
THE PROPAGATOR

MONTHLY NEWSLETTER OF THE ILLAWARRA AMATEUR RADIO SOCIETY

PO BOX 1838 WOLLONGONG NSW 2500

VOLUME 84, NUMBER 6

JUNE 1984

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MEETINGS ARE HELD ON THE SECOND TUESDAY OF EACH MONTH (EXCEPT JANUARY) AT 7.30 P.M.
AT THE STATE EMERGENCY SERVICES BUILDING, MONTAGUE STREET, NORTH WOLLONGONG.
VISITORS ARE WELCOME TO ATTEND MEETINGS.

NOTICE OF MEETING

For those with an eye for detail and have read our standard meeting notice, a change in venue and subsequently day must be advised. The Society can now lay claim to having a more permanent home, certainly one with which our interests and activities have some commonality. The SES have granted us the use of their hall in Montague Street, North Wollongong for future meetings and the first appropriate date will be TUESDAY - 12th JUNE, 1984. The usual 7.30 p.m. (variable) starting time applies..

Might the opportunity be taken now to publicly thank the Congregational Church for their forbearance over the past few years. Also might the Committee thank the Society members who ensured the Hall was left in a clean and tidy state such that our presence was at all times welcome. (The writer turns a deaf ear to the applause of smokers).

It is understood the Society will have a access to a room for use as a store etc., so make a special effort this coming Tuesday to ensure an opening night success.

GUEST SPEAKER

Denis, VK2DMR, who has had a long association with the SES will give a talk on the general activities of the SES and the possible or probable links with our own activities. If time permits, a dreaded talk on trapped dipoles will follow:

MAY MEETING

Approximately 60 members attended another successful meeting. Space prevents a detailed summary this month.

A special word for the quick recovery of Propagator Asst. Editor Ken VK2D01 who normally prepares this page. Following this presentation, the writer and no doubt most of the readers wish you a speedy recovery and quick return.

73's Murray VK2MY

REPEATER REPORT

THERE HAS BEEN SOME INTERFERENCE TO 6850 REPEATER DURING THE LAST FEW WEEKS IN THE FORM OF PARTS OF MESSAGES FROM A COMMERCIAL SERVICE. THE DEPARTMENT HAVE BEEN INFORMED AND THEY ARE INVESTIGATING IT. THE INTERFERENCE APPEARS SIMILAR TO THAT WHICH OCCURED AROUND APRIL 1982, AND WHICH WAS SUCCESSFULLY TRACKED DOWN AND ELIMINATED BY THE RADIO BRANCH. THE CAUSE WAS A FAULTY COMMERCIAL VHF BASE STATION IN THE WOLLONGONG AREA.

A MEETING WAS HELD OF ALL REPEATER COMMITTEE MEMBERS ON WED. 16/5/84 TO DISCUSS THE FUTURE OF OUR REPEATERS. BASICALLY THE OUTCOME WAS TO GET STARTED ON THE DUPLEXERS FOR THE 2 METRE REPEATERS AND THE MICROPROCESSOR FOR 7275.

AFTER DISCUSSIONS WITH OTHER REPEATER GROUPS IT SEEMS THAT THE DUPLEXER IS THE MOST TIME CONSUMING AND EXPENSIVE COMPONENT IN A REPEATER INSTALLATION, AND WE ARE ONE OF THE FEW GROUPS NOT USING DUPLEXERS. IT IS NOT A NECESSARY ITEM AS A REPEATER WILL FUNCTION QUITE WELL WITH TWO SEPARATE AERIALS AS LONG AS THEY ARE SPACED FAR ENOUGH APART. ALL OF OUR REPEATERS ARE NOW DEVELOPED TO THE STAGE WHERE THE ADDITION OF A DUPLEXER COMBINED WITH A SINGLE HIGHLY EFFICIENT AERIAL WILL GIVE SIGNIFICANT IMPROVEMENT IN PERFORMANCE.

WE ALREADY HAVE MOST OF THE MATERIAL WHICH HAS BEEN GATHERED OVER A PERIOD OF SEVERAL YEARS, AND WE ARE NOW LOOKING AT WAYS AND MEANS OF CONSTRUCTION.

WE HAVE HAD A GOOD RUN LATELY WITH MINIMUM TIME BEING SPENT ON MAINTENANCE AT THE REPEATER SITES. THE CORROSION PROBLEM MENTIONED LAST MONTH AT THE SITE OF 8225 AT HILL 60 IS BEING FIXED. 8225 WILL SOON BE CONNECTED TO EMERGENCY POWER THAT IS BEING INSTALLED FOR THE OTHER COMMUNICATIONS EQUIPMENT AT THE SAME SITE... NOT THAT THIS IS SO IMPORTANT, AS THE MAINS SUPPLY IS FAIRLY RELIABLE AND THE FEW BLACKOUTS IN THE PAST HAVE LASTED NO MORE THAN A COUPLE OF HOURS. INCIDENTALLY, ALL THE OTHER REPEATERS ARE RUNNING ON FLOAT CHARGED BATTERIES AND SO ARE INDEPENDANT OF SHORT TERM POWER FAILURE.

GRAEME VK2CAG

UHF KILOMRE KONTEST RESULTS.

RESULTS SO FAR FOR THIS MONTH...

NAME	CALL	JAN	FEB	MARCH	APRIL	MAY	JUNE	TOTAL
REG	VK2EMI	5	4	5	5	-	-	19
IAN	VK2EXN	4	3	4	4	-	-	15
LYLE	VK2ALU	3	-	-	-	-	-	3
GRAEME	VK2CAG	2	2	2	3	-	-	9
ROY	VK2KO	1	1	1	1	-	-	4
MORRY	VK2EMV	-	-	3	2	-	-	5

LOOKS AS IF REG HAS IT ALL TO HIMSELF.. CAN IAN CATCH HIM?

TUNE IN NEXT MONTH TO SEE IF THIS IS POSSIBLE..

73 DAVE VK2EZY,...

Moonbounce Report - June 1984.

Further optimisation of the signal to noise performance of the GAT6 preamplifier, using the low level signal source, resulted in echoes some 3 to 5dB above noise, but improvement is still possible.

Tests on 6/5/84 resulted in an EME contact with K2UYH, who was initially 'M' copy, then improved to 'O' copy. W8NLC was heard, but not strong enough for a contact - 'T's were sent. VE7BBG was then heard calling CQ on 1296.010MHz. He was called and a contact resulted, with 'O' grade signal reports being exchanged. ZL3AAD later reported that he was hearing VK2AMW at good signal strength and called us during a break in the test period but we did not hear him. Ian VK2EXN assisted once again during the tests .

The microcomputer controlled dish pointing readout system has been all-but completed as a University student project. It provides local hour angle and declination of the moon as screen readout and hard copy printout at any selected time. When 'continuous' mode of operation is selected the dish hour angle pointing direction is sensed by means of the position of a precision potentiometer which is gear driven from the main drive shaft. This is correlated with the moon's position as generated from the synthetic orbit by the computer. The readout indicates error angle and is updated each 2 seconds. If the error angle is less than 0.8 degrees the readout shows that tracking is correct. The printer continues to give the moon's hour angle and declination each one or more minutes, as selected.

The gear drive system will be installed on the dish as soon as practicable.

Lyle VK2ALU.
(Moonbounce Coordinator.)

A.N.A.R.T.S. ANNUAL GENERAL MEETING.

The A.G.M. of the above took place on Friday 1st June 1984 at the Power House Museum, Ultimo. A good roll up of members was pleasing to see. A number of members from this club nominated for positions on the committee of ANARTS, and were successful in the voting, a list of the positions and persons filling them is below,

PRESIDENT:	Terry Page	VK2KTP	(Sydney)
VICE PRES;	Dave Myers	VK2DFL	(Illawarra)
SEC/TREAS:	Allan Fall	VK2?	(Sydney)
COMMITTEE:	Mike Keech	VK2DFK	(Illawarra)
	Ray ball	VK2XCC/PHD	(" ")
	Bruce Beresford	VK2RT	(Engadine)

PUBLICITY OFF: Not Filled. To be filled at a later date.

As can be seen the members from this club now hold the balance of voting as regards the future of ANARTS. It is hoped that the R.T.T.Y & associated modes will benefit from some new ideas from the new committee. If the roll up of members to an AGM is any pointer then I see a good future indeed.

MODES OF CHANGE

Ian Eddy VK2IE.

I was reading the February issue of 73 last week. In it was a summary of a B.A.R.T.G. survey which stated that 65% of thier members were still using mechanical machines in the shack and that 34% were using computers, and over all 5% were using AMTOR. They went on to say B.A.R.T.G. is proposing for consideration at the next I.A.R.U. Region Conference later this year.....

- * The adoption of 10-bit ASCII Code using odd or even parity.. 1 start, 7 data and 1 stop bits.
- * Adoption of CCIR-476-1 at 100 baud (AMTOR) as the International Amateur Standard for Error Correcting Code.
- * Adoption of 50, 75, and 100 Baud R.T.T.Y. speeds (no further 45.45 Baud speed).
- * Drop voice and CW Identification when using R.T.T.Y.
- * Adoption for Amateur Mailbox operation protocol based on Viewdata... (Vidieotex).

Looking at the mechanical/computer percentages, they would be about the same as to be found in Australia. In America the computers are breaking down into the 45% fig. We can expect a lot more computers to start getting onto the bands in the next few years. The 'Lap' computers from Apple and IBM in the states are starting to get out into the shops now with High Memory, RS232 Ports and built in modems. They will find themselves at home in the shack very quickly.

Programs are things that cause a lot of people problems. Bruce VK2RT thru the ANARTS B/Casts asked listeners to send in any RTTY programs for various computers, so that the organization could help others get up and going with computers. The response was good as normal 'A BIG ZERO'....

Bruce is still looking to start up a RTTY Software Exchange, not so much for ANARTS, but for RTTY people in general. I have some C/PM progs available either via a Modem or by a supplied 8 inch Disk SSSD. If I can help anyone, let me know..

Software proliferation at this time, is time consuming and expensive.. By this I mean, on a Modem from Wollongong to Sydney costs money. The other way is on Disk through the mail which can be a bit slow. PACKET RADIO will fix this up, it will Interface both RTTY machines and ASCII Terminals. This will give amateurs the ability to send and recieve RTTY like information, qso's etc. It will also allow the computer operator to exchange programs under system control, or like the RTTY operator, chat to another computer. Packet radio communicates at 1200 Baud and is similar to AMTOR, in which it checks errors and corrects, the difference is that Packet IS error free, Amtor is virtually error free.

As far as cheap computers are concerned, if you look at an up and coming article in 'AREWISE' on the Apple Copy computer, it details the prices of the Apple Copy. These are a cheap computer and work equally as well as the original. I should probaly say at this point and that is, the apple is based on the 6502 CPU chip using a 1Meg crystal, which makes the computer 'Slow' as far as some of the more dedicated ones, 'Ferguson big board' but as a starter or first computer it does work extremely well with plenty of add ons available.

As can be seen with the proposals to the IARU Conference, you can see they are out to set 'thier' standards up and running, the ASCII standard is a.. FURFY.. They are looking at standardising 'their' Amtor (well they did re-invent it) . While on Amtor, there are a few stations now around that have found that it is not the thing it was cracked up to be by those who were pushing it the hardest up in Sydney.

/2

You still have to have a good signal to tune it in, the unit then has to Synchronise itself with the other station, then after that you might get some good copy through between all the resynching, you do need a good antenna rig, TU and Amtor unit to get good Amtor results. It comes down to signal to noise ratio at the front end of the TU, if its good, Amtor and RTTY are good. When its poor Amtor 'slows down' and RTTY stops and a little after, Amtor stops. Reason the TU has to present a signal to the Amtor unit, if its full of noise (poor signal to noise), then the Amtor unit cannot do much with the signal, so its either 'erroring' or 'synching'.

45 Baud, well its getting a bit old now, so it could be time its put to bed. Then look at normal typing speed, not too many people can type at 45 baud let alone at 50 baud.

Identification, well, who uses it now in Australia anyway. That has been with us for some time now.

I will, in future articles be writing more on Packet Radio and what it will be able to do for us here in Australia. This mode of operation is just starting here, although there are some 700 odd stations on air now Internationally. The unit I am looking at is the GLB PK1, this unit will accept a 45 baudot machine or Ascii Terminal (eg: computer, printer or VDU) which can run at speeds up to 9600 baud. The on air speed of Packet is 1200 baud, using the ascii code. Packet radio is error free in its operation. It can be used for transmitting for example, RTTY Pix on air to another station error free or exchanging computer programmes on air, either out of the cassette port of your computer or using a computer port and a communications program. I will also be presenting some ideas for which Packet can be used in the shack...

Cheers, Ian VK2IE.

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FOR SALE.

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This article is based on the TU I, a c.w./RTTY interface for the Apple II computer which appeared in last November's RTTY Special issue. WA7HRA now expands his horizons and ours by interfacing the VIC-20 and Commodore 64 for RTTY and c.w.

The TU II Interface for the VIC-20 and Commodore 64 Computers

BY BOB HART*, WA7HRA, AND BOB BURNS†, K1RB

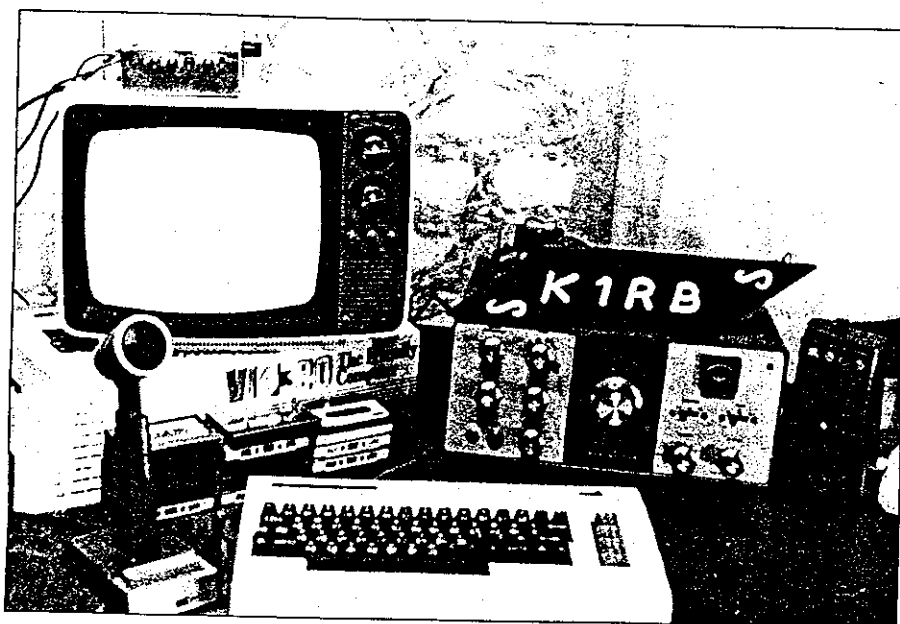
Price and availability of the Vic-20 and Commodore 64 personal computers have created as much of a stir in amateur radio as the proposal for a code-free license. Amateurs across the land are rationalizing that they need these fine little units to manage the family budget, educate the children, and, of course, play an occasional game. However, lurking in the back of their minds is the urge to join the fun on the RTTY bands and operate some keyboard c.w.

As all computer neophytes learn in a hurry, a computer without software is about as useful as an automobile without an engine. Visions of writing one's own program for RTTY rapidly vanish with the first exposure to FOR . . . NEXT, and the myriad of other commands in the new computer language. Fortunately, the Vic-20 has been around long enough for commercial programs to become available to the user.

Two such programs are the Kantronics "Hamssoft" program board (firmware) and the RAK Electronics "Vic RTTY/CW II" cassette (software). Both programs have their pros and cons.

The Kantronics program comes on a board that plugs into the memory expansion port. It costs \$49.95. The major advantage of this program is that it requires no additional memory beyond that which comes with the basic Vic-20. Whenever the card is in place, it is instantly available to the user. Newer versions have the option of storing user-programmed messages on tape via the cassette recorder. Although Kantronics in no way guarantees the performance of the program with any hardware other than their own, it worked great with the TU II.

The RAK Electronics cassette costs \$29.95. It requires the Vic-20, 8K memory expansion board. For those who already



The TU at work in the shack of K1RB.

have the memory expansion, there is the obvious desirability of the price. It retains the user-programmed messages on the tape and offers the distinct advantage of your being able to make whatever program changes you may desire, which is a real plus for individualized operation. For those who have a disk drive, the program can easily be down-loaded to a disk.

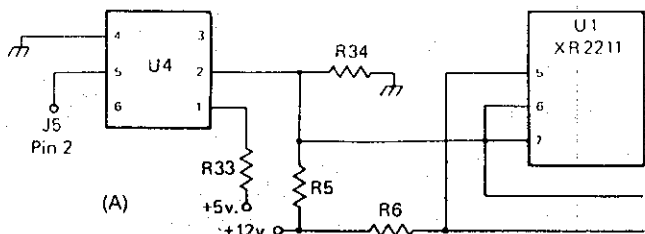
The TU II [CW/RTTY Apple II interface described in November 1982 CQ can be used to tie the computer to your amateur transceiver. The unit can be used with minor modification (see fig. 1). The only other requirement is a "patch" cable. A technical description of how the terminal unit works can be found beginning on page 18 of the above issue. Pin numbers listed for Apple are, of course, different for the Vic-20.

TU II was originally designed to take all its power from the computer. Vic can and should supply the required +5 v.d.c. in order to maintain TTL voltage compatibility. However, there is no convenient

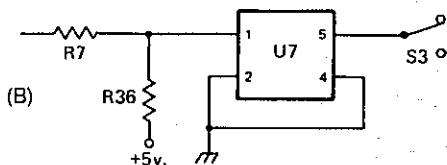
source of +12 v.d.c. Vic can supply an unregulated +9 v.d.c., but the performance of the XR-2211 tone decoder is significantly degraded for weak signal decoding when +9 v. is used in place of +12 v. Therefore, an external power supply is required. One of the inexpensive power supply cubes such as those used to power cassette recorders and calculators can be used. Install a jack on the TU II cabinet with the positive conductor running to the +12 v. supply side of switch, \$4. Be certain the shell of the jack is grounded to the cabinet and the pc board. During alignment of the TU, listen to the output of U2 at J2 with an earphone. Some power cubes have quite a bit of a.c. hum. If you do not have a pure tone output, you will not be very popular on the air.

The patch cable can be made from ribbon cable or multiconductor cable, such as antenna rotator control cable. If r.f.i. becomes a problem, shielded cable (grounded at both ends) will be required. Use some care when selecting cable

*1835 E. Main St., El Cajon, CA 92021
†17 Whitman Ave., P.O. Box 6, Whitman, MA 02382

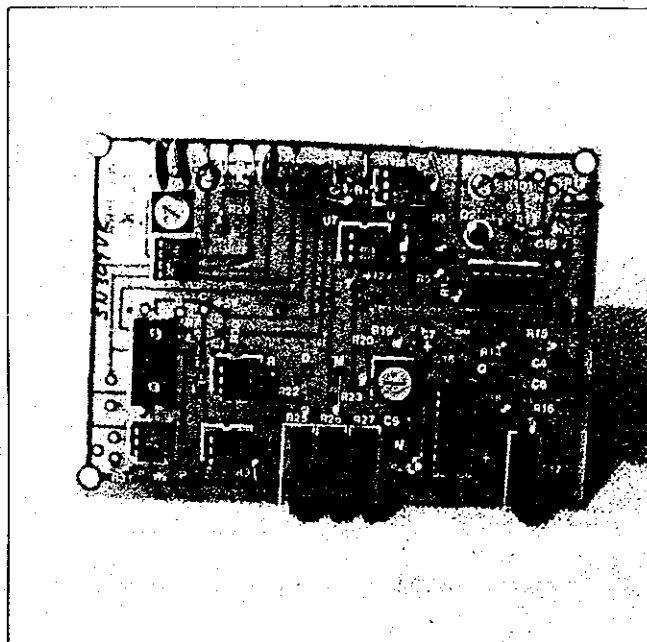


(A) Vic-20 is normally high during "mark." When the mark tone at pin 6/7 of U1 goes low on space, U4 turns on, which drives the RTTY demodulator line to Vic to the low state. Component changes for Vic-20 version are: R1, R3, C1 are deleted; U4 changes to 4N33; U5, U8 change to 4N33. The following are added: R33—470 ohm; R34—6.8K ohm.



(B) A pull-up resistor is required on the key line to U7 to ensure positive action with the Kantronics program. The RAK program will function with or without the resistor. The following are added: R36—2.2K ohm, R7—value changed to 220 ohms.

Fig. 1— Modifications to the original diagram which appeared in last November's issue (page 19).



A close-up look at the completed PC board.

lengths. Multiples of 12 and 18 inches make excellent antennas on 220 MHz and 2 meters. If you plan to operate on these bands, you can really frustrate Vic's efforts by introducing r.f. to the "innards." Tests at WA7HRA indicated no problem up to 90 watts output on c.w. in the h.f. bands. At that point the computer was swamped with radiation from the transmitter. RTTY at 100 watts did not cause a problem. A connector to match the Vic is required on one end, and a 16 pin dip connector is required on the other. Fig. 2 contains a chart of the pin-outs for the cables. Note that the cable for Kantronics requires some additional switching.

When installing the dip connector in the TU J1, be certain to get pin 1 in its proper position. An error in installation will put +12 v. to ground. To avoid this unhappy event, you can cut pin 9 off the dip connector and put a drop of glue in socket 9 of J5. Pin 9 is unused, and the simple modification may prevent a disaster. Also, the edge connector can be installed upside down with disastrous results. Identify the top.

Adjustment of the TU is much the same as in the referenced article except for the lack of a tuning indicator on the screen. Preliminary adjustment of the c.w. decoder, U3, can best be accomplished by using your receiver to generate a tone that falls within the pass band of the c.w. filter or at the frequency to which you normally listen. To generate a tone, turn on your crystal calibrator or tune for a broadcast heterodyne on 40 meters. Feed the signal to the audio input, J1. Adjust R28 to light D1.

Adjust R17, R21, R25, R26, and R27 as

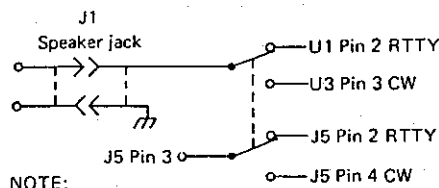
in the referenced article. Since the carrier detect output from the XR-2211 RTTY tone decoder (which lights D2) and the phase-locked-loop in the chip (which activates U4) are not always in exact syn-

chronization, it is a good idea to make a tape recording of a string of RY's at the output of J2, and then play the recording back into J1. While watching the printout on the screen, slowly adjust R17 until per-

Use	TU J1	Kantronics Game I/O	Kantronics User I/O	RAK Elect. User I/O
+5v.d.c.**	1	7	2	2
RTTY in	2	*	*	B & C
Switch S1	3	6	7	—
C.W. in	4	*	*	D
Ground	8	8	1	1
C.W. out	13	3	6	K
Push-to-talk	14	1	4	J
RTTY out	15	2	5	M

*Combine pins 2 and 4 on J5 with S1B to give a single switchable input to pin 3 of J5 to be fed to pin 6 of the Game I/O or pin 7 of the User I/O.

**Connect a .01 disc capacitor to ground at the Vic end to bypass r.f. from the computer.



NOTE: Switch S1 = DPDT (may be combined with S4 on a 4PDT center off)

Cable "pin-outs" are shown for Kantronics' "Hamsort" using either the Vic Game I/O or the User I/O. RAK's "Vic RTTY/CW II" uses only the User I/O. The Game I/O requires a 9-pin D-subminiature female connector (CW Industries CA-09-97 or equivalent). The User I/O requires a 24 pin edge connector (TRW 251-12-30-160 or equivalent).

Note: A User I/O cable kit is available from WA7HRA for \$10. Also available are drilled and silk-screened pc boards, \$10, and a complete set of pc board components and switches (not including the board), \$50. Send check, money order, or Visa/MC (including expiration date) to: HRA-Vic, P.O. Box 571, Hoodsport, WA 98548. Washington residents include sales tax. Add 5% for shipping to U.S. and Canada; others add 10%.

Fig. 2— Pinouts for the interconnecting cables.

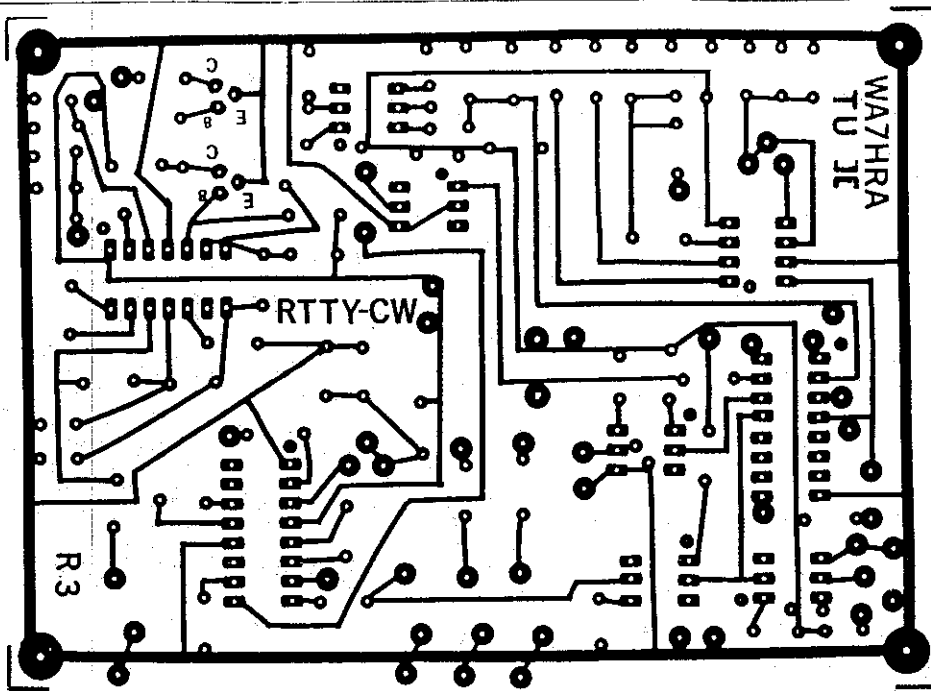
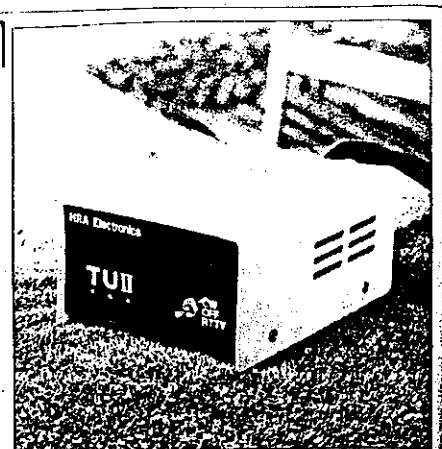


Fig. 3— Full-size PC board artwork for the interface.

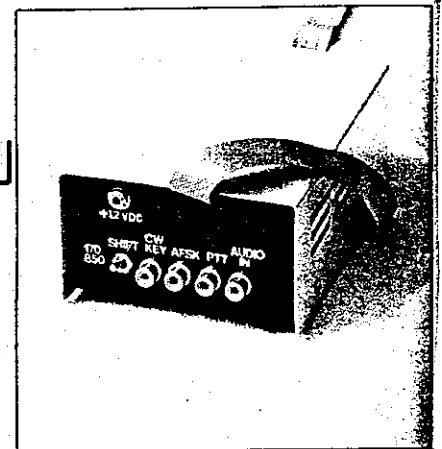
fect copy is achieved. Note the position of the screwdriver. Continue turning until you do not get perfect copy. Reverse the direction until you again print perfectly. Again, note the position of the screwdriver. Now, set R17 halfway between the two points. This procedure will assure that the mark tone generated by the XR-2206 and the mark tone detect in the XR-2211 are both on the same frequency.

If you are operating on a v.h.f./u.h.f. f.m. repeater, you may have to fine tune R17 to get on the exact repeater output.

You are now ready to complete the interface. Refer again to the referenced article for the simple hookup to your radio, and soon will find yourself in one of the fastest growing modes of amateur operation. Be careful, though. Don't get bitten by "the quick brown fox."



Front view of the TU as available from HRA Electronics.



Rear view of connectors on the completed HRA unit.

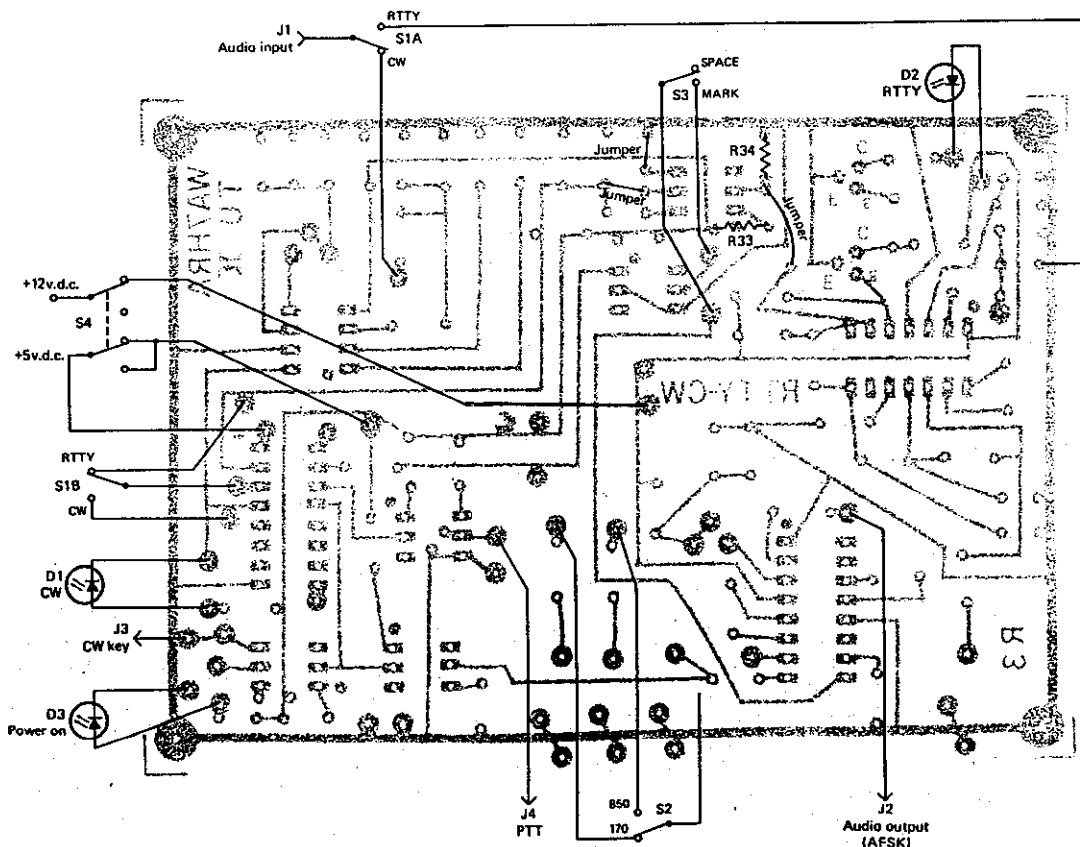


Fig. 4— Parts placement and layout for the interface.

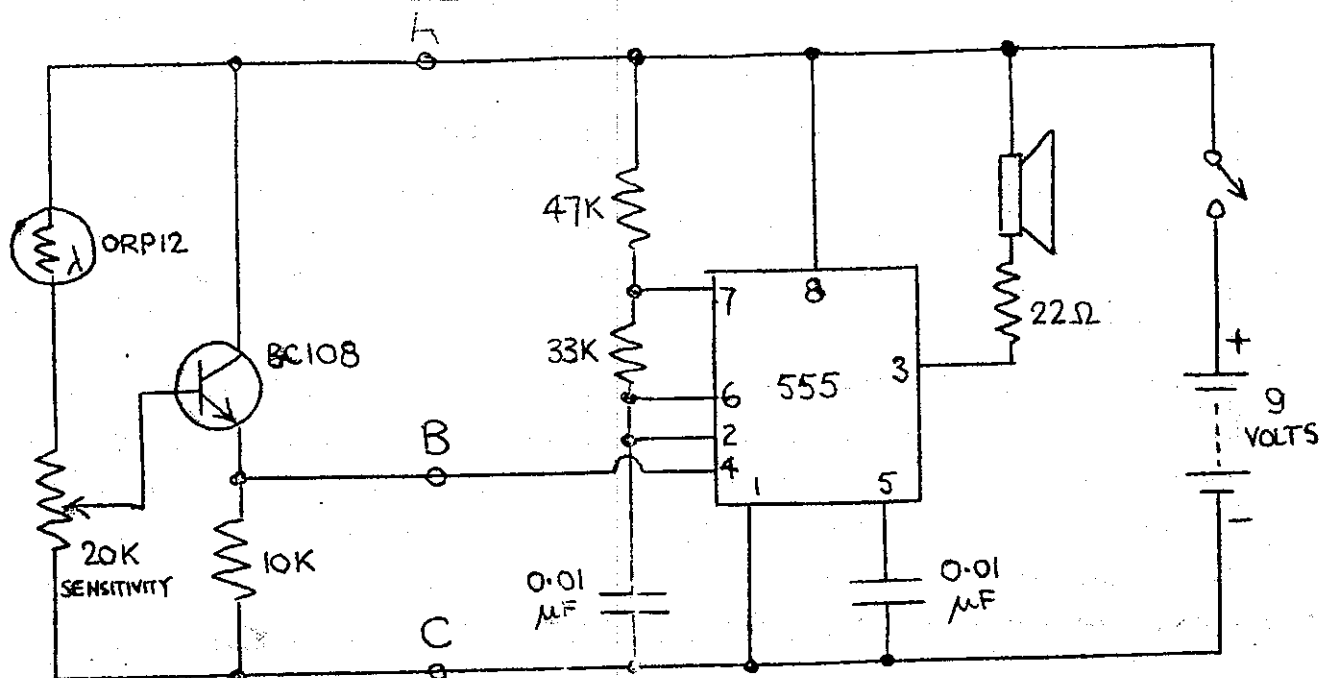


FIGURE 1

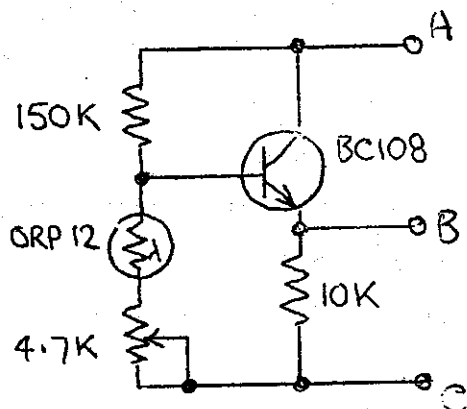


FIGURE 2

1. Production of sound when a light turns ON:

Make up the circuit in figure (1). When light strikes the light-dependent resistor (LDR) (an ORP12 or similar), its resistance becomes quite low. It conducts more current, which increases the base voltage of the BC108. The transistor turns on, causing pin 4 of the 555 to rise above its threshold voltage of about 0.7 volts, and sound is produced by the speaker.

Use the 20K potentiometer to adjust the sensitivity so that the circuit switches reliably when the light turns on and off.

This circuit can be used as (a) an "optical" burglar alarm, which goes off when a dark cupboard, etc is opened; (b) as an optical morse code receiver - use lenses to focus a distant flashing light onto the LDR; (c) as an ordinary oscillator, with wires A, B, and C disconnected.

2. Production of sound when a light is turned OFF:

Break the circuit in figure (1) at A, B, and C. Substitute the circuit shown in figure (2). Adjust the 4.7K potentiometer so that the oscillator just turns off when light shines on the LDR. When light is removed, the oscillator will sound.

This circuit can be used as a "door-minder" - when a customer (or burglar) breaks the beam of light shining on the LDR, the oscillator sounds.

THE PERTH WIRELESS MUSEUM

During a visit to Perth at Easter, Dave VK2YKQ learnt about a wireless Museum which at the time was unfortunately closed. Dave was lamenting the fact to me on his return, so I promised him that given the opportunity I would let him know what he had missed.

Recently I visited the city of Perth and took the chance missed by Dave and am happy to report that this is a must-see if you are in Perth. The Museum is situated on a hill overlooking Perth, and is appropriately called "Wireless Hill". The site is surrounded by a very large park with some excellent examples of many plants found only in WA.

The Museum itself is one of the original AWA Shortwave stations and built in the early days of wireless. It is interesting to note that the original very large antenna was completely isolated from ground by having the mast supported by a very large GLASS Insulator (about 2 feet in diam).

The displays are very impressive and include:....

- 1) A complete range of receivers starting with very early homemade crystal sets in the original Cedar cases, early valve receivers with the original OA2 valves, right up to the beer can radios of today.
- 2) The original Traeger Pedal Wireless, used for the Royal Flying Doctor Service and the first AM Traeger Pedal Wireless.
- 3) Both valve and solid state Television cameras, control consoles and transmitters.
- 4) An early AM 20KW MW radio station transmitter, and a 100KW Short Wave (ex Radio Australia) transmitter.
- 5) An early PDP Digital Computer with all the fancy blinking lights.
- 6) A very good Satellite Communications display.

In addition there is a display which is changed from time to time. So if you are in Perth, this is a must-see for anyone interested in radio and especially if you are interested in the history of RF communications.

DE Denis VK2DMR.



DON'T FORGET!

NEW MEETING PLACE: S.E.S. HQ, MONTAGUE ST. Nth. GONG.

"SECOND TUESDAY" OF EACH MONTH!

VISITORS WELCOME—
— BRING SOME FRIENDS.

BE THERE!

7:30 PM.

FROM LAST MONTH

TECHNICROSS SOLUTION NO.6

1	R	2	D	3	A	4	C	5	O	6	U	7	S	8	T	9	I	10	C	11	S		
8	E	M	I	T	H	S	U	O															
5	S	S	R	E	T	U	R	N	I	N	G												
10	I	O	T	A	F	R	E	E															
13	S	O	P	A	P	E	R														13	W	
14	T	A	R	G	E	U																	
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Square wave oscillator

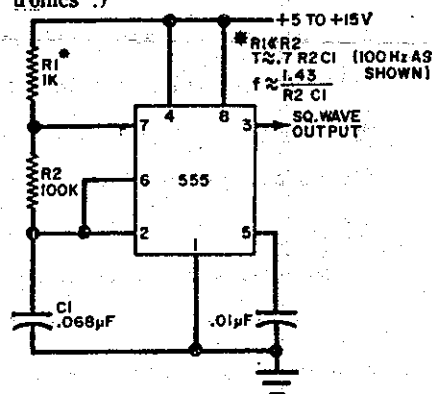
A conventional astable circuit using a 555 IC does not normally produce a symmetrical output waveform. However, square waves can be obtained from a 555 by using the simple circuit shown here.

The symmetry of a conventional astable circuit is a result of the fact that the charging and discharging time constants are not equal. If the timing capacitor can be charged and discharged through the same (or equivalent) resistance value, the symmetry can be restored.

In this circuit, the capacitor C1 is charged through R1 and R2 and it is discharged through R2. If R1 is made very small in resistance compared with R2, then both time constants will be reduced so that they depend essentially on R2 and C1.

The frequency of operation of this circuit is approximately equal to 1.43 divided by

the product of R2 and C1. The frequency is of course independent of the supply voltage. (By Walter G. Jung, in "Popular Electronics".)



SUBSCRIPTION TO THE ILLAWARRA AMATEUR RADIO SOCIETY

Attached is \$10.00 (\$5.00 Pensioners & Junior) in payment for membership for the period April 1984 to March 1985.

NAME:

ADDRESS:

POST CODE:

CALL SIGN IF ANY:

WIA MEMBER: YES _____ NO _____

DO YOU WANT TO JOIN WIA YES _____ NO _____

WANT QSL CARDS AT MEETING YES _____ NO _____

WIA MEMBERS ONLY.

NB: Receipts will be available for collection at following meeting. If postage required please enclose SAE.

I hereby absolve the Illawarra Amateur Radio Society from any responsibility with respect to accidents or personal injury occurring during any function or meeting of the Society.

Signed:

Please sent to: The Honorary Treasurer,
Illawarra Amateur Radio Club,
P. O. Box 1838,
WOLLONGONG. N.S.W. 2500.

THE ILLAWARRA AMATEUR RADIO SOCIETY - P. O. BOX 1838 WOLLONGONG 2500

Meetings: Second Tuesday of every month except January at 7.30 p.m. in the S.E.S. Headquarters, Montague Street, North Wollongong. Committee Meeting - 3rd Tuesday of each month.

Repeaters: VK2RAW - 6850 VHF Mount Murray. VK2RIL - 7275 VHF Sublime Point.

VK2RUW - 8225 UHF Hill 60 Port Kembla. VK2RIL - 8725 UHF Sublime point.

Broadcasts: On Sunday night prior to Club Meeting - 7.00 p.m. - RTTY on 6850 and 7275 VHF Repeaters; 7.15 p.m., Voice on 6850 VHF, 7275 VHF and by relay on 3.562 Mhz. Call backs after the WIA relay at 7.30 p.m.

W. I. A. Relay: On 6850 VHF at 11.00 a.m. and 7.30 p.m. weekly on Sunday.

Club Nets: 3562 MHZ SSB on Sunday at 8.00 p.m. and slow morse net on 28.440 Mhz on Tuesday at 8.00 p.m.

Newsletter: "The Propagator", published monthly to reach financial members in week prior to meeting. All articles, ads etc. to the editor, Dave Myers VK2DFL at 30 Highlands Pde. Bulli 2516. Telephone 84.9404. Copy deadline 3rd Tuesday each month.

Membership: The Secretary, I.A.R.S. P.O. Box 1838, Wollongong 2500. Full membership is \$10.00 per annum; students and pensioner concessional members \$5.00 per annum.

Awards: The award of the I.A.R.S. is "The Lawrence Hargrave" award. VK stations require 10 contacts with I.A.R.S. members; overseas stations require 5 contacts with I.A.R.S. members or contact with the Club station VK2AMW is sufficient in itself for the award.

Band details - time, day, date, frequency, station worked + \$2.00 or 4 I.R.C.'s to Award Manager, I.A.R.S., P. O. Box 1838, Wollongong 2500. No QSL cards required.

Store: The Club store operates at each Club meeting.

Committee: President - Dave Myers VK2DFL, 30 Highlands Pde., Bulli.

Vice President - Keith Curle VK2OB, 24 Beach Drive, Woonona.

Secretary - Murray McConnell VK2MY, 62 Ramah Avenue, Mt. Pleasant.

Treasurers - Geoff Cuthbert VK2ZHU, 2 Nioka Avenue, Mt. Keiraville.

- Andrew McEwan, 7 Nioka Avenue, Keiraville.

General Committee: Mike Keech VK2DFK, Ian Callcott VK2EXN, Ray Ball VK2XCC, Morry Van De Vorstenbosch VK2EMV, Jim Mead VK2EJM, Gerard Mueller, Roy Parton VK2KO, Jim Hayes VK2JIM.

Repeater Chairman: Graeme Dowse VK2CAG.

Repeater Committee: Mike Keech VK2DFK, Morry Van De Vorstenbosch VK2EMV, Ian Callcott VK2EXN, Dave Colless VK2EZY.

EME Co-ordinator: Lyle Patison VK2ALU.

Broadcast Officer: Dave Colless VK2EZY

QSL's IN: Mike Keech VK2DFK and OUT: Ian Callcott VK2EXN.

Propagator Editor & Staff: Dave Myers, Editor VK2DFL, Ken Frost VK2DDI, Cartoonist Brian Wade VK2AXI.

Store: Ray Ball VK2PHD/XCC

Publicity Officer: Nora Fisher, 17 Elizabeth Street, Mangerton, 2500.

Awards Manager: Jim Hayes VK2JIM

Life members: Graeme Dowse VK2CAG, Keith Curle VK2OB