
THE PROPAGATOR

MONTHLY NEWSLETTER OF THE ILLAWARRA AMATEUR RADIO SOCIETY

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NOVEMBER 1982

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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.

AUCTION

NOTICE OF MEETING: The November meeting of the I.A.R.S. will be held on 8th November at the Congregational Hall, Wollongong, and will be the occasion of the Annual Auction to be conducted by Denis, VK2DMR. So dig out all that unwanted gear and turn it into money. What you don't want someone else can probably find a use for.

LAST MONTH'S MEETING: Over 60 members and several visitors were at the meeting held on 11th October in the Congregational Hall. Matters discussed included arrangements for the JOTA weekend, and the meeting was told that the power box at Bass Point had been destroyed by vandals. It is hoped instead to make use of a generator supplied by Eric VK2YVF, (see separate report).

Full call holders were told that morse operators were required to conduct the morse sessions on 2 metres every evening - 15 minute segments and it's all on tape. If you can help, please contact a Committee member (see back page).

Reference was made to the apparent bad feeling at the use of the repeater for RTTY, also covered in last month's Propagator. It was pointed out that the repeater is for any mode, not just voice, and RTTY is allowed to be used. If there is any disagreement on this, please discuss the matter with the Committee.

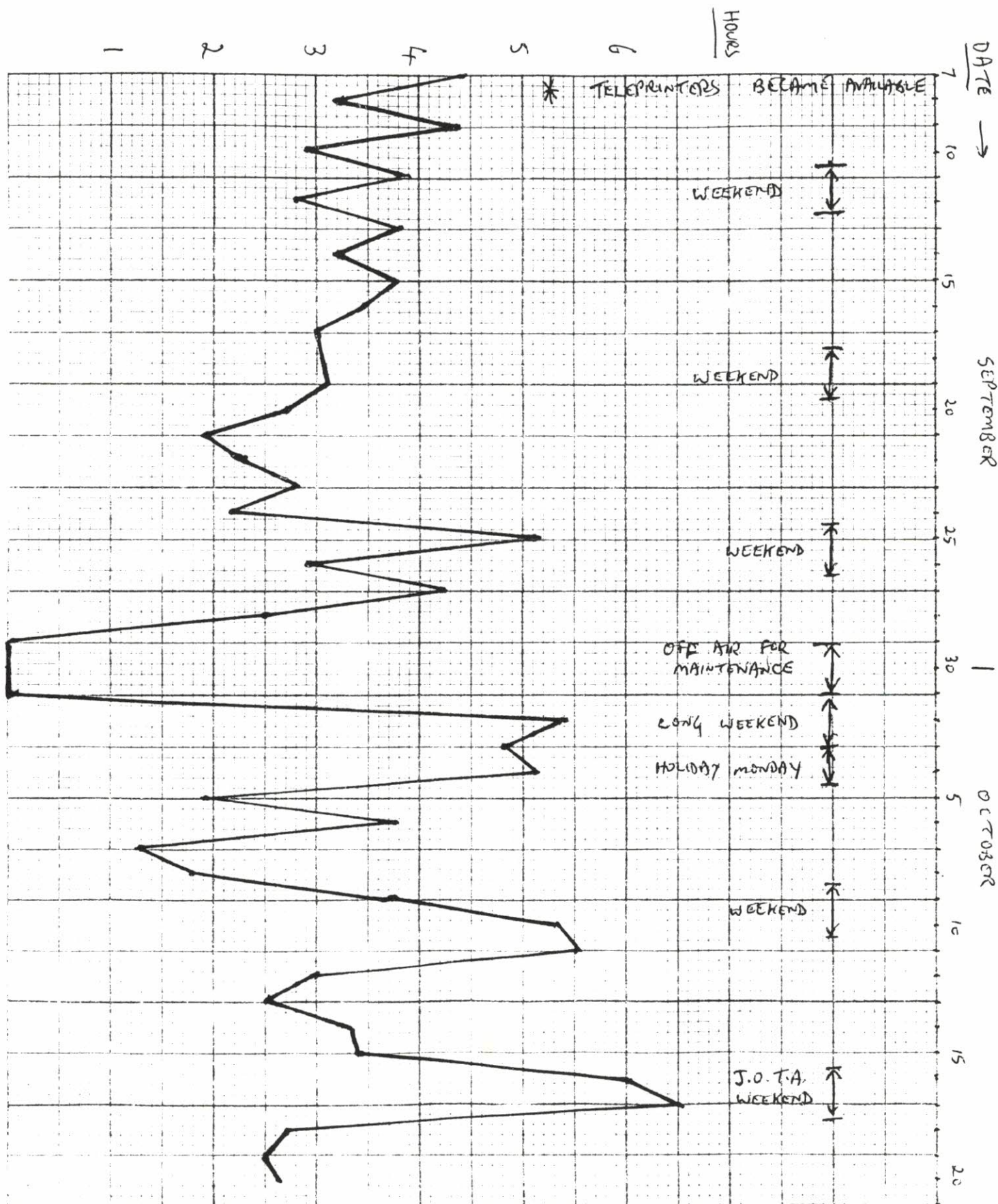
In reply to the request by Denis VK2DMR in last month's Propagator for information on the Siemens method of measuring motor speed, Ken VK2DOI told the meeting that Telecom's method was to use a special 125 c/s tuning fork as a strobe, and he gave Denis a 227 c/s LED flasher timing light he had made up for evaluation. If it proves successful, details in a future Propagator.

The raffle prize of an Esky was won by a visitor, Anthony.

Sid Molen VK2SG, President of ANARTS (Australian National Amateur Radio Teleprinter Society) then gave an interesting and humorous talk on the history and objectives of the Society which gained some 17 new members from those present. He described the types of demod. equipment available, the best being the DT6 at \$72, although another one in the pipeline, the IC 1000, will cost \$450. Sid mentioned the lack of co-operation ANARTS had so far received in its efforts to affiliate with the federal WIA, from whom news items are required. ANARTS, with a present membership of some 200, is prepared to help if technical or mechanical assistance is required.

Ian Eddy VK2DGA, who is employed by Telecom at Haymarket Telex, then gave a technical outline of RTTY, including such esoteric concepts as 'Diddle' and 'Anti-Diddle', leaving some of us well out of our depth. The meeting closed with the usual refreshments.

GRAPH SHOWING USAGE OF CHANNEL 5
 REPEATER FOR THE PERIOD 7.9.82. TO 20.10.82.



PHOTOTACHOMETER FOR RTTY

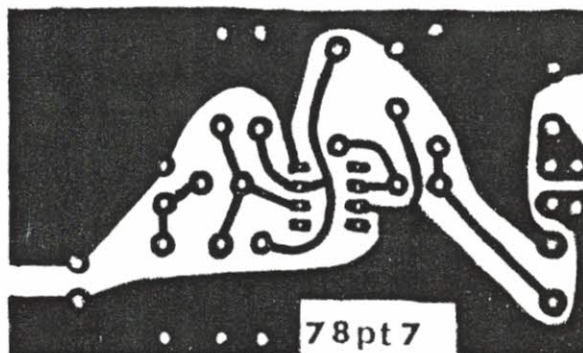
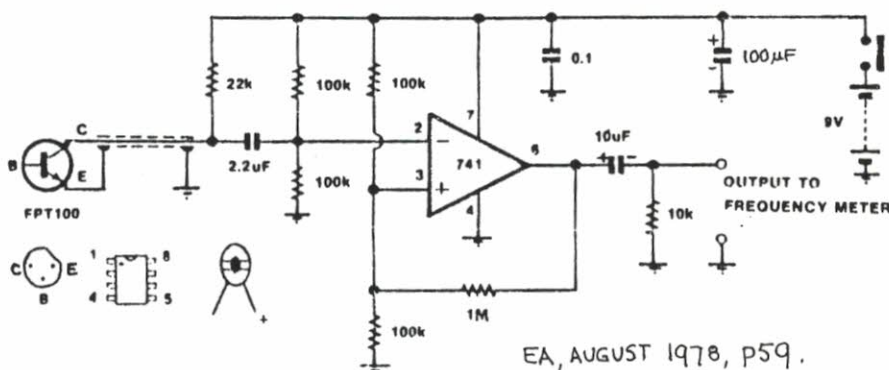
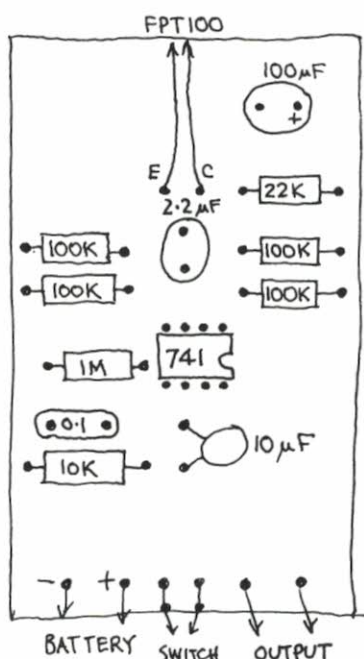
Brian, VK2AXI.

One approach to the problem of measuring the motor speed of a teleprinter was described in Electronics Australia, August 1979. A phototransistor is placed near the rotating governor cover, and the pulses obtained are amplified and squared up by a Schmitt trigger circuit using a 741 i.c. The output is fed into a digital frequency meter.

The device seemed to work quite well when held close to the four white arrows on the governor cover, provided they were fairly brightly lit. Since there are four pulses per revolution, the pulse rate (in Hertz) or the period (in microseconds) for motor of the M100 teleprinter should be:

Baud Rate	Motor Speed (rpm)	Pulse Rate (Hz)	Pulse Period (microseconds)
50	3750	250	4000
45.45	3409	227	4400

The circuit diagram, PCB pattern (copper side) and component layout (from the component side) are shown below. The E.A. article specified a 2.2 μF bipolar electrolytic capacitor between the collector of the phototransistor and pin 2 of the 741; I didn't have one to hand, so used two 10 μF electrolytics in series, with their negative leads joined together and their positive leads connected into the circuit.



MOONBOUNCE REPORT NOVEMBER 1982

ANOTHER WORKING DAY AT THE DISH ON SATURDAY 23RD OCTOBER SAW SIX CLUB MEMBERS AND 2ZAG'S SON PHIL, BUSY FOR SEVERAL HOURS. THE ACCESS PLATFORM REPAIRS WERE COMPLETED, RUST REMOVED FROM INSIDE THE RECEIVING CUBICLE, DISH DRIVE MOTORS HOISTED BACK INTO POSITION, SLOW DRIVE CLUTCH SOLENOID REMOVED FOR REHABILITATION BY THE UNIV. WORKSHOP, DRIVE GEARBOXES OPENED UP FOR FLUSHING OUT, OPERATING ROOM TO DISH CABLES ALL IDENTIFIED AND DISH DRIVE CUBICLE CABLE FUNCTIONS IDENTIFIED AND THE CABLES TAGGED.

DURING THE PREVIOUS WEEK, WORK HAD BEEN CARRIED OUT BY CLUB MEMBERS ON RUST REMOVAL AND PAINTING OUT OF THE TRANSMITTING CUBICLE AS WELL AS PAINTING THE TIMBER FOR THE ACCESS PLATFORM STEPS AND PLATFORM, INSTALLING THE STEPS AND MAKING UP AND MOUNTING CONTROL CABLE TERMINATION BLOCKS, READY FOR INSTALLATION AT THE DISH DRIVE CUBICLE AND TRANSMITTING CUBICLES.

MOST OF THE PRELIMINARY WORK HAS BEEN COMPLETED AND THE REAL INSTALLATION JOB IS NOW COMMENCING.

IT IS PROPOSED THAT THE NEXT WORKING DAY BE HELD AT THE DISH SITE ON SATURDAY 13TH NOVEMBER IF SUITABLE. ON THIS DAY IT IS PLANNED TO LINE UP MOTORS AND GEARBOXES ETC. TERMINATE WIRES ON BLOCKS, CARRY ON WITH DISH CUBICLE WIRING TERMINATIONS, CLEAN UP DECLINATION SELSYN DRIVE GEAR AND PREPARE FOR THE DISH FEED MOUNTING WORK.

A REQUEST HAS BEEN SENT TO USA FOR SPECIAL COMPONENTS FOR THE RECEIVING PREAMPLIFIER WHICH COULD NOT BE OBTAINED LOCALLY.

THANKS TO GEORGE 2DHP, WHO LABOURED UNDER SOME DIFFICULTIES LAST SATURDAY, FOR DONATING TWO CHAIRS FOR THE OPERATING ROOM.

LYLE VK2ALU.

FROM DAVE VK2EZY WHO IS NOT REALLY FIRED UP YET ON TYPING.

FOR SALE:-

TR 2400 TWO METRE HANDHELD TRANSCEIVER. VERY LOW MILEAGE, ONE OWNER. ALL OPTIONS INCLUDING EXTERNAL SPEAKER / MIKE, BR5 DC CHARGER, SOFT CASE AND BELT CLIP ETC. THIS UNIT HAS ONLY BEEN USED BY A LITTLE OLD LADY ON SUNDAYS. EXCELLENT FUEL CONSUMPTION AND VERY EASY TO DRIVE.
PHONE VK2EZY ON 28 9198 (BUSINESS HOURS) . PRICE SOUGHT - \$290.

EXTRACTS FROM THE INSTRUCTION MANUAL OF A JAPANESE BROADCAST TRANSMITTER.

Safety Notice : Even how the radio engineers who are concerned in maintenance of broadcasting apparatus, receive many warnings or recommendations for the security, there is no limitation as regards the sufficient security. To emit electric waves from the present broadcaster, very high electric potential consisting of direct current high voltage, which overlap mutually, is given to the grounding side of the voltage that is supplied to the anode circuit of transmitter valve. Additionally, in the intermediate power amplification circuits, a high potential of which degree depends on each circuit, is given. Because of this, the total amount of the potential energy which these high voltage circuits constantly possess during the broadcaster is in operation, is, as has been known, utterly sufficient to take our lives away to the heaven by a touch. The reason for this depends upon the unfortunate fact that the human body can be a good path for electric energy. In consequence, we can say that our work accompanies dangerousness always, and it is essential to sufficiently forewarn each other for the security of engineers themselves during their works, as well as to previously know the remedies against the potential occurrence of any accidents.

Among the "Cautions in handling the transmitter" we find:

Wear working clothes, and cover the body as much as possible even in the hot weather. Do not take off the clothes. Do not wear sandals or clogs.

Should an electric shock accident occur, even if the shock is slight, the victim becomes very nervous. Therefore, it is necessary to put him to a rest appropriately until such a mental shock disappears. In an electric shock, you feel it utterly unpleasant even if it is due to a low voltage of around 250 V. It is followed by a long-time palpitation and an unsolvable anger, then the loss of will to continue the operation in most cases.

In the case of respiration paralysis due to a high voltage shock:
The temporal paralysis of respiration nerves by the electric shock can be naturally removed in the course of time, otherwise one must experience suffocation till it recovers. Thus, if any co-worker executes the artificial respiration, one can get well, while in a case of absence of other people, one must try to become capable of respiration as much as possible by giving a physical force to the paralyzed breast, for example by striking and pressing the breast to the wall, desk or floor from the back. This is, therefore, an execution of artificial respiration by ourselves in straitened circumstances. During this we must encourage our own spirit and endure this painful state of suffocation, firmly believing that the present paralysis is of merely temporal short period of time.

Regarding cardiac massage:

It should be born in mind that, in performing the cardiac massage effectively, it is inevitable to more or less damage the sternum and ribs. If the operator is worried about the possible damage to the sternum and ribs, he can never perform the effective cardiac massage. On the other hand, the operator should master the technique thoroughly so as not to cause unnecessary damages.

The above fractured English may be rather hilarious, but the subject is deadly serious, and these extracts are worth thinking about. What a pity though that the firm concerned could not make a better job of its instruction manual. This a common failing of foreign made equipment.

BAD NEWS DEPARTMENT

A small number of 1½" o.d. toroids on sale at the Club Store on meeting night soon went, but may not be quite what the purchasers were looking for. I bought one marked FX 1588, intending to use it for an antenna balun, but when I consulted a Mullard handbook I found to my chagrin that this toroid is made of B2 material which has a frequency range of only 0.5 MHz to 2 MHz - hardly suitable for h.f.

I also bought, on spec, a couple of the RCA three terminal devices marked S2800B. A multimeter soon showed that they are not transistors as I'd thought, but SCR's, and as of only 200 volt rating, no good for mains use. Enquiries of the manufacturers produced the following final-letter code:

A - 100 volt, B - 200 volt, C - 300 volt, D - 400 volt, E - 500 volt, F - 50 volt, M - 600 volt, Q - 15 volt, Y - 30 volt.

Ken, VK2DOI



"NO! NO! NO! That's not what I meant by trouble-shooting!"

ILLAWARRA AMATEUR RADIO SOCIETY.

THIS SOCIETY IS SUPPORTING A STRONG RTTY FOLLOWING, AND SINCE THE AVAILABILITY OF SIEMENS M100 TELEPRINTER MACHINES MEMBERS ARE STARTING TO GET ACTIVE ON RTTY. THE SOCIETY PRESENTS A MONTHLY BROADCAST IN RTTY ON VHF CHANNEL 6850. THE RTTY BROADCAST IS CONDUCTED ON THE SUNDAY EVENING BEFORE THE SECOND MONDAY OF EACH MONTH EXCEPTING JANUARY, AT 7:00 PM, PRECEDING THE PHONE BROADCAST. INFORMATION OF COMING EVENTS WITHIN THE SOCIETY AND DISTRICT, AS WELL AS A SUMMARY OF THE INFORMATION RELATING TO THE SOCIETY IS CONTAINED IN THESE BROADCASTS. THE I.A.R.S. OCTOBER GENERAL MEETING WAS HELD LAST MONDAY NIGHT AND HAD A DEFINITE RTTY FLAVOUR TO IT. TWO GUEST SPEAKERS, SYD VK2SG PRESIDENT ANARTS, AND IAN VK2DGA TECHNICAL COMMITTEE CHAIRMAN ANARTS, OUTLINED THE GROWTH OF ANARTS AND WHAT ANARTS REPRESENTS TODAY, ALONG WITH SOME BASIC RTTY TECHNICAL FACTS. IT IS PLEASING TO SEE A CLUB WITH SUCH WIDE AND VARIED INTERESTS SUCH AS SSTV, ATV, MOON BOUNCE AND RTTY TO NAME SOME. A NEW REPEATER IS SOON TO BE COMMISSIONED, WITH MICRO CONTROL PROVIDING DEDICATED RTTY OPERATION WHEN REQUIRED. A.N.A.R.T.S. WISH THE I.A.R.S. ALL THE VERY BEST IN THEIR FUTURE ENDEAVOURS, AND WILL PROVIDE ASSISTANCE WHERE REQUIRED IN THE FIELD OF RTTY.

JAMBOREE ON THE AIR REPORT by RON VK2 DXQ

After being hindered by rainstorms, equipment was finally set up at the Mt. Keira Girl Guide Camp for our third attempt at Jamboree-on-the-Air from that location.

Assistance in setting up and operating over the weekend was given by Ian VK2 EXN, Jim VK2 DLJ and Neil VK2 ?, who is a member of Denis VK2 DMR's Tech class and is hoping for a call sign after the November exams. To these people I extend my most grateful thanks.

Equipment installed included a three element tri-band beam complete with rotator, a vertical ground plane and a 200 metre long wire. Associated equipment for mounting and staying said antennas does not leave much spare space in the back of a utility I can assure you!

Transmitting and receiving equipment included a Kenwood TS520, kindly loaned by John VK2 NHA. A Kenwood TS 120V supplied by Ian VK2 EXN coupled through a Jumbo 200W linear (Jim VK2 DLJ.) Two metres was ably catered for by an Azden PCS3000 and many enjoyable "local" contacts were made on this rig during the weekend.

On arrival at the site at about 9.30 am Saturday, activity on 20 metres sounded promising, with many state side stations heard at good strength. However, as the day crept on only Australian and New Zealand stations were heard. Conditions appeared to be fairly good until a storm during Saturday afternoon swept through leaving quite poor propagation conditions. Conditions did not seem to improve greatly after the storm and as a result 20 metres was extremely crowded on Saturday night. During the poor conditions we were fortunate in having probably our largest number of visitors at any one time over the weekend. (Murphy's Law, I think they call it.)

Sunday morning brought the hope of better conditions with the European stations being heard, but alas, no visitors at that particular time (Murphy again?) The remainder of the day was spent on 40, 20 and 2 metres working local, interstate and New Zealand stations with some success.

A great saviour during poor propagation periods was the Siemens teleprinter, set up and supervised by Jim VK2 DLJ which gave hours of delight to the girls and some parents as well. During Saturday night Eric VK2 YVF sent a special J.O.T.A. message and other text which delighted the onlookers.

We had the company of 86 people (in camp) as well as countless visitors, during the weekend. A visitors list attracted 165 names and I would estimate half that number again who did not enter names. It is blatantly obvious that J.O.T.A. popularity is growing fast.

Expressions of interest and gratitude were conveyed to me by a number of the leaders who attended and a possibility of at least two new members from the visiting parents was indicated.

Special thanks go to Lola XYL of VK2 EXN, who answered questions, wiped noses, and cleaned up mess all weekend, proving what a good scout (guide?) she is.

Operations were wound up at 4.00 pm local time Sunday, and after dismantling of equipment, operators and helpers journeyed home for a well earned rest.

RON VK2 DXQ

J O T A at Kiama

Operating under the call of VK2 ERF/p.3 Stations were set up and operational on all H.F. and V.H.F. Bands. Operators were: Richard VK2 ERF, Rod VK2 KRP, Mike VK2 KBM. Dipoles were used on all H.F. Bands. And a 4 element Quad was used on 10 meters. A total of seven Countries were worked and approx. 65 contacts made.

Richard VK2 ERF worked VK2 AMW/P on all Bands. S.S.B. F.M. and C.W. 10 contacts were made and thus Qualifying for the Club Award. The operating Hq. was the Scout Club House at Kiama Harbour. Since only short notice was given, it reflected on the attendance figure.

Next year, we hope for a considerable increase in numbers. Never the less the J O T A weekend was a great success.

73's Richard VK2 ERF

JOTA JOTTINGS

A TOTAL OF FOUR STATIONS WERE OPERATIONAL FOR THIS YEARS JOTA AND FROM ALL REPORTS IT WAS THE BEST AND MOST SUCCESSFUL EVER. ROBERTSON (DE VK2EZY)

THE WEEKEND OF THE 16TH AND 17TH OCTOBER AS WELL AS BEING COLD AND WET (AND SNOWING), WAS ALSO JOTA TIME. STAN VK2KSS AND MYSELF WERE INVITED TO MAN A STATION AT ROBERTSON SCOUT HALL. USING A 159 METRE LONGWIRE ANTENNA, STAN'S FT DX401 AND A VERY EFFICIENT ANTENNA TUNER WE FIRED UP AT 0000 UTC. ABOUT 49 SCOUTS, CUBS AND OTHER MEMBERS OF THE SCOUTS WERE PRESENT TO PARTICIPATE. POSSIBLY THE MOST INTEREST CAME FROM PARENTS AND OTHER LOCALS, AS THIS WAS THE FIRST TIME THAT THE TOWN HAD HAD ANYTHING LIKE THIS OCCUR.

CONTACTS WERE MAINLY ON 20 METRES + A FEW LOCAL CONTACTS ON 2 M. WE HAD A TOTAL OF 33 CONTACTS, 17 BEING JOTA STATIONS, 21 DX STATIONS, INCLUDING VK9ZA (ANDY) ON WILLIS ISLAND, T2GSH (GORDON) ON TUVALU, FROSLO (HENDRICK) 9, ON REUNION, 6D5J (PEPE) COLIMA AND LZ2AB. OTHER INTERESTING CONTACTS WERE P2OJOA, THE OFFICIAL SCOUT STATION IN NIU GINEE, VE3SHQ THE SCOUT STATION IN OTTAWA AND VK2SAS (ST. IVES GROUP), WHO WERE WASHING A SUBMARINE FOR THE NAVY FOR THEIR 'JOB WEEK' TASK. HI HI.

ABOVE ALL THE EFFORT ACHIEVED IT'S OBJECTIVES AND EVERYONE INVOLVED HAD A 'TOP' TIME (INCLUDING THE OPERATORS).

THANKS GO TO THE SCOUT GROUP OF ROBERTSON, THE ROBO LOCALS, '5-, VK2KSS AND THE SPUD FARMER BEHIND THE SCOUT HALL WHO DID NOT OBJECT WHEN WE RAN ANTENNAE ACROSS HIS POTATO PATCH.....

GREYS POINT (DE VK2DMR)

DAVE (=VK2PBP) AND DENIS (VK2DMR) WERE GUESTS OF NORTH ILLAWARRA DISTRICT SCOUTS AT GREYS POINT SCOUT HALL AND HAD A MOST ENJOYABLE TIME (PARTLY BECAUSE THEY CAMPED IN A SCOUT HALL AND COULD NOT GET FLOODED OUT LIKE LAST YEAR). A TOTAL OF 70 SCOUTS AND 15 LEADERS WERE THERE AND DESPITE THE POOR LOCAL AT THE BOTTOM OF THE VALLEY HAD SOME QUITE ENJOYABLE CONTACTS. THE SUCCESS OF THE VENTURE COULD BEST BE GAUGED BY THE NUMBER OF QSL'S SENT TO SCOUTS FOR THEIR COMMUNICATOR BADGE.

THE TWO STATIONS OPERATED ON BOTH HF AND VHF AND USED BOTH PHONE AND RTTY. ANTENNAS WERE RANDOM WIRES OF GIGANTIC PROPORTIONS (COURTESY OF THE SCOUTS) AND A COUPLE OF MARGINAL VHF VERTICALS.

IN OUR FIRST ARTICLE WE TALKED ABOUT FUNDAMENTALS AND HOW TO GET YOUR MACHINE TO OPERATING IN 'LOCAL LOOP'. THIS TIME WE WILL TALK ABOUT RTTY AS DISTINCT FROM TTY. THE SIGNAL FROM YOUR PRINTER IS A SERIES OF CURRENT PULSES AND AS SUCH ARE NOT SUITABLE FOR DIRECT TRANSMISSION. TO TRANSMIT THE SIGNAL WE CONVERT THE MARK TO ONE TONE -AND THE SPACE TO ANOTHER. THIS IS DONE BY THE MODULATOR. WE HAVE PUBLISHED A SIMPLE MODULATOR IN LAST MONTHES PROPAGATOR AND THIS MONTHES ISSUE INCLUDES A BETTER CIRCUIT.

THE TONES FROM THE MODULATOR ARE THEN INTRODUCED INTO THE TRANSMITTER AS YOU WOULD ANY OTHER AUDIO INFORMATION----E.G. INTO THE MIKE INPUT OR THE 'PHONEPATCH IN' SOCKET.

THE REVERSE PROCESSN OF COURSE'N HAS TO BE DONE WHEN RECEIVING I.E.M THE TONES HAVE TO BE CONVERTED TO PULSES. THIS IS DONE BY THE 'DEMODULATOR'. THIS GENERALLY SWITCHES A TRANSISTOR STAGE TO TURN THE LOOP CURRENT OFF AND ON.

THERE ARE A MULTITUDE OF WAYS OF INTERCONNECTING THESE THREE MODES OF OPERATION I.E. FROM TRANSMIT TO RECEIVE TO LOCAL LOOP..... MUCH OF THE CHOICE IS A MATTER OF PERSONAL PREFERENCE. EVERYBODY DOES IT SLIGHTLY DIFFERENTLY

WE HAVE SET OUT BELOW THREE DIFFERENT WAYS THAT THIS COULD BE DONE.

INTERCONNECTION METHOD #1 (VK2DMR)

IN THIS METHOD THE LOOP CIRCUIT IS THE MAIN CIRCUIT SWITCHED. ONE SIDE OF THE OOP SUPPLY IS EARTHED SO AS TO MINIMISE THE AMOUNT OF WIRING AND CIRCUIT COMPLEXITY (LESS THINGS TO GO WRONG).

I HAVE USED A SEPARATE LOOP SUPPLY WHICH IS HOUSED IN THE MODEM (MODULATOR/DEMOD). THIS RESULTS IN ONLY ONE LEAD TO THE PRINTER WITH A STANDARD 6.3 MM PHONE PLUG.

THE SWITCH USED IS A STANDARD MULTI-CONTACT 3 POSITION LEVER SWITCH (EX-PMG OOPS TELECOM). THESE SWITCHES CONTAIN TWO BANKS OF 4 C/O CONTACTS. THE CENTRE POSITION IS USED FOR LOCAL LOOP AND THE 'UP' POSITION FOR XMIT AND THE 'DOWN' POSITION FOR RX. THE KEYBOARD, READER AND MAGNET ARE ALL IN SERIES WITH THE PHONE PLUG. ALL FUNCTIONS ARE CONTROLLED AT THE MODEM.

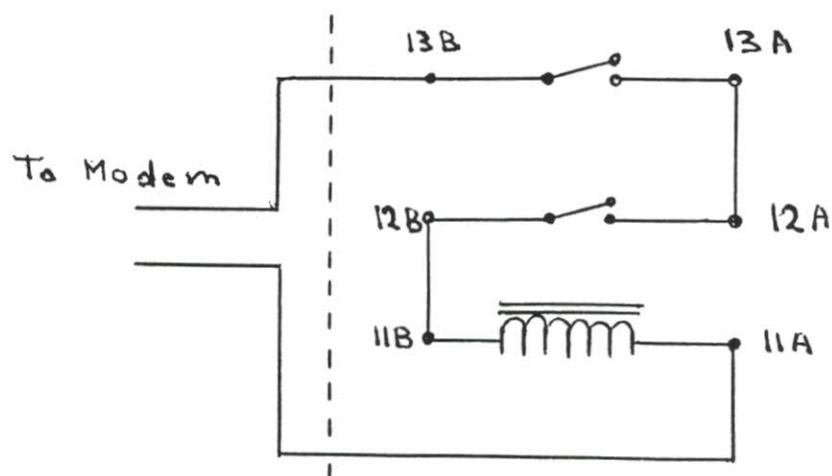


Fig. 1 Printer connections

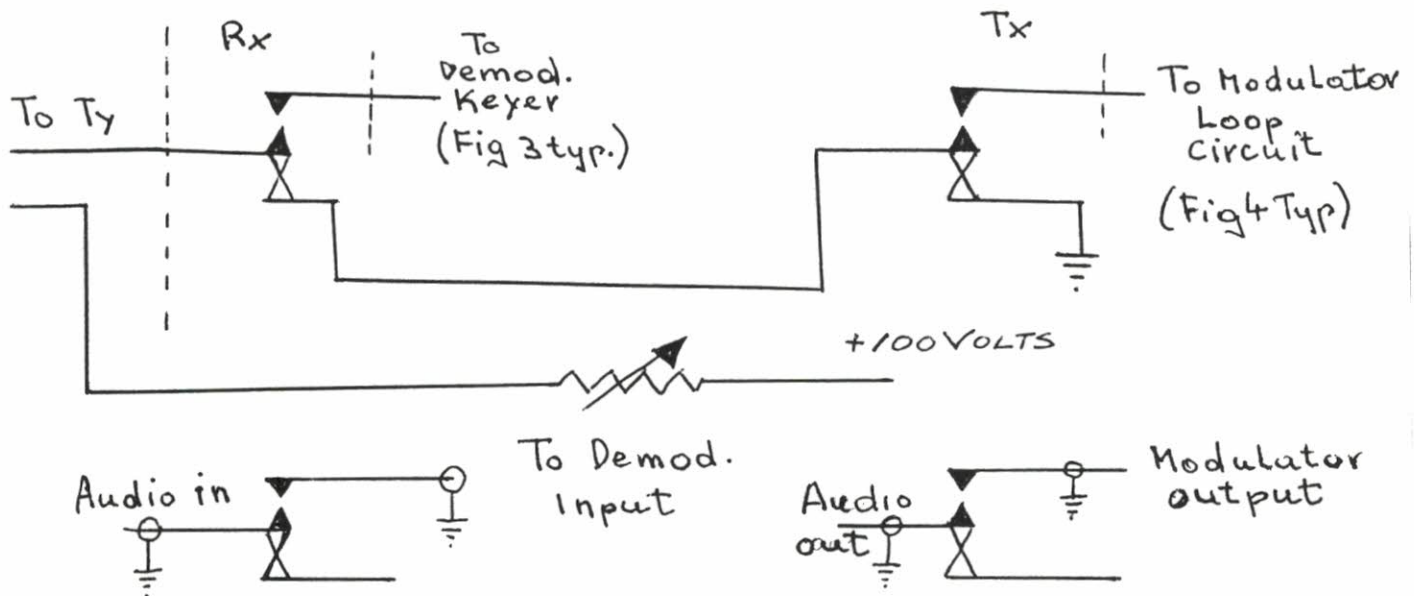


Fig. 2

Modem switching
(Local Loop shown)

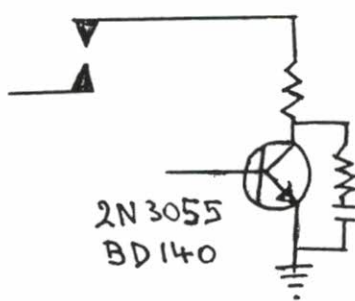


Fig 3 Typical Keyer Circuit

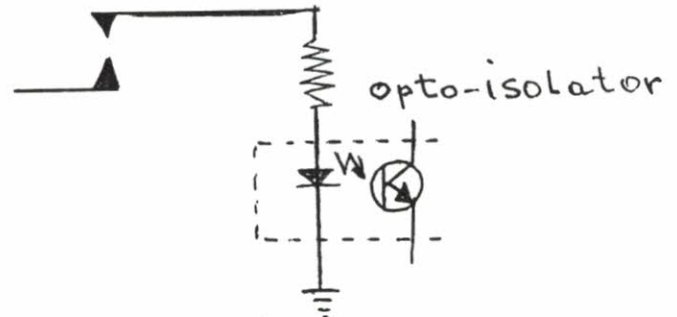


Fig 4 Typical Modulator Drive

THIS SIMPLE SYSTEM RESULTS IN :

- 1). SIMPLE CHANGE FROM RX TO TX TO LOOP
- 2). SIMPLE CONNECTION BETWEEN UNITS.

THIS SYSTEM RESULTS IN ONLY AUDIO CABLES INTO AND OUT OF THE TRANSCEIVER, (I USE THE PHONE PATCH IN AND OUT ON THE TS520 S). AND ONE 2 CONDUCTOR CABLE TO THE PRINTER. IF YOU WISH TO YOU COULD USE ANOTHER SET OF CONTACTS FOR THE PTT LINE. (I USE VOX).

NOTE+++++

RTTY IS A 100PERCENT DUTY CYCLE MODE AND AS SUCH DO NOT USE FULL DRIVE WITH AN SSB TRANSCEIVER..... I USE THE MIKE GAIN ON THE 520 TO TRANSMIT 25 WATTS. NEGLECT OR FORGET THIS AND DESTRUCTION OF P YOUR FINALS WILL RESULT AS SURE AS DAY FOLLOWS NIGHT..... (I INTEND TO THE SCREEN SWITCH AT THE REAR OF MY TCVR TO LIMIT PLATE DISSIPATION ON RTTY..... IT MAY SAVE ME SOME HEART ACHE OR HEARTBURN OR BOTH)..

I decided to make use of the parts in the Siemens Modems (available from the store), The 2,000 ohm relay has multiple contact sets and was ideal, running from the 55 V loop power supply: There are 3 sets of change over contacts and two sets each of make & break contacts. The control box houses all supplies, switching relay, ETI 730 Demodulator & ETI 731 Modulator and EA UART regenerator. The actual switching between receive and transmit is done from the control switches above the main key-board on the M 100 teletype, as follows:-

Refer to diagram "A" - The relay coil is wired in series with the "Clear" key normally vlosed contact set, via a normally open set of contacts on the relay. The "Call" key is wired to bridge the contact set, when operated i.e. it is connected to the normally open contacts. When the "Call" key is pressed it momentarily shorts out the open contact set on the relay, the relay pulls in and latches on its now closed contact set. To release the relay pressing the "Clear" key breaks the supply line to the coil: a Siemens spark supressor set is connected across this switch to avoid arcing and radiated RFI. Note that a small 70 V (nominal) neon is connected across the "Call" key contacts and lights dimly when the relay is open. I have it set in the window in front of the elapsed hours recorder (lower right on the panel).

When actuated the following switching is carried out:-

1. The Push-to-talk lines are energised via my external controller - See "C".
2. The audio output from the ETI 731 modulator is connected to my main Audio input patch panel (L on diagram). The premix audio from M is disconnected.
3. The audio input to the ETI 730 demodulator is earthed to avoid unwanted printing
4. the VOX in Diag "C" is energised via another set of make contacts (not shown on the diagram for clarity).
5. Local control for voice I.D. is retained on the main premixer, Diag "C".

When de-energised the reverse occurs.

The system runs witout hitches of any kind and is easy to set up.

The UART switching is done in the Demodulator circuitry and is not diagrammed.

The control box, Diagram "C" was constructed last year to facilitate the airing of Club broadcasts, and operates as follows:- The switching for two different transceivers is carried out by a 4 pole change over relay. The coil can be energised via a VOX unit, built to the EA design by a control tone on the Left channel of a stereo tape recorder, or manually by a bypass swich.

The relay switches both P.T.T. lines and connects the Mic * 1 and Mic * 2 inputs to the respective transmitters - note the input does not in fact come from the dynamic mics in normal circumstances but via the presets (5K) as shown. The audio input is from (a) the tape recorder via the ETI designed Limiter and an attached speech processor (read filters), through a 741 buffer stage. or (b) from the No. * 1 microphone via the 741 microphone preamp, which also triggers the VOX, or the VOX can be manually operated. A separate LM 380 provides independent head-phone monitoring of all signals. Not shown is two pole double throw switch in the output lines to the transmitters which cut off all audio output - useful for testing purposes.

- A typical RTTY broadcast is prepared and aired as follows:
1. The text is written out in short form, then
 2. The main microphone (not a communications quality unit) is connected to the tape recorder and the morse practice output connected to the left channel line input.
 3. The tape is set in the record mode, and is usually recorded on Ferrichrome equivalent tape with Dolby on - this is not for the final "high fidelity" but to reduce hiss in the final re-re-processed signals.
 4. About 10 seconds of tone is recorded on L channel, then the commentary recorded on the R channel.
 5. After 3 minutes - a bit more or less, a station identification break is announced and the key pressed to record a signal on L channel. This is of about 5 seconds duration to give relay stations time to announce their call signs.
 6. And so on until the broadcast information is complete. Then a final 10 second track 1 of tone.
 7. Provided all has gone to plan a tape of about 12 - 13 minutes is the result.

This is usually prepared about 2 P.M. on the Sunday, and a copy transmitted to Graeme via simplex for the RTTY broadcast, or alternatively converted to taped RTTY at this QTH and sent to Graeme as RTTY for re-broadcast. Naturally to stay in time constraints some of the regular Club "directory" information is left out of the RTTY text.

The main tape is rewound and checked - remember Murphys Law - and then the transmitters are connected to the controller, as shown.

When the tape is run the control tones key the relay via the VOX unit and mute the audio and drop the P.T.T. lines for about 5 second intervals every 3 minutes, so that the time out timers at the repeaters will reset.

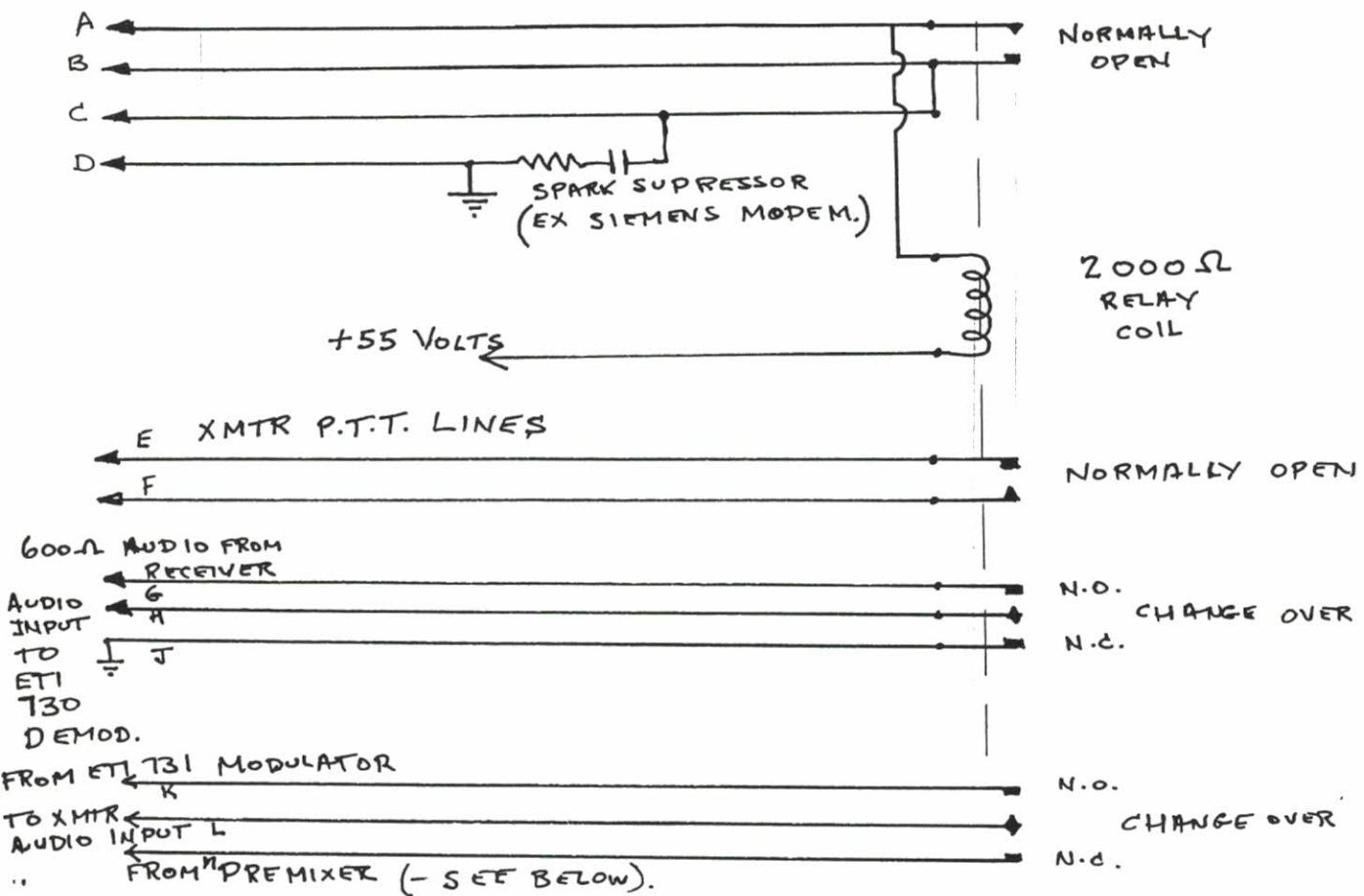
The relay stations normally take their signals directly from my repeater input signals i.e. on 146.25 VHF or 433.225 UHF rather than from the repeater outputs. This has two benefits - 1. The repeater Idents are not re-broadcast, and 2. the audio is much cleaner not having been modified by the repeaters input and output filters. The original audio is processed before the split is taken to the headphone monitor so that the station monitor hears the actual signal that is put to air.

To forestall any questions, yes all the circuitry is readily available and kits can be used for the VIX and Limiter, but you will have to tag strip the remainder of the bits, including the two 3 terminal regulators for the split \pm 12 V power supplies,

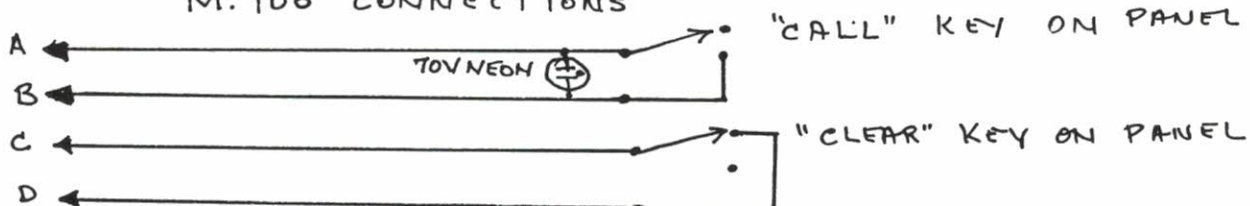
73's,

Eric VK2YVF.

To M. 100

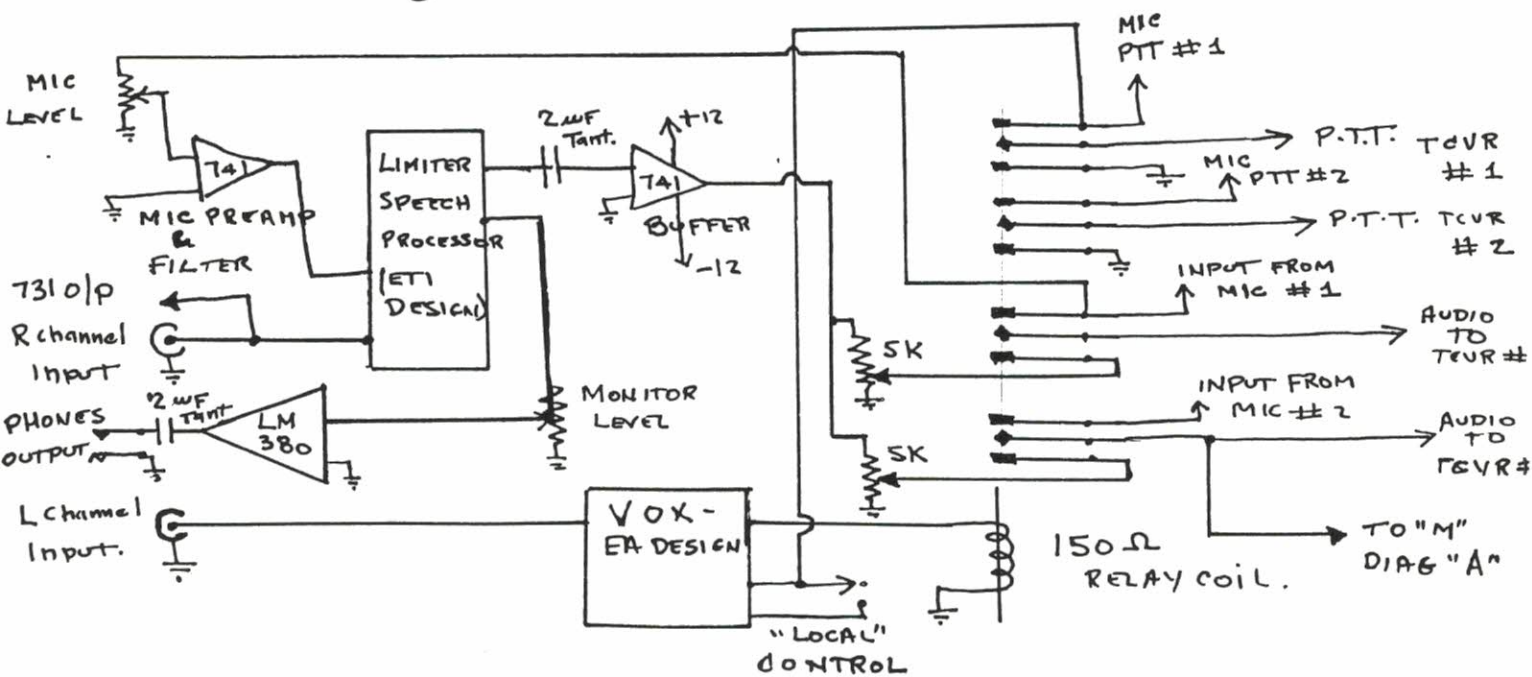


M. 100 CONNECTIONS



"B"

"C"



WHEN CRYSTALS AREN'T GOOD ENOUGH

Early in 1977, in order to clear the FM band, the Newcastle TV transmitter of the ABC, ABHN Mount Sugarloaf, operating on Channel 5 (101 to 108MHz), was replaced with a new one operating on Channel 5A (137 to 144MHz), with transmission on both channels continuing for some weeks. As the Wollongong ABC television transmitter, ABWN, is also on Channel 5A, a system of Precision Offset Exciter Operation was introduced, whereby the Newcastle transmitter is accurately offset 26.025 kHz from the nominal carrier, with the Wollongong transmitter having zero offset.

The technique known as Precision Offset Operation is used to reduce the visibility of mutual interference between two television transmitters on the same channel. The carrier frequencies of the two transmitters are derived from a common frequency source, or two highly stable separate sources, and separated in frequency by a precise amount. The frequency separation is normally of the order of $5/3$ of the line repetition frequency and finely adjusted to a multiple of 25 Hz so that a line-to-line and field-to-field cancellation of the interfering signal occurs, much in the manner of the technique used for reducing the visibility of the colour sub-carrier in colour TV systems. In effect, the use of Precision Offset gives an improvement in visibility equivalent to some 12 to 13 dB reduction of interference level when compared to the non-precision offset situation. In order to maintain this degree of improvement, the frequency difference between the two transmitter carriers must be held to plus or minus 2 Hz. The interference then has the appearance of a not very visible 'Harris Tweed' pattern, but if the frequency difference changes it appears as much more visible vertically moving stripes.

Because it is the frequency difference and not the absolute carrier frequency that has to be maintained to high accuracy, the most obvious implementation would be to derive the transmitter carrier frequencies from a common frequency source. However, this is difficult because of the physical separation of the two transmitters and therefore the alternative method of using two highly stable frequency sources has been adopted. The allowable tolerance in frequency difference above indicates that the two sources must maintain a frequency stability of roughly one part in 10^9 . The best crystal sources can be guaranteed to this order of accuracy for only about one day, and therefore it has been necessary to employ Rubidium Atomic Frequency Standards, using the atomic resonance frequency, (6.834 682 641 GHz) of rubidium gas - namely the Rohde and Schwarz Model XSRM, which gives a sinusoidal 5MHz output of high spectral purity. These units have a specified long-term frequency error of 5×10^{-11} per month and are calibrated at the CSIRO National Standards Laboratory, being re-checked every two years.

Each unit is followed by a Frequency Converter giving outputs of 0.1MHz, 1MHz and 10MHz, only the 1MHz output being used in this application. This output drives a Rohde and Schwarz Offset Exciter at each station producing a 38.9MHz output by means of p.i.n. circuits, and a second output which is a submultiple of the station's carrier frequency. The Wollongong transmitter being high level modulated uses only this second output with zero offset. The Newcastle transmitter uses both, the 38.9MHz for the i.f. oscillator and the second output for the mixer local oscillator, also producing the required offset. These frequencies have the same accuracy as the Rubidium Standard.

Ken VK2DOI

THE ILLAWARRA AMATEUR RADIO SOCIETY

Meetings: Second monday of each month except January at 7.30 PM in the Congregational Church Hall, Coombe Street, Wollongong.

Postal: The Secretary, I.A.R.S., P.O. Box 1838, Wollongong 2500.

Repeaters: VHF 6850 (146.250 in / 146.850 out) - VK2RAW

UHF 8225 (433.225 in / 438.225 out) - VK2RUW

Broadcasts: Club news on VHF 6850, UHF 8225 & by relays via VK2PBF on 28.460 Mhz and VK2YKQ on 3.565 Mhz at 7.15 PM on the Sunday night preceeding the monthly meeting. News to Eric Fien VK2YVF on telephone 71 6364 by 6.30 PM.
W.I.A. relays via VHF 6850 at 11.00 AM & 7.30 PM every Sunday.

Nets: 3.565 Mhz SSD on Sundays at 8.00 PM & 28.440 Morse at 8.00 PM every Tuesday.

Newsletter: The Propagator is mailed to reach members in the week preceeding the meeting. Editor Leo Kleeborn, VK2YJK, telephone 84 9751 for news items and advertisements. Copy deadline is the last Tuesday of the month.

Membership: Write to the Secretary or contact any committee member. Annual dues are \$ 7.00 full member & \$ 4.00 pensioner or concessional member.

QSL Service: Available to members of the I.A.R.S. who are ALSO members of the W.I.A. Bureau managers - Mike Keech (Inwards) & Ian Calcott (Outwards).

Award: The Award of the I.A.R.S. is the Lawrence Hargrave Award. VK stations must work 10 different I.A.R.S. members: Overseas stations must work 5 I.A.R.S. members. Alternatively any amateur who works the Club Station VK2AMW qualifies for the award. Send details of contacts - stations worked, day date, time and frequencies together with \$ 2.00 or 4 I.R.C.'s to the Secretary. QSL cards are not required.

Store: The store operates at each meeting. Contact Paul Ferguson for stock details.

Committee: President - Keith Curle, 24 Beach Drive, Woonona 2517. VK2OB

Vice President - Denis McKay, 17 Doncaster Street, Corrimal 2518. VK2DMR

Secretary - Dave Myers, P.O. Box 1838, Wollongong 2500. VK2PBP

Treasurer - Geoff Cuthbert, 2 Nicka Avenue, Keiraville 2500. VK2ZHU

Repeater Chairman - Graeme Dowse, VK2CAG. Repeater sub-committee :- Pat Jordan, VK2KEY; Denis McKay, VK2DMR; Mike Keech, VK2VXS, Eric Fien, VK2YVF; Mark Ryan, VK2KFI.

Broadcast Officer: Eric Fien, 331 Cordeaux Road, Mount Kembla 2526. VK2YVF

QSL: Mike Keech VK2VXS & Ian Calcott VK2FXN.

Propagator Editors: Leo Kleeborn, VK2YJK & Ken Frost, VK2DGI. Cartoonist - VK2KING by Brian Wade, VK2AXI.

Store: Paul Ferguson, VK2DZJ.

Publicity: Dave Henderson, VK2YKQ.

General Committee: Jock Taylor, VK2JT; Ray Ball, VK2PHD & Morry Van de Vorstenbosch VK2EMV

The next Conference of Clubs will be hosted by the Westlakes Radio Club and will be held the first weekend in November. W.I.A. members of the I.A.R.S. are reminded that they are entitled to attend as observers.
