digestive system and thus finds its way into the offending pad. Exposure to UV light causes a violent reaction, and the pad explodes. An initial increase in dung production is noted, but the animals are soon conditioned to the sudden noise of exploding pads. The Division is now working on self-cleaning fans for milking sheds.

SIMPLE NOISE BRIDGE

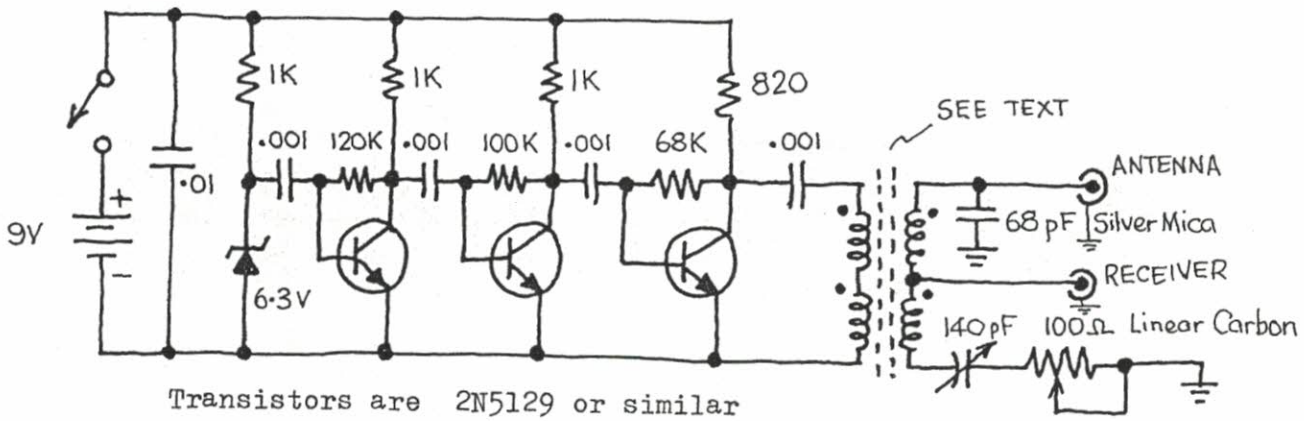
Dave Meyers VK2PBP

Described below is a circuit for a simple and inexpensive noise bridge, or for the ill-informed, "QRM-free Aerial Tuning". With a noise bridge you can check all aspects of unknown capacitance or reactance in an aerial or tuned circuit.

The circuit is quite simple, the only thing to take care with is the output transformer. Care must be taken to obtain a good balance between windings. It consists of an Amidon T50-2 or similar core. Four 5-inch lengths of 28gauge enamelled wire (or close to it) are twisted together along their length. The quadrifilar winding is simply wound on the core to produce 4-5 turns, and the ends can be marked beforehand or found with a multimeter afterwards.

Connect any two windings together to form the primary and the other two togethe to form the secondary. Take care to get the polarization correct as shown in the diagram.

This is similar in design to the one which Gio VK2VPD described in an earlier Propagator, but seems more stable.



Transistors are 2N5129 or similar

The 140pF variable cap is from a Japanese transistor radio or available at Dick Smiths for about $1-50.

Different value resistors above and below 50 ohms can be used to calibrate the resistance pot scale. Various value capacitors below 68pF and in series with a 50 ohm resistor are used to calibrate the capacitor rotation. The capacitor rotation on one side of its noise null as established with just a 50 ohm resistor (as a load) will indicate capacitive reactance while the other side will indicate inductive reactance. Using various value caps and calculating X_c for each value (using a calibrated receiver) calibrates the X_c side, the X_L side is a mirror image of X_c.

Further information on noise bridges can be found in ARRL Handbook or RSGB Handbook. These are a very handy piece of equipment for any shack. Approximate cost (all new parts) is about $10-00 with a metal case.

FOR SALE Two RTTY demodulators, 455KHz input, $16 each. Contact Mike VK2VXS.

FOR SALE Several Model 15 Teletype machines $20 each. M. Hort VK2BZE, 30 Eastern Ave, Shellharbour.

FOR SALE Quad Spider Hub, W6SAI design, strong construction. Cost $60, sell $30. John Thurstun VK2DET, 84-3400.

FOR SALE AWA VTVM "Voltohmyst" with instruction book and circuit. I bought two at auction in Kiama and only need one. Yours for what it cost me - $35. Roger Graham, 34-1431.

FOR SALE One set of new HF helical mobile antennas 80 40 20 15 and 10 metres, made by "Lepstick" - $100. One BC348 communications receiver including power supply and external speaker with bands 200-500Kcs, 1.5-3.5Mcs, 3.5-6.0Mcs, 6.0-9.5Mcs, 9.5-13.5Mcs, 13.5-18Mcs. Has BFO for SSB and CW reception - $50-00. One Model 15 Teletype Teleprinter - $50. One Alpha-77 regulated power supply 13.8 volts 1.5 amps (CB type) - $20. Les VK2ALK, QTHR, 042-563174 evenings 042-280408 business hours.

BUDWADDAZITALLMEEN??

Dave VK2YKQ/VAV

At the World Administrative Radio Conference in Geneva in 1979, the method and nomenclature of describing Radio emissions was revised to allow greater flexibility and precision, as well as to cover those emissions not previously covered.

The new system is no more complicated than before, and much more flexible. The designation consists of two main parts -

I. Necessary Bandwidth - e.g. 3K00, this is defined as "The width of the frequency band such that, below the lower and above the upper frequency limits, the MEAN power emitted are each equal to the specified percentage of the total Mean Power of a given Emission. Unless otherwise specified by the CCIR for the Class of Emission, the value of that specified percentage should be taken as 0.5% (-53dB).

II. Classification. e.g. J3EJN, this consists of three to five characters. The first three are the Emission Classification, and the last two are the Additional Characteristics, **or** you should place two dashes, after the Emission Classification.

Using this system, SSB in the amateur sense would be -

3K00J3EJN or simply J3E--

3k00 - means that the emission is 3.00 Khz in bandwidth
J single-sideband suppressed carrier
3 a single channel containing analog information
E Telephony (including sound broadcasting)
J Sound of Commercial Quality
N no multiplexing.

6kHz bandwidth AM would be 6K00A3EJN or simply A3E--
5kHz FM would be either -

5K00F3EJN or
5K00G3EJN depending on whether your transmitter uses phase modulation or Frequency Modulation (Do you know??).

Included in this issue of the Propagator is a chart to help you figure out what mode you are using. It seems to be a simple jump from the old method to the new, although I am sure that there are a few old Dinosaurs who will resent any change.

CALLSIGNS & NUMBERPLATES

Did you know that you can now have your callsign in your car numberplate?

A check with the Department of Motor Transport found that you can have any combination of six letters or numbers or both - e.g. VK2PBP, VK2XYZ, etc.

But the catch is, it will cost you $180-00 per year! and you never own the plates.

What price a callsign?

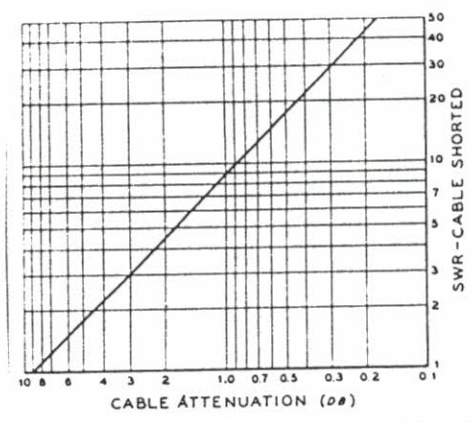
Dave VK2PBP

MEASURING R.F. LOSS IN COAX

The efficiency of your coaxial feedline may be determined by measuring the line loss at your operating frequency. You can do this by short circuiting the far end of your coaxial line and measuring the standing wave ratio with your SWR meter. If there is no line loss whatsoever, the SWR reading will be infinite (full scale), indicating that the reflected wave is equal in amplitude to the incident wave. In a real life situation, of course, this is not the case, and the SWR reading under the test condition will be less than infinite, due to line loss.

In order to make this measurement, the antenna termination is removed from the far end of the transmission line and the outer shield is firmly shorted to the inner conductor of the line. A small amount of power is applied to the line through the SWR meter. The meter is calibrated in the normal fashion and then the SWR reading is noted. The line loss may then be computed from the noted SWR reading and the accompanying chart. If, for example, the SWR reading is 4.5, the cable loss (attenuation) is 2 decibels. This means that your coaxial line is about 63% efficient, and that 37% of your transmitter output power is being lost in the line. If the SWR reading is 9; then your line loss is only 1 decibel and your line is about 80% efficient.

(Adapted from "Wire Antennas" ORR) Ron VK2DXQ



THEY TOLD ME THAT VU'S ARE PRETTY UNUSUAL...

EXPERT OPINIONS

BOMBING FROM AIRPLANES

As far as sinking a ship with a bomb is concerned, you just can't do it.

US Rear-Admiral Clark Woodward (1939)

POSSIBILITY OF INTERCONTINENTAL MISSILES

There has been a great deal said about a 3000 miles high-angle rocket. In my opinion such a thing is impossible for many years. The people who have been writing these things that annoy me, have been talking about a 3000 mile high-angle rocket shot from one continent to another, carrying an atomic bomb and so directed as to be a precise weapon which would land exactly on a certain target, such as a city.

I say, technically, I don't think anyone in the world knows how to do such a thing, and I feel confident that it will not be done for a very long period of time to come. . . . I think we can leave that out of our thinking. I wish the American public would leave that out of their thinking.

Dr Vannevar Bush (1945)

THE ATOMIC BOMB

That is the biggest fool thing we have ever done. The bomb will never go off, and I speak as an expert in explosives.

Adm William Leahy to President Truman 1945

PROPOSAL TO DRIVE A STEAMBOAT BY SCREW-PROPELLER

Even if the propeller had the power of propelling the boat, it would be found altogether useless in practice, *because* the power being applied in the *stern* it would be *absolutely impossible* to make the vessel steer.

Sir William Symonds, Surveyor of the Royal Navy (1837)

BAFFLED AGAIN

Incurious people are content to take the miracle of electricity for granted. They press a switch and the light comes on, and that is all they know about the miracle in their homes. This has never done for me. I have to know how things work, and if I cannot find out from some technical handbook - the "Every Boys' Wonder Book" series does an advanced manual on electricity - then I combine such information as I already have with simple logic.

Thus it is very easy to deduce that the light switch controls a small clamp or vice which grips the wires very hard, so that the electricity cannot get through. When the switch is flicked on the vice is relaxed and the electricity travels to the light bulb where a bit of wire, called the element, is left bare. Here, for the first time, we can actually see the electricity, in the form of a small spark. This spark is enlarged many hundreds of times by the curved bulb which is made of magnifying glass.

Why, is our next question, do these light bulbs have a limited life? As any schoolboy knows, heat converts oxygen into moisture. When all the oxygen in the light bulb has become liquified in this manner, it naturally quenches the electric spark.

Now we come to electricity as a source of power rather than a source of light or heat. Why, when you plug in an electric iron, does it get hot, whereas when you plug in an electric fan it does not get hot but whirrs round and round? The answer is that when light or heat is required we use bare electricity, whereas when power is required we keep the electricity covered up. The constant flow of sparks, unable to escape, is converted into energy. This energy is fed into a motor which makes things go round and round.

I have not yet touched on fuse wire. It has always amazed me that an industry which is so enterprising in most respects - the invention of colour electricity for use in traffic lights and the harnessing of negative electricity for refrigeration are two examples that come to mind - should still, two hundred years after James Watt invented the electric kettle, be manufacturing fuse wire too thin. I pass on a hint for what it is worth. There is available from hardware shops a sturdy wire used mostly for making chicken runs, and this is far more durable than the stuff sold by electricians (who must, I appreciate, make a living). By using ckicken wire, I now have a fuse box which - even when the spin-dryer burst into flames due to too much booster electricity having been fed into it - has for six months been as impregnable as the Bank of England.

But why have fuse wire at all? I completely understand that the fuse box is the junction at which the wires leading from the power station join, or fuse with, the wires belonging to the house, and that these two sets of wires have got to be connected with each other somehow. But what is wrong with a simple knot?

In some respects, I reiterate, my knowledge is imperfect. I have not yet explored the field of neon signs - how do they make the electricity move about? And the pop-up toaster - how does it know when the toast is ready? With an electronic eye, presumably - and this brings us to another fruitful area. What is the difference between electricity and electronics? Is electronics now just the smart word to use, like high-speed gas? How can an English computer speak French, which requires a different voltage?

Logic would answer these questions too, and many of a more technical nature, but the light over my desk has just gone out. A valve blown somewhere, I expect.

- Keith Waterhouse, in "Punch", 1968.

I

NECESSARY BANDWIDTH

3KØØ

Necessary Bandwidth

eg 3KØØ
^
Decimal Position

H = Hertz
K = Khz
M = Mhz
G = Ghz

Emis
Classifi
Basic Ch

1ST Symbol

Type of Modulation of the Main Carrier

N.. Emission of an unmodulated Carrier

Emission in which the main carrier is Amplitude Modulated (includes angle-modulated sub-carriers)

A .. Double sideband
H .. Single sideband — full carrier
R .. " " — reduced or variable level carrier
J .. " " — suppressed carrier
B .. Independant sideband
C .. Vestigial sideband

Emission in which the main carrier is angle-modulated

F .. Frequency Modulated
G .. Phase modulated
D .. Emission in which the main carrier is Amplitude and Angle-modulated either simultaneously or in a pre-established sequence.

Emission of pulses — (emissions where the main carrier is directly modulated by a signal which has been coded into quantised form (eg. PCM) should be designated under amplitude or angle-modulation)

P .. Unmodulated sequence of pulses
K .. A sequence of pulses modulated in amplitude
L .. " " " " " width/duration
M .. " " " " " position/phase
Q .. " " " in which the carrier is angle-modulated during the period of the pulse.
V .. A sequence of pulses which is a combination of the foregoing or is produced by other means.
W .. Cases not covered above in which an emission consists of a main carrier modulated either simultaneously or in a pre-established sequence, in a combination of two or more of the following modes: Amplitude, Angle, Pulse.
X .. Others

2
Nat
Mod

0..
1..
2..
3..
7..
8..
9..
X..

II

CLASSIFICATION

T3EJN

Additional Characteristics (optional)

4th Symbol — Details of Signal (s)

- A.. 2-condition code with elements of differing numbers and/or durations.
- B.. 2-condition code with elements of the same number and duration without error-correction
- C.. B with error-correction
- D.. 4-condition code in which each condition represents a single element (of one or more bits)
- E.. Multi-condition code in which each condition represents a single element (of one or more bits)
- F.. Multi-condition code in which each condition or combination of conditions represents a character
- G.. Sound of Broadcasting Quality (mono)
- H.. " " " " (Stereo or Quad)
- J.. Sound of Commercial Quality (except K & L)
- K.. " " " " with the use of frequency inversion or band splitting
- L.. " " " " with seperate FM signal to control the level of demodulated signal.
- M.. Monochrome
- N.. Colour
- W.. Combination of the above
- X.. Others

5th Symbol — Nature of Multiplexing

- N.. None
- C.. Code-division (including bandwidth expansion techniques)
- F.. Frequency-division
- T.. Time-division
- W.. Combination of Frequency-division & Time-division
- X.. Others

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3RD Symbol — Type of Information to be Transmitted

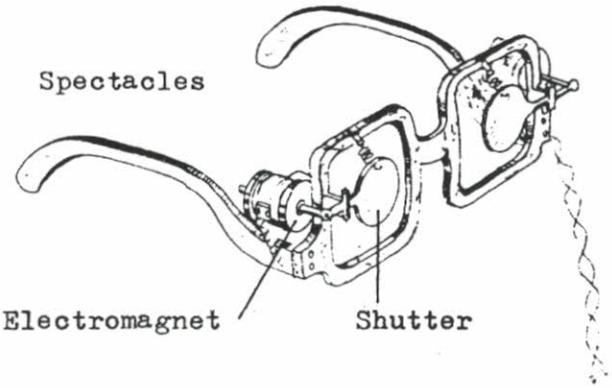
- N.. No information transmitted
- A.. Telegraphy — for aural reception
- B.. " " automatic "
- C.. Facsimile
- D.. Data transmission, telemetry, telecommand
- E.. Telephony (including sound broadcasting)
- F.. Television (video)
- W.. Combination of the above
- X.. Others

2nd Symbol — Type of Signal(s) Modulating the Main Carrier

- 0 No modulating signal
- 1 Single channel containing quantised or digital information without use of a modulating sub-carrier *
- 2 As for 1 but with use of modulating sub-carrier *
- 3 Single channel containing analogue information
- 7 2 or more channels containing quantised or digital information.
- 8 2 or more channels containing analogue information
- 9 Composite system with one or more channels containing quantised or digital information, together with one or more channels containing analogue information
- X Others

* Excluding time-division Multiplexing

TV PROGRAMME MULTIPLEXER



Mr. Frose has submitted an idea which could well revolutionise the viewing habits of the nation. Like many of us, he apparently has regular battles with the rest of his family over the choice of TV programmes - and has decided to do something to restore harmony in the living room. After many long winter evenings spent in his attic study, pondering on the peculiar taste in programmes of others, he has come up with the following radical solution. Although he is not yet ready to divulge all the details of his invention, the general principle is now free for publication.

The main point is that the TV set is not switched to just one of the channels available: all channels are selected simultaneously! To be more precise, the channels are scanned and each is displayed very briefly on the screen. In the interests of preserving the viewers' sanity, each is provided with a pair of special spectacles. These contain shutters, which are operated by electromagnets. In each pair of spectacles the shutters are only opened at the moment that the corresponding TV programme is being displayed on the screen.

Each pair of spectacles is accompanied by a set of headphones, which provide the sound output for the corresponding channel. In this way, several people can watch the same TV set - each following their own programme. All in all, a stroke of genius! The author is presently working on the possibility of adapting the circuit for FM radio transmissions in both mono and stereo.

From "Elektor", July/August 1979.

BUDDING TECHNICIAN

A young go-cart enthusiast was making the acquaintance of his aunt's brand-new baby, her first - and asked if any more children were planned. The new mother, rather taken aback, replied that at that stage she didn't really know.

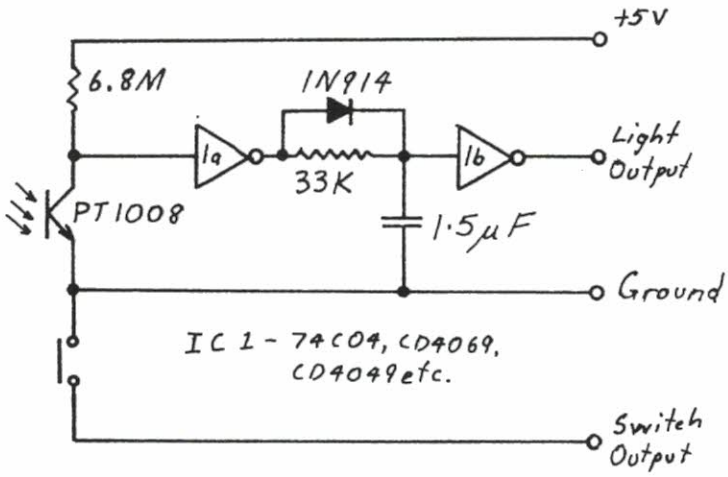
"There's a pill you can take," said her nephew, "and may I have the pram wheels when you've finished with it?"

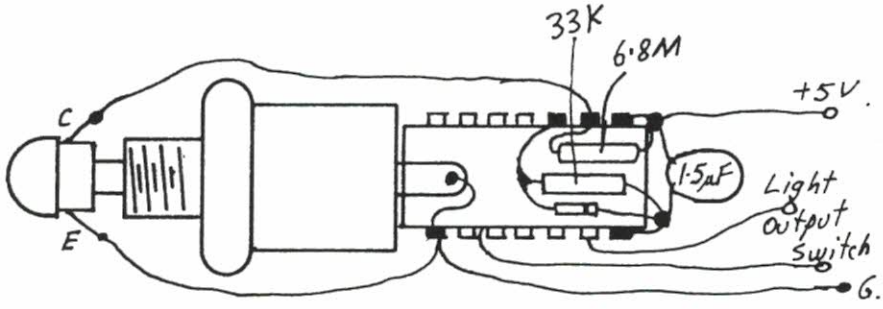
- NMAA Newsletter, May 1980.

Simple Lightpen

The function of a lightpen is very simple - it merely tells the computer whether or not the piece of screen it is pointing at is illuminated. This circuit uses a CMOS hex inverter to amplify and buffer the output from a phototransistor. The next gate is used as a retriggerable monostable. Without this, the signal would pulse each time the screen was scanned. The switch is used to tell the computer when the pen is pressed against the screen.

Construction is fairly straightforward. The switch used was similar to a Dick Smith S-1102. The IC, with its legs trimmed short, fits between the switch terminals. The phototransistor mounts on the switch actuator, either by melting the leads into the plastic, or by using a small amount of 5-minute Araldite. The other components mount on the IC. Because of this construction method, the smallest possible components should be used.





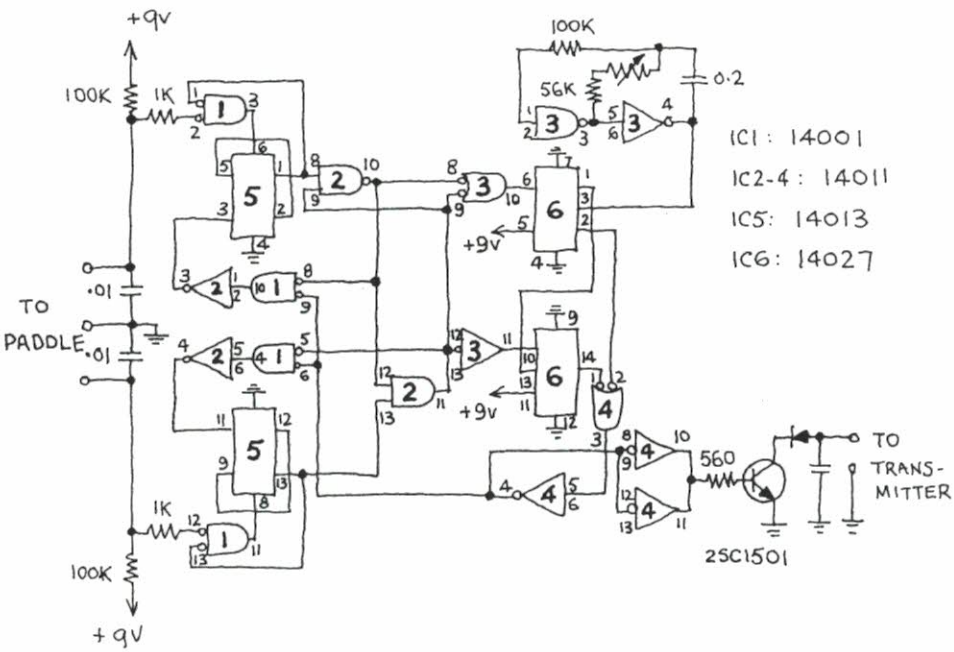
The phototransistor used is not critical, the PT1008 being used only because it was on hand. The 6.8M resistor may have to be changed to suit different phototransistors or different screens. The 4069 may be substituted by any CMOS inverter circuit or other suitable IC. (I know of one lightpen built to the same design using the ubiquitous 555 for the IC.) Since the prototype was built to be used with the Sorcerer, which has internal pull-up resistors on the parallel input port, these have not been included in the circuit. They may be necessary with some computers.

To use the lightpen as an input device, we have to flash a white square on the screen at each location where the pen might be until we find where the pen is. The location of the square which produces an output from the pen is then the location of the pen.

W. G. C.

SIMPLE PADDLE FOR CW KEYER

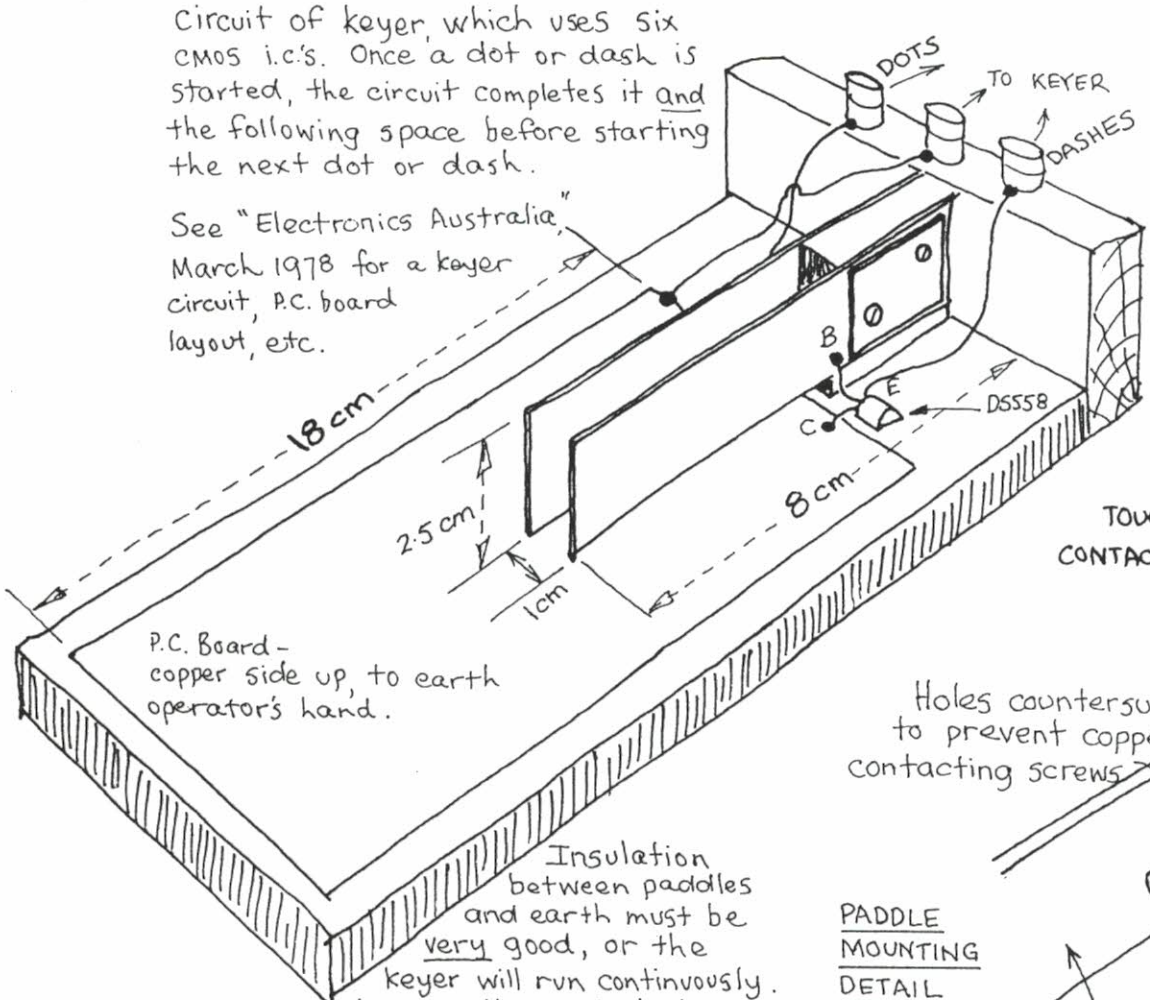
- Brian VK2AXI



Circuit of keyer, which uses six CMOS i.c.'s. Once a dot or dash is started, the circuit completes it and the following space before starting the next dot or dash.

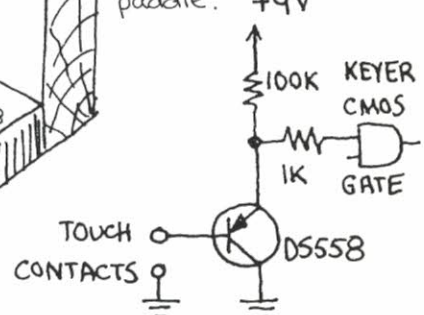
See "Electronics Australia", March 1978 for a keyer circuit, P.C. board layout, etc.

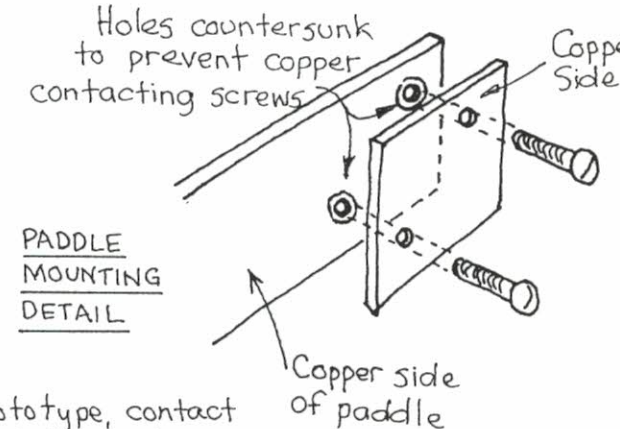
The sketches show one way to make a touch-operated keyer paddle. The paddles are cut from single-sided fibreglass P.C. board. A piece of plain P.C. board provides a base on which to rest the operator's hand. Touching either paddle then completes the base circuit of the DS558 transistors, which in turn earth the inputs to the respective CMOS gates in the keyer.



TOUCH-CCT DETAIL

The two resistors and CMOS gate belong to the keyer circuit. One PNP transistor is connected to each paddle.





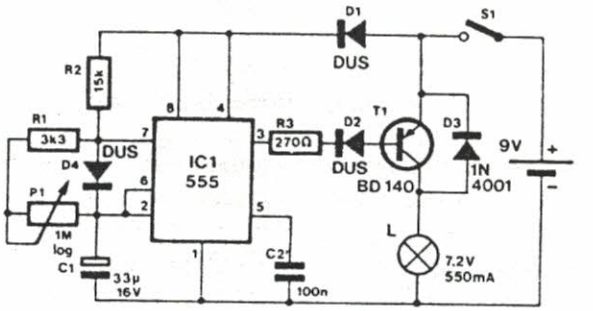
PADDLE MOUNTING DETAIL

Insulation between paddles and earth must be very good, or the keyer will run continuously. The mounting detail shows how to clamp the paddle with a scrap of P.C. board. In the prototype, contact between the paddle's copper foil and the wooden mounting was sufficient to trigger the keyer.

BURGLAR'S BATTERY SAVER (ELEKTOR, 1979)

Elektor attempt to cater for everyone and included here is a circuit for gentlemen in the nocturnal profession. Put an end to stumbling in the shrubbery with the torch light controller described here. Incidentally it is also an excellent battery saver. Varying the brightness of a torch appears simple enough but using a series resistor or potentiometer is out of the question since power is dissipated in the form of heat. One solution is not to use a d.c. supply voltage but rather a squarewave with a variable duty cycle. The brightness of the lamp then depends upon the length of the duty cycle.

In the circuit shown, a 555 timer is connected as an astable multivibrator and used to supply the squarewave. The duty cycle of the squarewave can be varied by potentiometer P1. Diodes D1 . . . D3 protect the circuit if the polarity of the battery is reversed in which case the circuit will not operate and the torch will be 'full on'. Gentlemen, do not change your batteries in the dark!



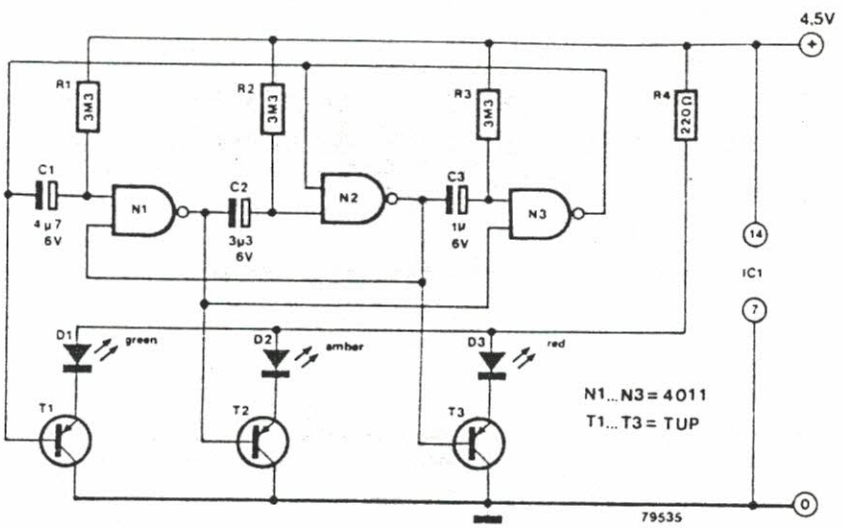
C. Hentschel (Germany)

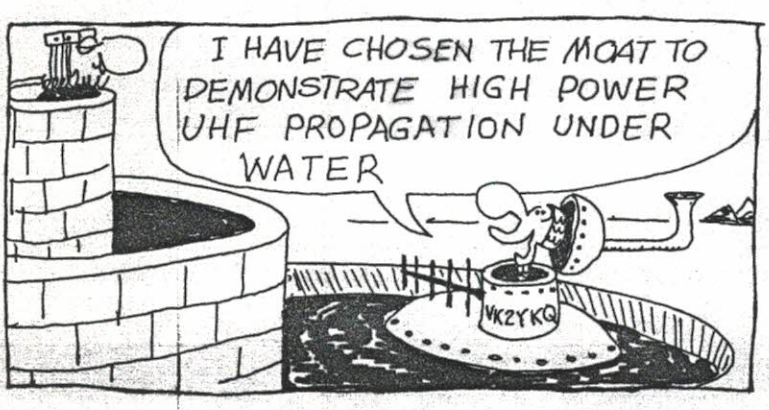
MINIATURE TRAFFIC LIGHTS (Elektor, 1979)

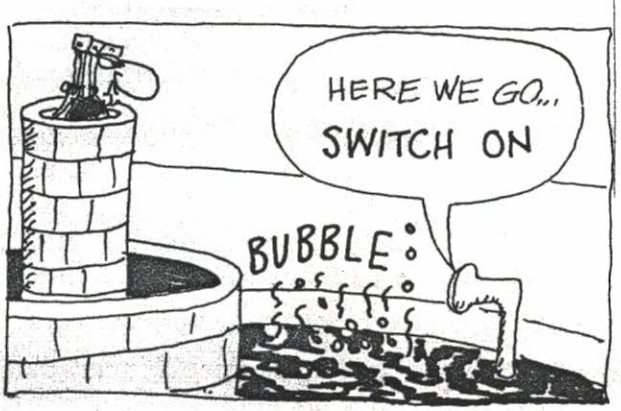
Although the following circuit was submitted by the author as a design for an unusual brooch, it is certainly not limited to that application alone. For instance it could prove useful for the model enthusiast, or find favour with our younger readers as a 'novelty' badge.

The operation of the circuit is virtually self-explanatory. Each of the outputs will go low in turn whilst the other two are held high. The time for which each LED remains on is determined by the corresponding RC constant. Three 1.5 V 'pen' cells will prove adequate to power the circuit.

J. Ladage (The Netherlands)







A CRYSTAL MARKER GENERATOR

FROM LF TO UHF ····

By Rod Graham VK2BQJ in "Tasmanian Amateur Radio", October 1979.

INTRODUCTION

A most desirable adjunct to the test equipment in any shack is a crystal locked oscillator of known frequency. Such a device could serve as a band edge marker, a weak signal source or as a test signal. Desirably, all these functions could be carried out with the one device, the oscillator frequency being adjustable to enable it to be zeroed on WWV etc. The marker generator described is excellent for these purposes.

One parameter which has always been a problem has, in the past, been the spectrum of the oscillator. In general, oscillators with harmonics at say, 1MHz intervals, were rarely useful above about 100MHz at best. Those with harmonics past 100MHz used crystals rarley lower than 8MHz which made them of restricted use.

Over the last several years, the writer has built many test oscillators with the aim of having a generator producing spots 1MHz apart from 1MHz through to 1296MHz. This article draws attention to a circuit which easily acheives these parameters.

THE CIRCUIT

The oscillator circuit is essentially an aperiodic Butler oscillator. The frequency is adjusted by means of the series trimmer. Q3 acts as an emitter follower buffer to drive Q4 and Q5 which form a Schmitt trigger delivering a square wave with very fast rise and fall times.

The transistors specified in the original article for Q4 and Q5 were BSY21s. However, types such as the 2N3564, 2N5770(PN5770), 2N918, BFY90 etc make excellent substitutes. (According to 5MM, 2N914 and 2N2222transistors have been used but information as to signal strength on 1296MHz is not available).

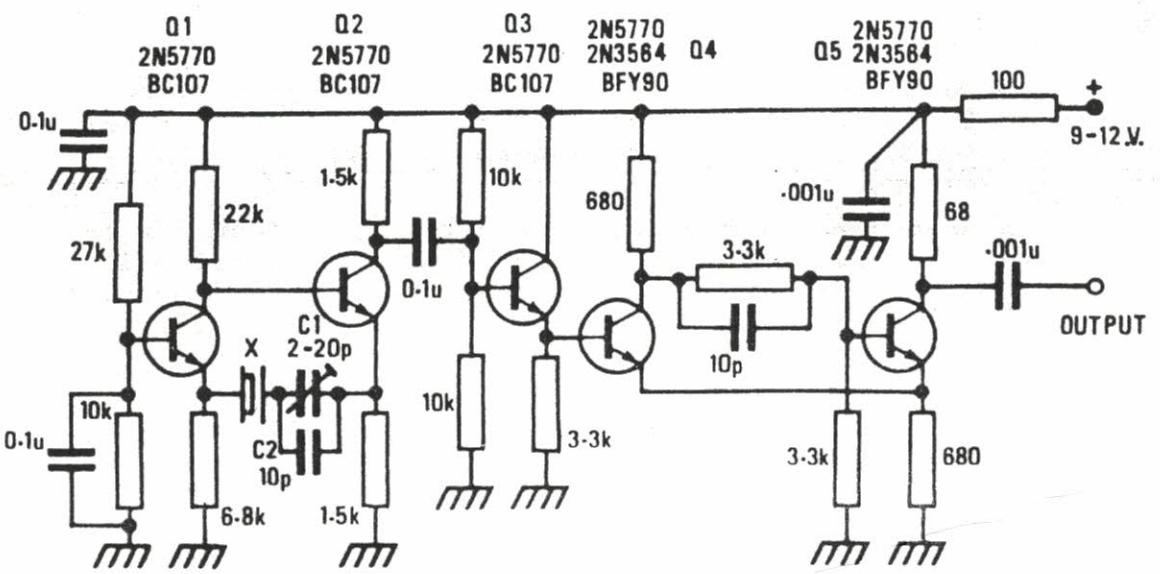
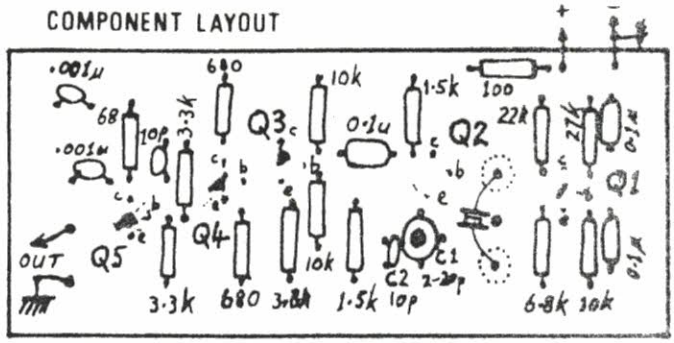


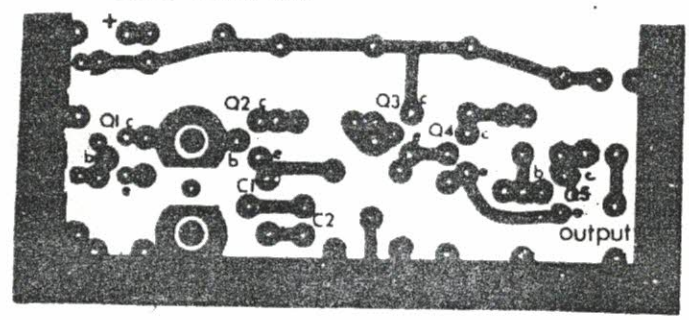
Fig.1. MARKER GENERATOR CIRCUIT

COMPONENT LAYOUT



by Rod Graham VK2BQJ

PC BOARD copper side



PERFORMANCE

As the crystal is not mounted in an oven, and often the harmonic of interest is several hundred times the crystal fundamental, temperature changes should be avoided. e.g: enclose crystal in a polyurethane block etc. For a similar reason, the power supply should be well regulated or aged batteries used.

Up to 100MHz, the spots are many dB over S9, likewise on 144MHz. On 432MHz the spots were S9 when the unit was a few inches from a 5QZ/6SS/6UP type converter front end.

On 1296MHz, the spots were around S2/3 when the unit was either coupled into the converter via a piece of coax or via a few inches of wire into the RF cavity (diode mixer type converter).

This circuit is highly recommended. A 100kHz crystal has been tried and gives usable harmonics to 432MHz. However, for crystals lower than 1MHz, more series capacitance is required. As crystals vary, this should be determined by experiment.

HOSED

A Los Angeles court yesterday heard why 63-year-old Mrs Isabel Hernandex committed a technical assault on a busload of people.

The bus terminal is right outside her home and the passengers kept throwing their used tickets on to her lawn. One day Mrs Hernandex happened to be hosing her lawn when the bus rolled up.

Something snapped. Mrs H. boarded the bus and hosed down all the passengers. The case goes on.

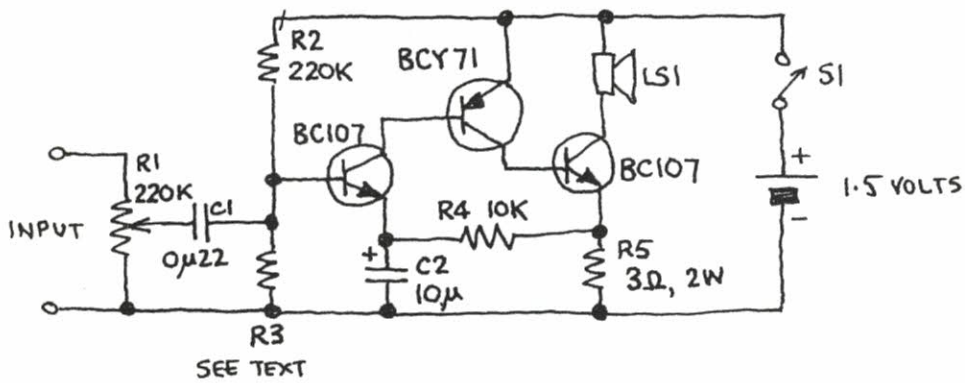
- Daily Express

AUDIO AMP RUNS ON 1.5 VOLTS

This interesting amplifier design appeared in "Practical Wireless" for March, 1981. It needs about 50mV in and has output power of about 10mW - described as surprisingly loud. It was designed to provide an audio amplifier for a crystal set.

When the amplifier is first switched on (with no input signal) the current in the output transistor must be set. The current is measured by connecting a milliammeter in series with the loudspeaker, or by measuring the voltage across R5 with a voltmeter and calculating the current from Ohm's law.

For a loudspeaker with an impedance of 3-5 ohms, the current should be set to about 50 mA. For higher impedance speakers up to 15 ohms, 30 mA is used. Current is set by substituting different values of R3 in the range 100K to 330K, or by using a potentiometer.



If the transistors in the circuit diagram are not available locally, then the following substitutions should work: type DS548 instead of BC107; and type DS558 instead of BCY71.

Polly want a photovoltaic cell?

Cockatoos and galahs have developed a taste for modern technology.

Telecommunications links using silicon technology in the Australian outback have not escaped the old problem of parrot beaks.

A three-year project financed by the Australian National Energy Research Development and Demonstration Council is studying the reliability of Japanese-developed solar-energy cells under Australian conditions.

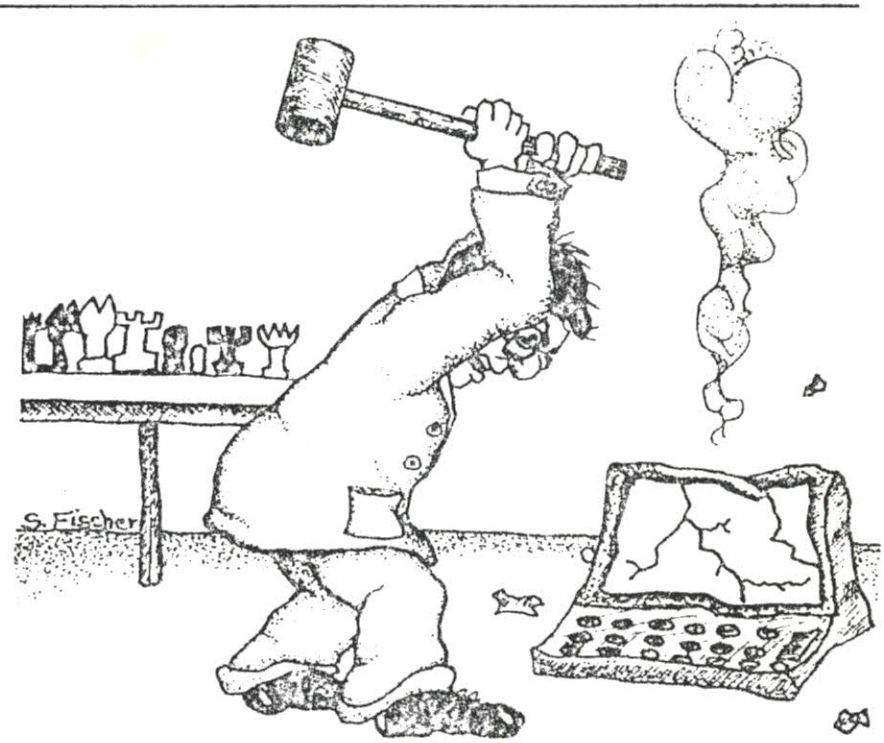
The parrots can no longer short-circuit the systems by swinging on wires and bringing them into contact, but the birds have developed a taste for the photovoltaic cells.

The birds are chewing and mutilating these cells which provide power for remote telecommunications links.

Yesterday a representative of the council said the cocky problem was one aspect of the study. He said some telecommunication link stations had been damaged by cockatoos.

— DENNIS SHANAHAN

(S.M.H.)



"Checkmate, pal!"

(from "Smoke Signals".)