

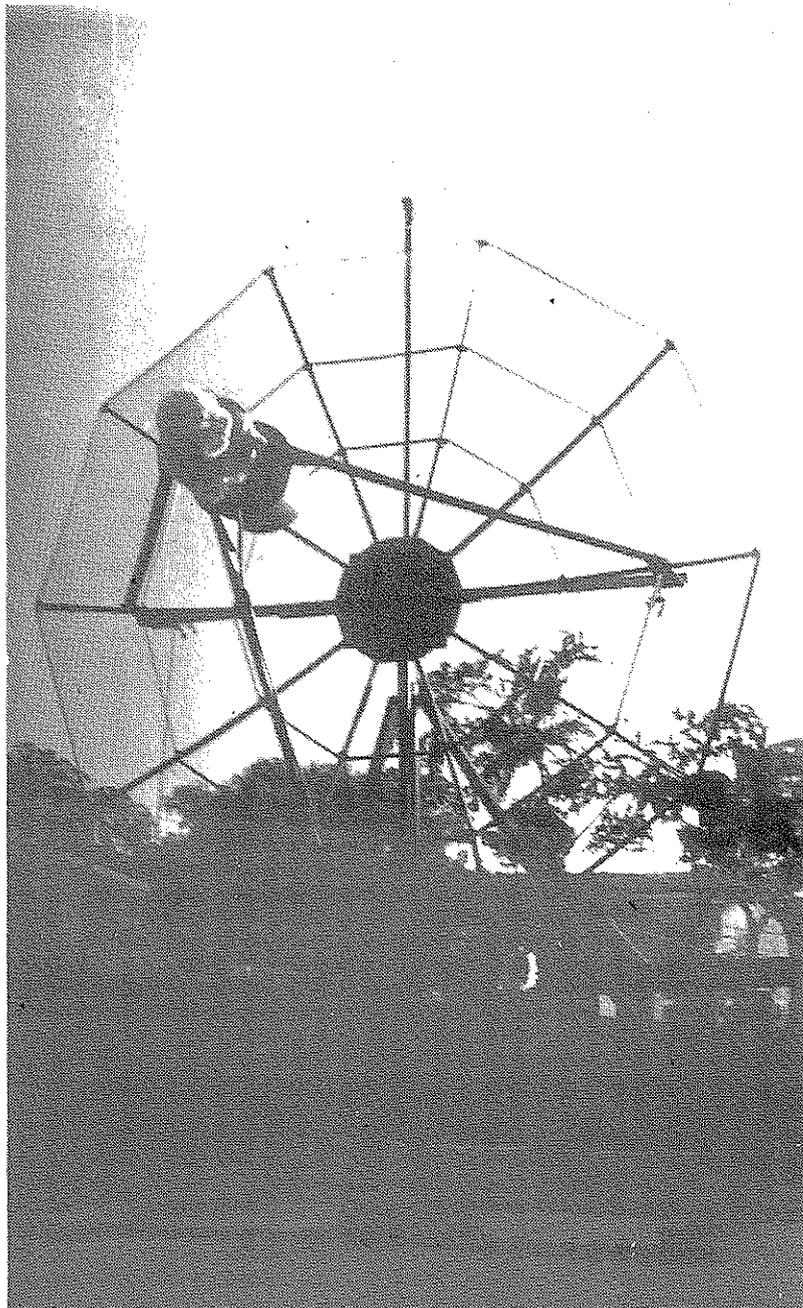
# 6UP

vol.2. no.3.

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VHF MAGAZINE



VK1ZTs 1296MHz MOONBOUNCE ANTENNA see pages 4 & 15.

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6UP is printed by SNAP INSTANT PRINTING PTY. LTD.  
87 King Street Sydney

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Reprints of all articles from Vol. 1. are available by sending THREE 12 cent stamps to the address below stating the month of issue and the title of the article. An Index to Vol. 1. has been prepared & will be published next month. Back Issues of Vol. 2. No's. 1 & 2 are available by sending THREE 12 cent stamps to the address below. Better still, send a subscription if you dont already subscribe.

6UP  
 47 Ballast Point Rd  
 Birchgrove 2041.

I'm so disgusted at the behaviour and tactics of the VK2 delegates to the WIA Federal Convention that I shall refrain from further comment...here at least. Old Timers (and not so old) are probably saying Ho Hum, they're at it again. Such a complacent attitude, and general apathy, only allows such things to continue. Anyway, read page 16.

The rest of this editorial is given over to a STOP PRESS ITEM. An early morning phone call recently informed me of negotiations between several states over the "1973 2m Band Plan". Everybody hated it. What has emerged are the following recommendations for 2m FM repeaters and nets. Initially at least, it looks sensible. Are we getting somewhere at last ? Ch.1. input: 145.05MHz, output: 145.55MHz. Ch.2. input: 146.1MHz, output: 145.6MHz. Ch.3. input: 146.15MHz, output: 145.65MHz. Ch.4. input: 146.2MHz, output: 145.7MHz. Ch.5. input: 146.25MHz, output: 145.75MHz. Ch.6. input: 146.3MHz, output: 145.8MHz. Simplex channels:- Ch.B. and Ch.A. (rounded off) remain, Ch.C. is removed. RTTY on 146.6MHz, ATV simplex on 147.0MHz. All capital cities will be allotted Ch.2. repeaters the others being available for allocation by state repeater groups. Ch.6. will be the last to be allocated in any event. Unless further changes have occurred since 3-5-73 that is it. It is of course subject to general approval by the other states and the PMG. I wonder what now happens about the motion passed by the Federal Convention concerning the eventual move of all repeaters and FM nets above 146MHz.?

The january/february S.E.R.G. BLURB editorial by VK5ZOO contains sensible suggestions as to how we should conduct our affairs. David sums up "...to develop a more healthy attitude to congeniality and peace with each other; and then in this atmosphere we can discuss and ask our absent members if they are in agreeance to any changes that affect us all as a body, not as groups of individuals."

The narrow-viewed interests of what is essentially a minority should not be allowed to forcibly devolve on others, restricting them and the gamut of our hobby as a whole.

Roger VK2ZTB

SKEDS AVAILABLE

Readers are invited to submit items for this column as well as 'Skeds Wanted'. Three insertions in either category will be made unless otherwise requested.

VK3AUU occupation dairyfarming - available for 6m meteor scatter skeds, or what have you, prior to 0615 EAST each morning or at odd times during the day. Transmitter runs 300W output ( PEP SSB) to a 9 element yagi at a height of 10m.

David Tanner VK3AUU  
Lye & Dixon Road  
RIPPLEBROOK Vic. 3818

Informative Bits & Pieces. Lyle Patison VK2ALU passes on the following information about some very handy components for the UHF and microwave enthusiasts. "Chip" capacitors for use at UHF & microwave frequencies are available from

Vitramon Pty. Ltd.  
534 - 536 Princes Highway  
Rockdale 2216 phone: (02) 599-2325

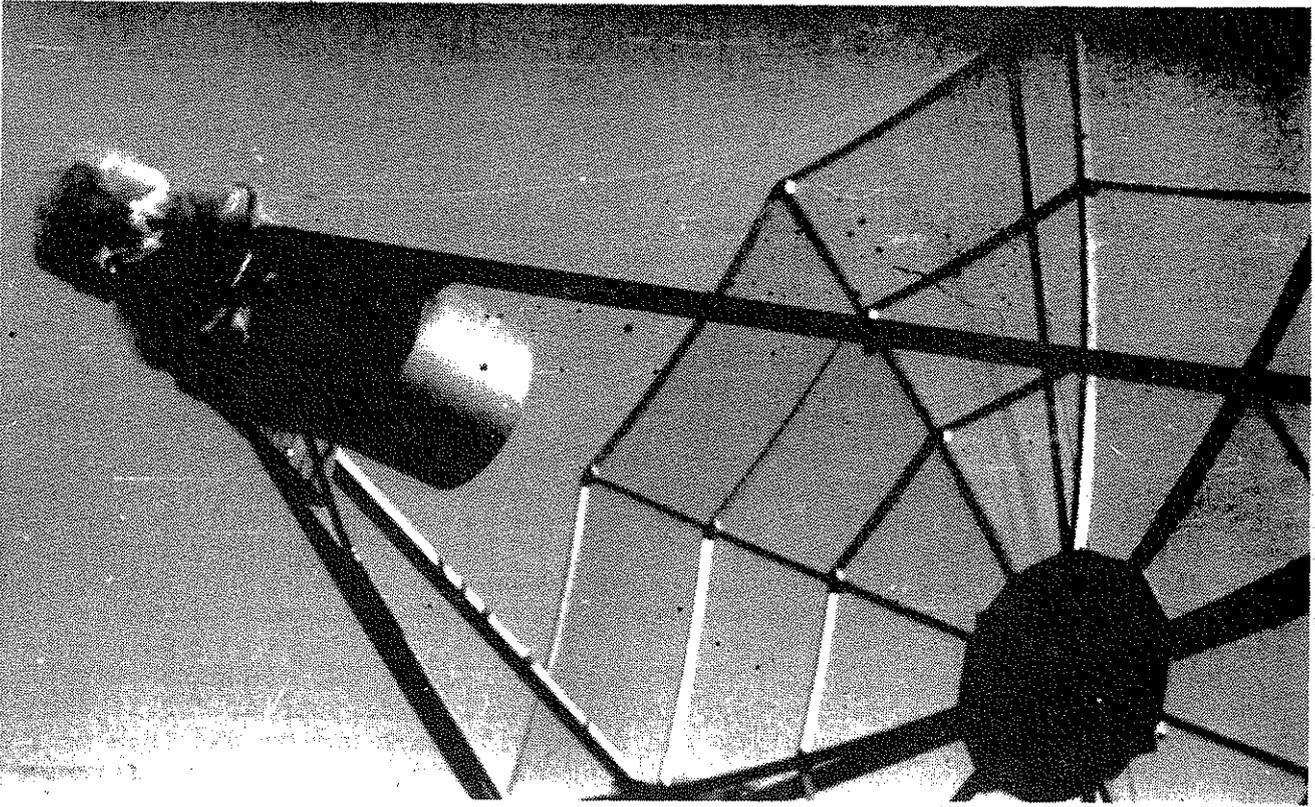
Also, those excellent UHF bipolar transistors mentioned previously, the BFR91 & BFR93, are available from ELCOMA. Dont forget to mention 6UP - and tell them when they say "what's that?"

If you havent already heard of, or seen a copy of "The Victorian VHfer" then it might be a good idea to investigate it. Produced by the Victorian VHF Group and published monthly it contains very good technical articles and lots of interesting local news. Technical standard is high and printing quality very good. Recent articles include "Antenna Measurements" by Dick Turrin W2IMU, "UHF Power Dividers", "Some Notes on 6 & 2 metre transverters" by Mike Trickett VK3ASQ. Subscriptions to WIA members only for \$2,40/year from M. Goode VK3BDL

92 Mont Albert Rd  
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Dont forget another mine of information and ideas "The Australian EEB". Technical and printing standard excellent with interesting and thought provoking articles from time to time.....always well referenced. The EEB ran a very interesting series on receiver design, lots of ideas. Subs are \$1.55/year to

P.O. Box 177  
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Above, and

Front cover photo: Neil VK1ZTs 1296MHz moonbounce set up. A homebrew 10ft dia. "portable" dish made in ten segments from wood, the dish surface being metal gauze. The feed is Dick Turrin's (W2IMU) circular waveguide feed, fabricated from galvanised sheet, circularly polarised. The mount is el-az, crude - but effective. & W2NFA and transmissions to NRL. The preamp - converter mount immediately behind the feed waveguide (in plastic bag). The coax line seen travelling down the support strut goes to the transmitter which is at present mounted on a small platform at the bottom of the strut. The dish is positioned manually and gives close to the calculated gain figures when measured on sun noise. A calibrated derrick-boom on the lower edge of the dish (not seen here) serves as elevation adjustment. No tut-tutting ..... it works doesnt it?

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# 70cm SSB TRANSMITTER

by Roger Hord VK2ZRH

This article is the result of a good many years of experimenting with SSB on 432 MHz.

Some of the problems that were encountered with producing SSB on 432 were,

- (1) Frequency drift.
- (2) Spurious emissions (RF oscillations).
- (3) Rejection of unwanted frequencies.
- (4) High or low band mixing.
- (5) What frequency SSB to heterodyne from.

After much thought it was decided to use 28 MHz SSB and low level mixing as most amateurs have HF SSB transceivers (see block diagram, fig.1.).

## Instruments

Before commencing this project a simple wave meter was built for measuring frequencies between 200 - 450 MHz, (see article elsewhere in this issue).

## Tx Oscillator (see fig. 2 and fig. 3.)

As in all exciters whether transmitter or receiver, obtaining sufficient grid drive is one of the biggest problems. After much experimenting I observed that obtaining sufficient grid drive using valves at 400 MHz would be difficult.

Finally an exciter was built and consisted of a 6EA8 multiplier (pentode) to 50.5 MHz, triode section to 101 MHz followed by three 6AK5s to 202 MHz then a QQE02/5 doubler to 404 MHz.

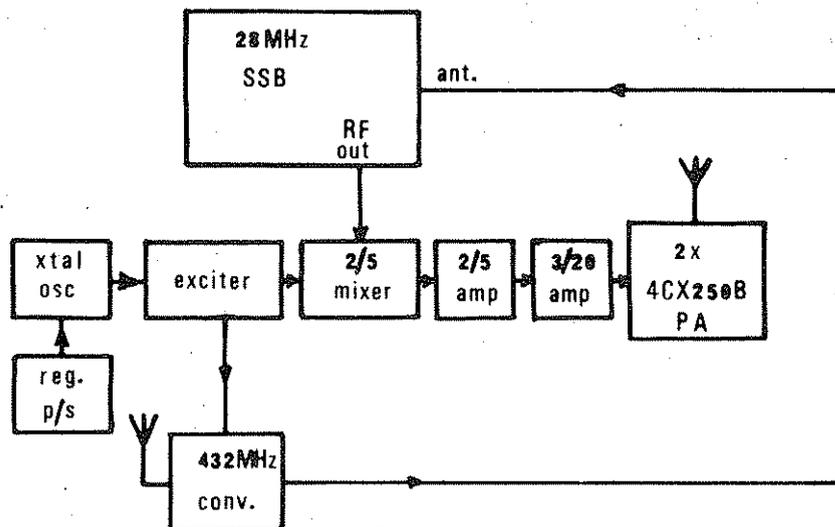


Fig.1.

## Tx Mixer (see fig. 6.)

The mixer used was a QQE02/5 which produces low intermodulation distortion, is very stable and has sufficient power output to drive a QQE02/5 amplifier.

Although no measurement tests were made on this mixer a complete laboratory test including spectrum analyser display outputs can be found in "Ham Radio" June 1972. The mixer is driven from an HF SSB transceiver at 28 MHz from the grids of the final PA in the HF transceiver as shown in fig. 7.

## Tx Amps (see figs. 5 and 6.)

The first amplifier consists of a QQE02/5 valve producing approx 2½ W output sufficient to drive a QQE03/20 amplifier.

All tuned lines\* in the mixer and 1st amplifier are ¼ wave and probably better efficiency would have been obtained if ½ wave lines had been used.

A layout diagram of the mixer and 1st amplifier is shown so all circuits should tune to the desired frequency.

## Final PA (fig. 8.)

The QQE03/20 amplifier was built in a separate shielded box and was found to have sufficient power to drive a pair of 4CX250Bs.

## One Word of Warning

A number of QQE03/20 and QQV03/20 valves were laboratory tested in this amplifier and were found to produce the following results.

Rated output was obtained and both grid and plate circuits tuned perfect with QQE03/20 valves. When QQV03/20 valves were used the output was very poor and resonant frequency of input and output circuits varied alarmingly.

Summary

Now that we have discussed the mixer, linear amplifiers and oscillator chain, a few modifications could be made in the oscillator chain.

i.e. reducing the number of stages and perhaps transistorising the line-up. Any ideas?

\*( A local comic book ..... ED.)

Tuning Up Procedure

- (1) Apply +12v to oscillator and amplifier box. Also +250v HT to exciter and mixer.
- (2) Adjust slug in coil L1 until oscillation occurs at crystal frequency (12.625 MHz) by listening to a HF receiver. Check for frequency stability.
- (3) Now connect RF probe (terminated with 75 $\Omega$ ) to output of L3 and tune L2 for maximum indication. Disconnect RF probe and connect suitable length of 75 $\Omega$  coax cable from L3 output to input coil of exciter. (L4). Care must be taken in length of coax cable. If the length is too long it may be required to reduce the number of turns of (L2-L3) (L4-L5) for resonance. About 12" was used in this transmitter.  
In the alignment of the valve exciter, tuning up procedure is done the same as in a transmitter. i.e. By inserting a metre in series with each grid resistor in turn along the valve chain and tuning the coil or capacitor for maximum current.
- (4) With the meter connected in the grid of V1 pentode (47k) tune L2 and L5 for maximum current. (0.2 MA). Now check grid current of V1 triode (47k). Tune L6 by expanding or compressing turns for maximum reading. (0.25 mA).
- (5) At this stage, with the aid of a wavemeter, check L5 and L6 for correct frequency and retune if necessary.
- (6) Insert meter in 27k grid resistor of V2 and tune L7 for maximum grid current (0.25 mA) and correct frequency. (101 MHz).
- (7) Again insert meter in 33k grid resistor of V3 and tune trimmer 1-8pf (L8) for maximum reading (1.5 mA) and correct frequency on L8. (101 MHz).
- (8) With meter still connected carefully go back over previous tuning adjustments and check for maximum reading. Now measure grid current of V4 (22k) and tune 3-30pf (L9) for maximum reading and frequency of L9. (202 MHz).
- (9) Move on to V5 grid resistor (27k) now and tune 3-30pf (L10) in combination with L11 for maximum reading (0.4 mA) and correct frequency of 202 MHz at L10.
- (10) Solder a short from the cathode of the mixer V6 to ground by passing the 560 $\Omega$  resistor. Measure the grid current of V6 (10k) and tune 1-10pf trimmer (L12) in combination with the 0-1pf (L13) for maximum reading (0.1mA). By using the wave meter check for 404 MHz.
- (11) When tuning is complete momentarily pull out crystal from socket and ensure grid current drops to zero. If any grid current is observed parasitic oscillation is occurring in one of the stages and should be removed before moving on to the next operation. When completely satisfied remove short from cathode of mixer. (560 $\Omega$ ).
- (12) Connect HF to QQE02/5 amplifier (V7) and connect dummy load to output of L17.
- (13) Insert 28 MHz SSB (carrier) into mixer and with the aid of the UHF wavemeter tune capacitor C1 across L14 for output on 432 MHz.  
NOTE There will be a proportion of output on 404 MHz at this stage.
- (14) Now place UHF wavemeter near output lines of L16 and tune capacitor C2 for maximum output on 432 MHz. By this time a reading on the dummy load should be observed and just a tuning of the capacitors on grid and plate lines should produce maximum output at 432 MHz.

HAMADS

The Canberra Radio Society is flogging an Audio Amp kit. The kit contains one TAA611C IC and a pcb. The other components will be supplied on request. The kit comes complete with circuit & spec. sheet. Po = 3.3W for 21mV input. Draws 300mA from 15v supply at max. output.

Price \$3-50 from Andrew Davis.  
49 Duigan St  
Scullin 2614

- L1 = 1/4" dia. slug tuned approx 30t of 30B&S tapped 20t at cold end
- L2 = 1/4" dia. slug tuned approx 25t of 30B&S
- L3 = 8t 30B&S
- L4 = 8t 30B&S 1/4" dia. slug tuned
- L5 = 25t 30B&S 1/4" dia. slug tuned
- L6 = 15t 30B&S 1/4" dia. slug tuned
- L7 = 7t 16g tinned copper slug tuned
- L8 = 5t 18g tinned copper slug tuned
- L9 = 3t 18g tinned copper slug tuned
- L10 = 4t 18g tinned copper slug tuned
- L11 = 3t 18g tinned copper slug tuned

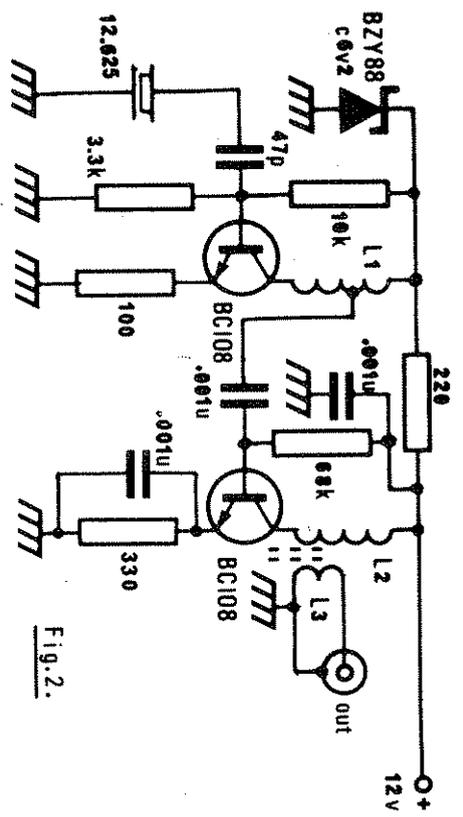


Fig. 2.

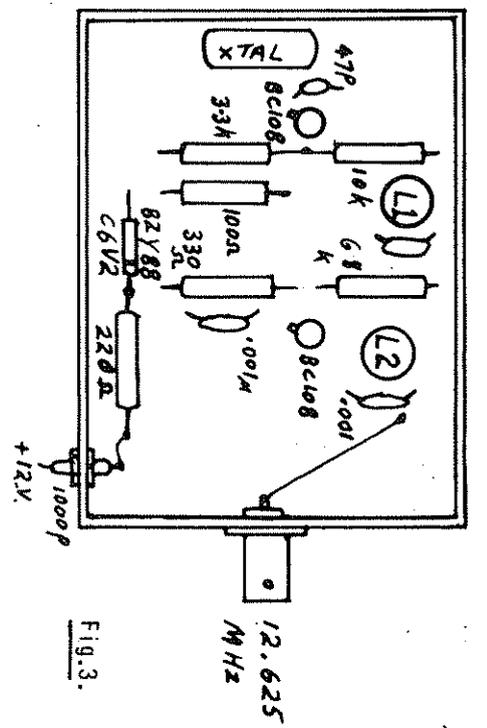


Fig. 3.

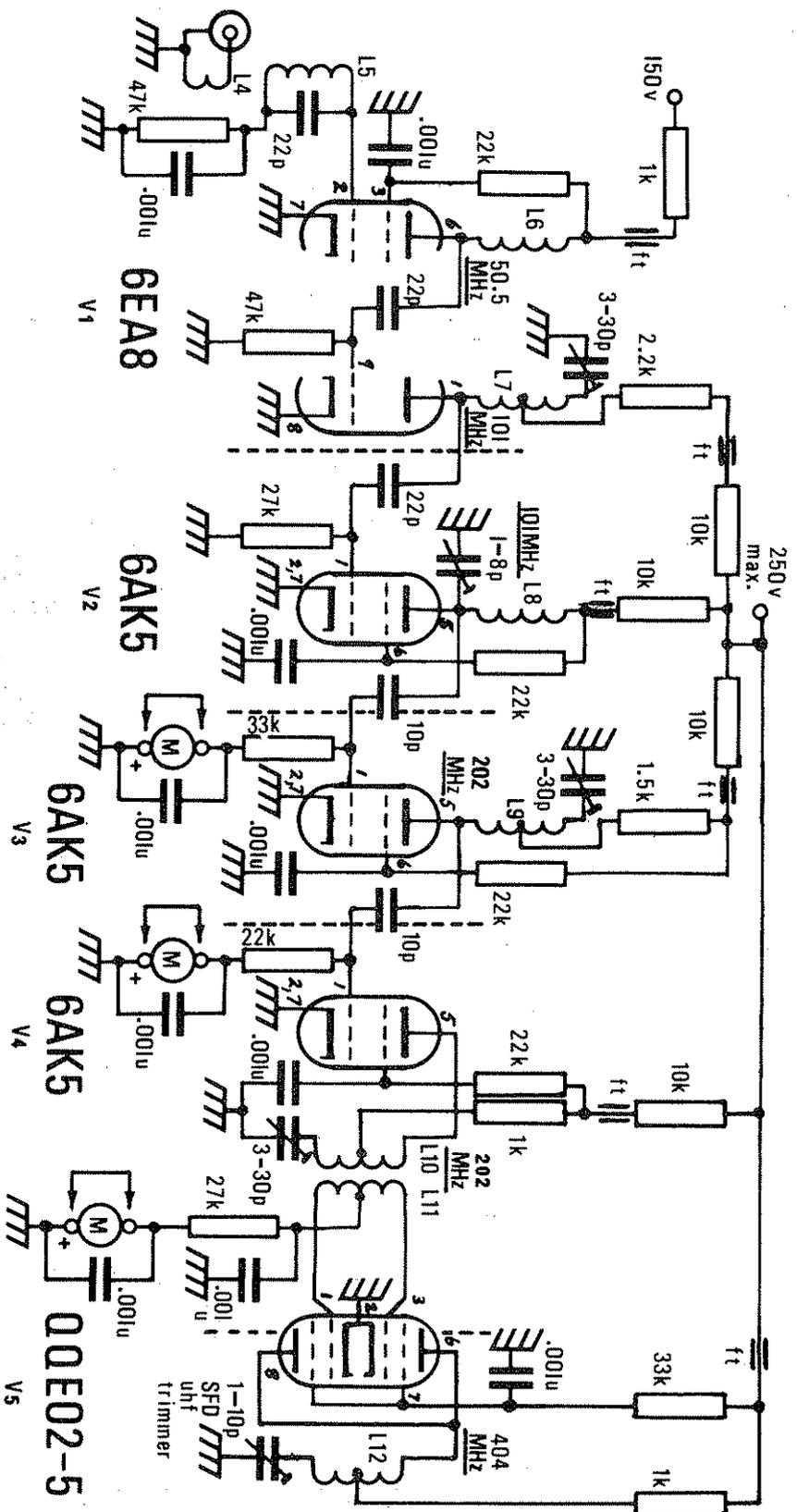


Fig. 4. multiplier chain - 432MHz SSB Tx

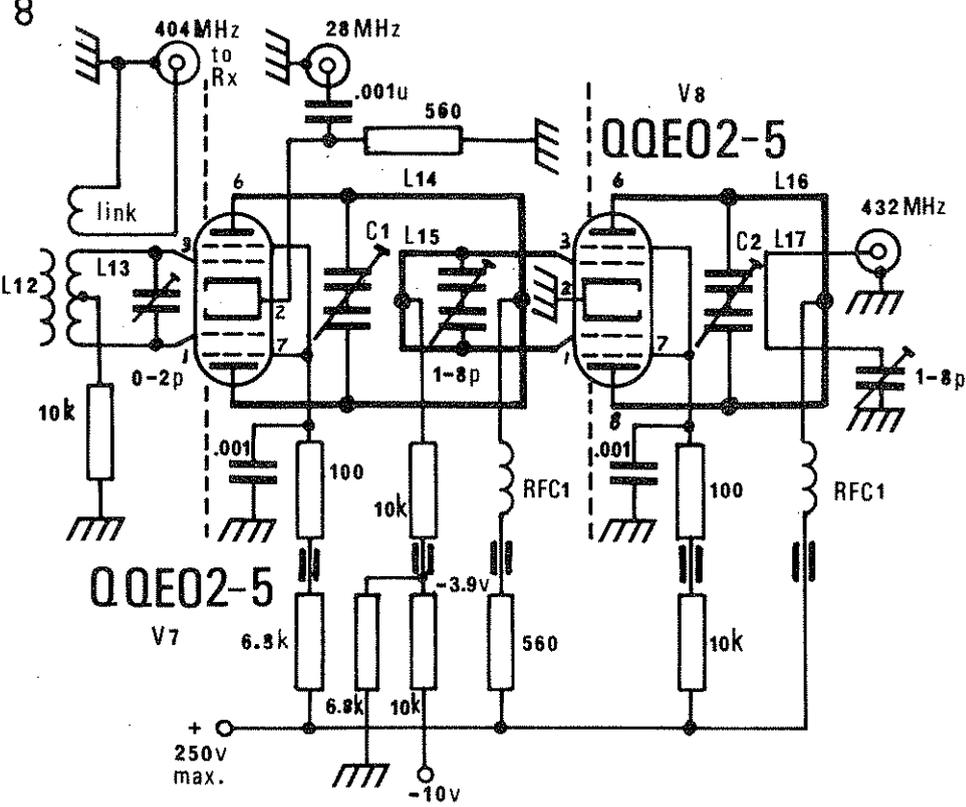


Fig.5. Mixer - Amplifier.

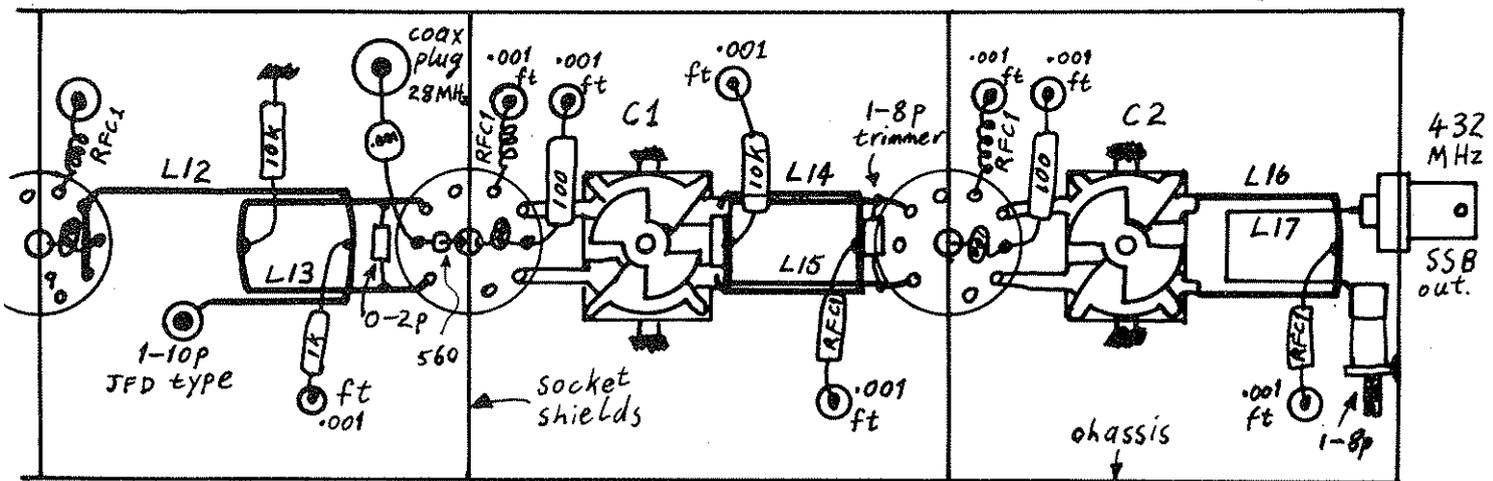
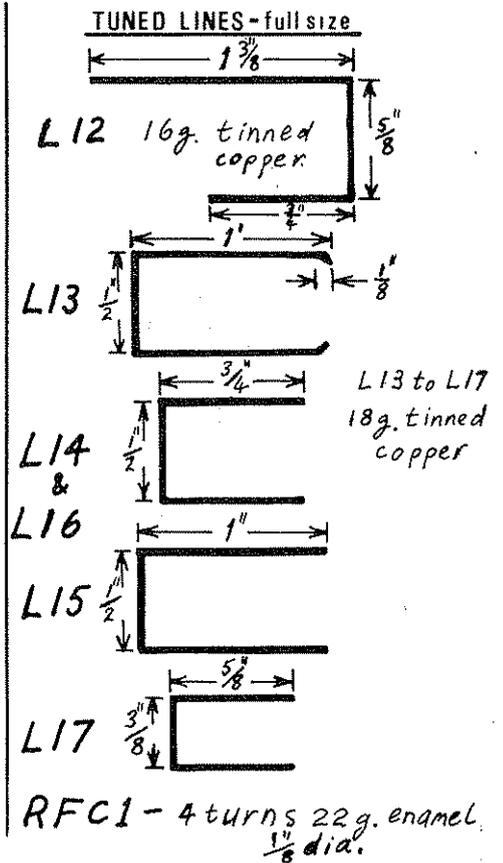


Fig.6. FULL SIZE LAYOUT - mixer-amplifier.

V5-V6-V7 RFC = 4 turns 1/8" dia. 22 swg.  
 V8 RFC = 4 turns 1/4" dia 18 swg.  
 FILAMENT RFCs.

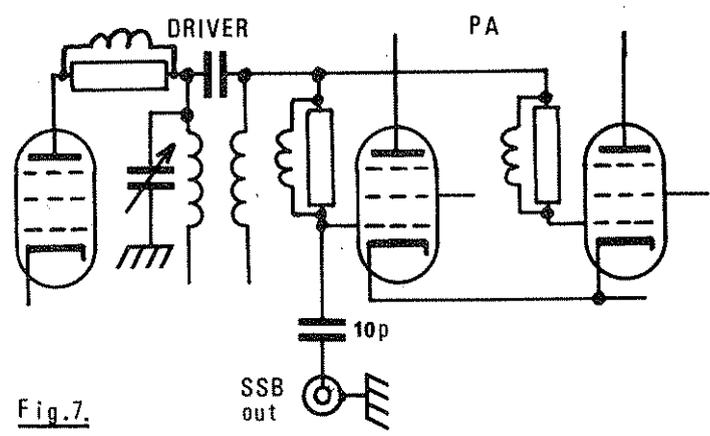


Fig.7.

NEXT MONTH.....  
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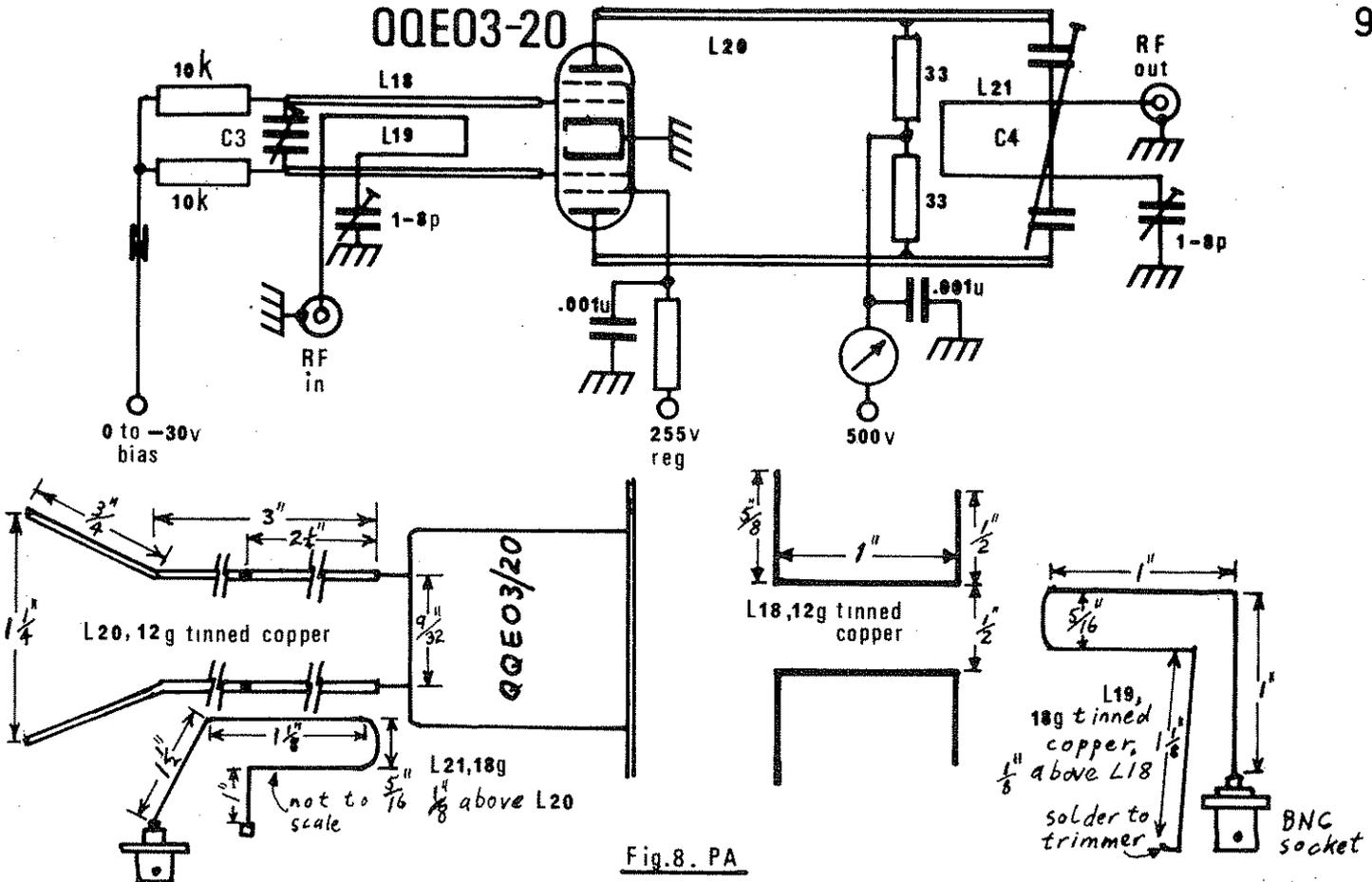


Fig.8. PA

The QQE03/20 Amplifier

Connect the exciter output to the main PA by a length of coax cable and suitable dummy load on the output. Connect necessary HT voltages and adjust bias for 30mA standing current.

With 432MHz drive applied tune input and output circuits for maximum power. Remove drive (28MHz) and the output should fall to zero indicating no instability in the amplifier.

Incidentally, a check at 404MHz on the output circuit with no drive applied should produce zero reading.

Although not necessary a blower motor was used on the final PA (QQE03/20) for cooling purposes in the summer. The type used was a transverse air blower TYPE NO. QLD6/0600A1-301 L-11, 220v, 50hz and was obtained from S.T.C.

TYPICAL READINGS TAKEN  
Plate supply voltage 245v

PENTODE 6EA8

PLATE = 145v pin 6  
SCREEN = 120v pin 3  
47k GRID = 0.2mA

1st 6AK5

PLATE = 150v pin 5  
SCREEN = 100v pin 6  
27k GRID = 0.25mA

3rd 6AK5

PLATE = 100v pin 5  
SCREEN = 70v pin 6  
22k GRID = 0.5mA

QQE02/5 MIXER

PLATE = 235v 15mA  
SCREEN = 215v 4mA  
10k GRID = 0.1mA 560Ω shorted

TRIODE 6EA8

PLATE = 90v pin 1  
47k GRID = 0.25mA

2nd 6AK5

PLATE = 120v pin 5  
SCREEN = 65v pin 6  
33k GRID = 1.5mA

QQE02/5 DOUBLER

PLATE = 215v pin 6 + 8 paralleled  
SCREEN = 115v pin 7  
27k GRID = 0.4mA

QQE02/5 AMPLIFIER

PLATE = 250v 50mA  
SCREEN = 150v 9mA  
GRID VOLTS = -3.9v

QQE03/20 FINAL

PLATE = 500v  
SCREEN = 255v  
GRID VOLTS = -25v

STANDING CARRIER

30mA  
1mA  
8mA

# METEOR SCATTER PROPAGATION

by Rod Graham VK2ZQJ

## Distribution of Meteors

As has been mentioned previously, meteors can be considered in two groups ..... shower and sporadic. A number of physical parameters have been considered, now we consider meteor distribution.

Sporadic meteors are ever present, see table in part 1. At around 0600 local time, the earth is looking, in effect directly along its orbit, sporadic meteors peak at around this time. Some 12 hours later, say 1800 hours local time, the view is back along the orbit and only the faster meteors can catch up, thus there is a minimum of sporadic meteors at this time.

Shower meteors on the other hand, as the name implies, come as a discrete group from a point, the radiant.

## Some Features of Showers

A given shower can reappear from year to year and be equally distributed from year to year. Other showers show a display one year and other years a very minor display; showers can therefore have periods. Thus it does not follow that a shower one year will necessarily support a DX pile up the next (see 15, page 23). To support the radio data for year to year consistency of some showers and the non year to year consistency of others, much visible observation data is available; much of which is of historical interest.

To successfully use a shower for radio propagation not only is it necessary for the shower to have a useable radiant as far as the stations are concerned, it is also necessary to know the time of occurrence, but more importantly when the shower peaks. This latter point has often been overlooked.

The november 17th 1968 LEONIDS, a regular shower for the northern hemisphere, was particularly dense in 1968. By visible observation the shower peaked at 1751 hrs, the half-maximum counts occurred at roughly minus nine minutes and plus 24 minutes, an asymmetrical peak it will be noted. (8,26).

By way of contrast to the LEONIDS, was the display of the 1967 PERSEIDS. This reoccurring shower appears in august. The shower peaked on the 13th august, the half-maximum counts occurred on the 11th august and the 14<sup>th</sup> august, in marked contrast to the LEONIDS (27,4 page 40).

The december '67 GEMINIDS reached a peak which lasted for less than one hour (7), the delta AQUARIDS peaked for a period of over three weeks (28)!

## Meteor Density

Given the time of occurrence, another important consideration for propagation is the number of meteors per unit of time. The number of meteors by visible count is a well established exercise of astronomical interest. Various authorities have pointed out some of the problems in estimating the numbers of meteors arising from a particular radiant. The major parameters will be considered. Visibility: Astronomical objects are measured in units of light intensity which are referred to as units of magnitude. Minus numbers are very bright, the more negative the brighter the object; the larger the positive value the fainter the object. Fairly obviously there is introduced immediately an observer capability criteria and whether or not a telescope or some other optical aid was employed. A trained eye can detect objects of magnitude 5, rather faint. The 1967 PERSEIDS ranged from -2 to +2 with occasional fireballs at -8, extremely bright. (28).

There is also the problem of the field of view subtended by the observers eye. It is well known that the fainter the object, the smaller the field of view (23). It has been shown that while the observed ratio of objects of magnitude 1 and 5 was about 1 to 5, the actual ratio was 1 to 25 (23), a problem which rapidly becomes more serious.

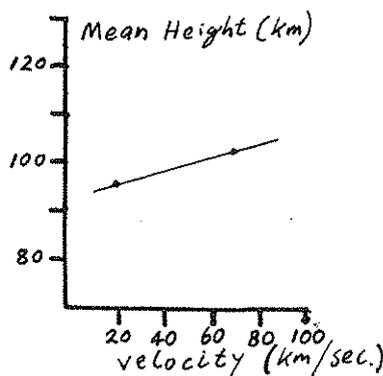
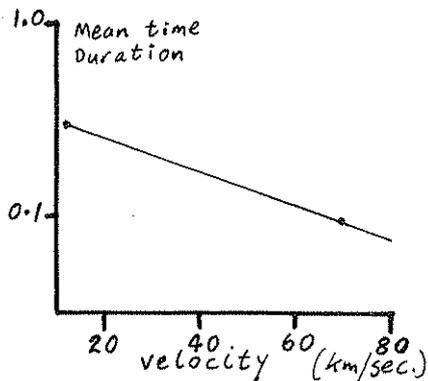
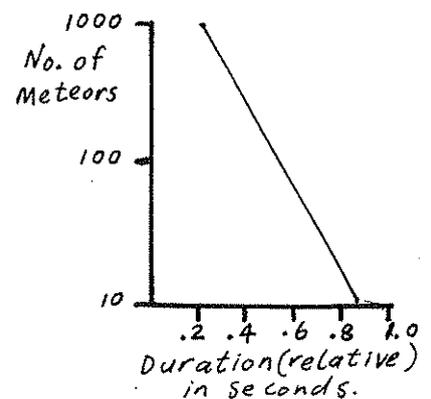
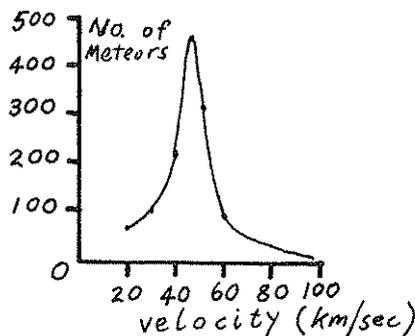
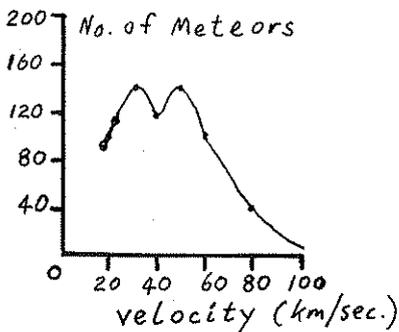
Yet another consideration is the distribution of meteors from the radiant. Some radiants are known to be tightly clustered eg: the LEONIDS; the PERSEID radiant occupies an area of some  $20^{\circ}$  (23,28). Thus it can be seen that exactly where the observer happens to be looking can influence the count over and above the strictly optical considerations mentioned previously. For a discussion on the concept of zenithal hourly rate see 27, 26 and 29. The ZHR is a device used to rationalise data for curve plotting.

Having considered the visible counting problems we now consider the radio detection problems and subsequent correlation. As will be developed later, how many meteors are detected is a function of frequency, power, receiver sensitivity, antenna direction, beam pattern, beam width and transmitter pulse rate. It can easily be seen that a return pulse of several seconds duration could exclude a

series of shorter pings; that the antenna pattern was unfavourable for a particular event. One concept used to obviate the latter problem is the technique of whole sky surveillance. The antenna is a pair of crossed dipoles or a collinear array, the former usually fed out of phase and looking upwards with a beam pattern of perhaps  $120^\circ$  width, which means that the resultant pattern misses events below say  $30^\circ$  above the horizon (quadrature feed crossed dipoles at  $0.3\lambda$ , and an independent  $\frac{1}{4}\lambda$  vertical on an infinite aluminium groundplane)(- excellent antennas for Oscar 6).

It has been argued that objects of magnitude 10 can be detected by radio techniques (4). If magnitude 5 is taken as the visible limit of unaided visible detection then the ratio of visible to radio particles has been put at 1 : 1000 (4).

It is obvious that a large number of fudge factors have to be considered if one wishes to correlate astronomical named type showers with radio events. It becomes apparent that with the singular exception of some 5 showers, all in the northern hemisphere so far (15), the vast majority of the well beloved visible showers must be relegated to insignificance when radio propagation is under consideration - this problem of correlation is very obvious from table 1, part 1 of this series. To date it seems to be fair comment that the southern hemisphere does not enjoy the genuine visible/radio showers described for the northern hemisphere, on the other hand perhaps the peak was too sharp as per LEONIDS, maybe the southern hemisphere showers are all broad as per PERSEIDS.



LEFT OUT OF PART 1. page 6. "The Local Scene" the states worked and prospects of VK3 were left out. Add: VK3 to VK5 worked. VK4, VK8, VK2, VK5, VK7 back scatter.

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6UP STATE OF THE ART CONTEST

In august 1972 the NSW VHF Group WIA held a three week contest which was designed to encourage marginal forms of VHF and UHF communications by disallowing such modes as sporadic E, Transequatorial and F2 propagation and prohibiting use of net channels, repeaters and translators. In order to further encourage use of State of the Art techniques, minimum distances for each band were specified, these being based on the normal range of "beginner" type stations.

Although no national publicity was given, entries were received from four states but the logs were "lost" by the new committee and no results or explanations, for not publishing results, were made available despite complaints from entrants.

As the NSW VHF Group has not held a contest since june 1972, the publishers of 6UP have decided to hold a contest on the above lines during the coming winter. We intend to publish the results in october 6UP and are offering as first prize a subscription to "VHF Communications" or some other suitable journal if the winner prefers.

RULES

- (1) DURATION 0000hrs 16th july to 2400hrs 5th august 73. (All times EAST).
- (2) There is one division..... Transmitting, Open.
- (3) All Amateur Stations may enter, whether fixed, portable or mobile.
- (4) All VHF and UHF bands may be used, but cross-band contacts are prohibited. Cross-mode contacts are permitted.
- (5) Only one contact per band per station is allowed for each calendar EAST day.
- (6) Entrants must operate within the terms of their licences.
- (7) Before points may be claimed for a contact, serial numbers must be exchanged. The serial numbers of five or six figures will be composed of RS (telephony) or RST (telegraphy) report plus three figures, commencing at 001 for the first contact and increasing by one for each successive contact.
- (8) On the 52MHz band, contacts via the modes generally referred to as sporadic E and transequatorial propagation will be disallowed. The Editor reserves the right to adjudicate doubtful cases. Contacts over distances below 50 miles on the bands 52 to 450MHz will be disallowed as will contacts below 25 miles on bands 576MHz and above. Contacts on net frequencies or through repeaters and on translators, including satellites, will be disallowed.
- (9) Scoring for all contacts will be based on mileage multiplied by a factor dependent on the band being used, as follows: The maximum score allowed for an EME contact will be 2000 points.

<u>BAND</u>	<u>FACTOR or MULTIPLIER</u>
52MHz .....	1
144 " .....	2
432 " .....	4
576 " .....	6
1215 " .....	8
above 1300MHz .....	12

Each log entry must show the claimed mileage and score. In the event of two stations disagreeing on mileage the average of the two estimates will be taken.

- (10) All logs must contain the following information: Date and time (EAST), Band, Emission, Power, Call sign worked, Serial No. sent, Serial No. received, Distance, Points claim.
- (11) Entries and logs should be forwarded to reach the Editor on or before friday, 14th september, 1973.

Send entries to: The Editor, 6UP.  
47 Ballast Point Rd.  
Birchgrove 2041 NSW.

ENHANCED METEOR SHOWER ACTIVITY FOR THE SOUTHERN HEMISPHERE

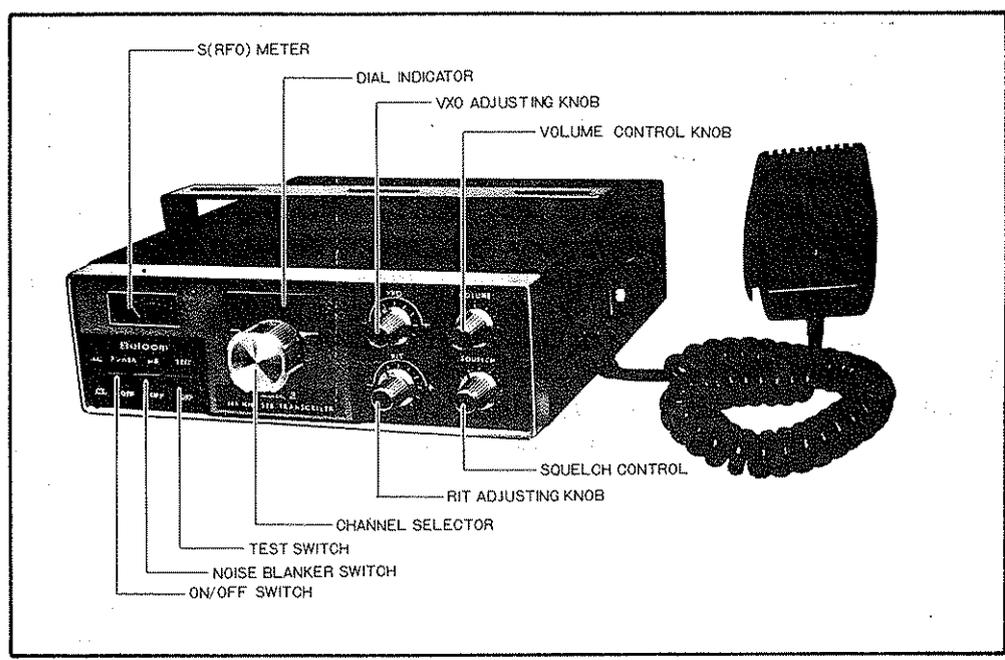
MAY	4,5,6	SEPT.	nil
JUNE	8,9,10,11,12,23,24.	OCT.	20,21,22
JULY	26,27,28,29,30,31	NOV.	nil
AUGUST	1	DEC.	4,5,6,12,13,14

SIDEBAND ELECTRONICS ENGINEERING

BELCOM Liner 2

SSB transceiver for 144MHz, 10watt PEP output, 12v dc operation, VXO coverage 144.100MHz to 144.330MHz, can be modified to any other part of the two metre band with additional mixing crystals, complete with microphone and mobile bracket, many facilities as noise blanker, clarifier on reception and squelch;

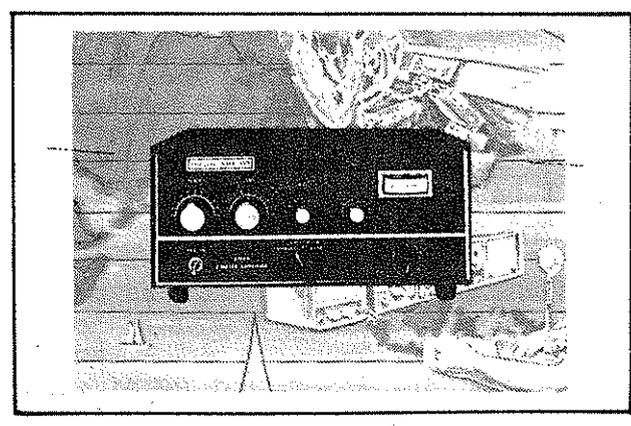
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.....\$375 - S.T. included.



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phone: (047) 511-394 (renewed old number)

# 6UP REVIEW

Band Post Mortems, Special Events, Conventions  
and other happenings on the VHF scene

## BAND POST MORTEMS

with Mike Farrell VK2AM

**52MHz** The chief event on this band over april was the first JA opening for 1973 to NSW on the afternoon of the 13th. Signals were fairly weak and short lived but VK2s ZRH, ZNS, ZQG and BHO worked one or more JA3s. Other VK2s were heard in Japan but not worked. Several VK3s reported hearing weak carriers and possibly Vladivostok TV during the opening but no workable signals.

Over Easter, VK4RO heard the HL9WI beacon at good strength. Bill, HL9WI, was contacted on 20m but was not able to hear Ross's six metre signal owing to a high noise level at the Korean end.

Several Es openings have been noted - VK4 to VK3 on the 14th and VK4 to VK2 on Easter sunday. The last opening in april was on the evening of the 30th at 2035EAST. Signals were weak and in-and-out but VK7ZAI was heard S9 at times trying to break a QSO between VK2ZOI and VK2ATQ. The opening was unfortunately short lived.

Weekend meteor scatter contacts are continuing (c.f. april 6UP) and good results are expected during the Aquirids shower in the first week of may. Now is the time to organise schedules for the June-July meteor season - it is expected that many stations who would like M/S contacts with VK2 stations but do not know of the activity situation here may care to write to the Editor and he will list your call as being available for schedules, in the june issue.

There is a beacon on the Ogo SOWARA Islands transmitting on 50.110MHz for those interested in listening for rare DX.

From Peter Jackson VK6ZDY comes the following report. Peter recently transferred his job to Port Hedland and has been getting amongst the TEP DX.

JAs started coming through on the fourth of march and have been in fairly regularly to date of writing (10th april), signals ranging from 4 & 1 to 5 & 9+++.

JHLIGC runs unknown SSB power into four bays of stacked 5 element yagis at 34m height. Needless to say he's very strong. Most JA openings have been to the north of Australia. The JAs report hearing VK8VF, VK6TS and VK6DR at Carnarvon. They also report working into DU1, DU9GC on 50.100MHz and DU9KGG on 50.120MHz. HL9WI not heard so far.

On Es have heard VK6VF on 23-3-73 from 1050Z-1220Z also VK6CW and others on the 52.765MHz FM net at 5 & 7 but couldn't break them. Darwin VK8VF heard on two occasions: 19-2-73 at 0345Z R5/S7, 6-3-73 1030Z-100Z R4/S1.

Peter runs FT200-FTV650 into a 5 element yagi at 15' or a turnstile.

**144MHz** Concerted efforts by Sydney stations to work into Victoria on this band are starting to pay off. Schedules between VK2AM and VK3ANP have been enlarged to include VK2NN, VK2ZRH, VK1MP and VK3AJN. The two VK3s being located in Wangaratta. Signals have been heard both ways but no QSOs as yet although it appears to be only a matter of time.

A pleasing offshoot from these schedules is the interest being generated in country areas. A number of VK1 and VK2 south-western stations are listening in and making plans to come on the air. VK2ZBP at Illabo (near Junee) receives the Sydney dogpile at good strength and will be transmitting shortly. VK2SW, Wagga is listening on 144MHz with a 7 element yagi and works VK3AJN cross-mode. The prospects of Wagga activity should be of great interest to VK5 as well as VK2 and VK3.

A new Canberra station now on is John VK1JL. He runs a 2E26 to a ten element yagi and is in a good location.

In northern NSW, VK2ZAY Boggabri continues to put a large signal into Sydney on SSB and VK2ZCV Tamworth is back on SSB. A new, not so DX station is VK2AHK at Windsor on SSB with a Gonset rig to a cubical quad. Reg. VK1MP is going SSB so he can talk to Barry VK2ZAY.

VK5VF on 144.8MHz is now being monitored by VK2ZRH on M/S - he receives good pings and bursts, considering the relatively low ERP, and Roger's only complaint is that the frequency varies from day to day, sometimes making the beacon hard to find. Several stations are hoping to do some two metre M/S work this winter.

**432MHz** In the absence of any startling news, we have excerpts from the Dapto Moon-bounce project to march 1973 by Lyle Patison VK2ALU.

On 31/3/72 the first major step was achieved when we heard our own echoes from the moon on 432MHz after solving the problem of receiving preamplifier transistor burn out which was caused by low frequency oscillation in its constant current power supply circuit.

Moonbounce tests were then arranged with WA6HXW in California USA and on the second test on 19/4/72 signals were heard both ways, resulting in the ARRL recognising WA6HXW and VK2AMW as the new holders of the 432MHz Moonbounce distance record. (c.p. 6UP may 1972.)

Further improvements were made to the receiving system, notably the construction and use of a variable frequency variable bandpass audio filter which employed a special active filter device provided by K6MYC. Towards the end of the year a very exotic transistor (Fairchild Type MT4578) was received from W6FZJ. This allowed the construction of a receiver 432MHz preamplifier to the circuit also supplied which, when tested by a very accurate noise generator, gave the remarkable noise figure of 1.2db. This preamplifier has now been installed in the feed box in place of the BFR91 preamplifier and a worthwhile improvement in received signals is anticipated.

A total of 18 EME tests were carried out over the year with WA6HXW (6), OZ7UNI (2), K2UYH (5) and W6FZJ (5). Signal reports were exchanged on 6 occasions, as follows; WA6HXW (2), K2UYH (1) and W6FZJ (3). Tests are continuing with K2UYH and W6FZJ.

A very interesting test was carried out on 21/1/73 when the amateurs at the Naval Research Laboratory in the eastern part of the USA listened for signals from throughout the world via the EME path with their 150 ft. diam. dish VK2AMW gained the distinction of being the best signal heard on 432MHz according to the NRL reports, we were also the only station heard south of the equator on any of the bands (144MHz, 432MHz and 1215MHz) used by NRL for the tests.

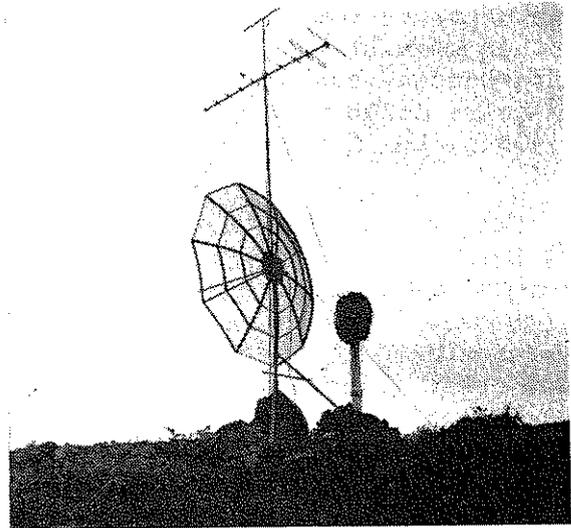
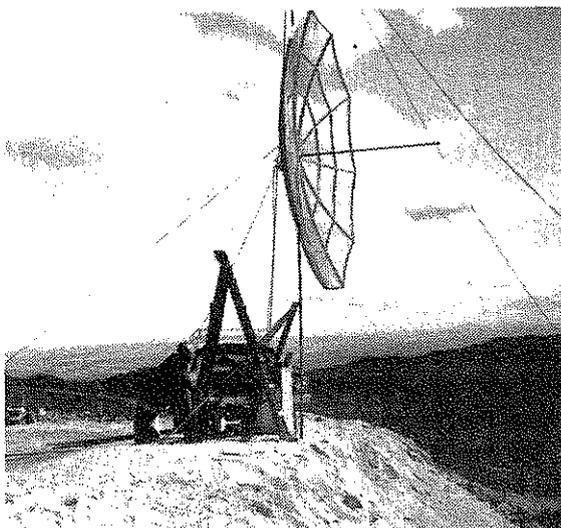
Equipment operation has been simplified during the year by the use of an automatic transmitter keying system by means of a programmable tape recorder. Preparation time for tests has been substantially reduced by installation of all the equipment in the operating room in a large security cabinet, which allows it to be left permanently connected up ready for switch on.

The "faithful few" have continued to work on the project and in so doing, have achieved for the Illawarra Branch of the WIA a well known and respected position in the field of serious amateur experimental work.

On the local scene, Rod Graham VK2ZQJ has completed a 432MHz linear amplifier using 4CX250Bs in parallel, employing stripline construction. This amplifier was described by K2RIW in april and may 1972 QST.

1296MHz Neil VK1ZT, having recorded the signals of VK3AKC and W2NFA via EME has now been heard by the Naval Research Laboratories in New Jersey via EME. Congratulations Neil !

David Tanner VK3AUU has recently constructed a 1296MHz converter using a 1N21F mixer double converting to 14MHz with 113MHz as the first IF, single crystal arrangement. He says that he's not too sure of its performance as yet, but it appears to work.



Two pictures of Neil VK1ZT's 10ft dish for 1296MHz in its previous role as portable antenna for long range troposcatter work on this band. The pictures were taken on Round Mountain (VK4) during Neil's record breaking attempt as VK4ZT. Neils OM, ZL2IA shown with gear.

16 2304MHz Encouraged by the results of a 28 mile contact on 3-9-72 the old firm of Dick VK2BDN and Bill VK2ZAC have just completed a three month rebuild of their 2304MHz equipment which was directed towards higher RF power output and improvement in portability. A successful trial was conducted on tuesday 24-4-73 over a path of 53.5 statute miles with VK2BDN located at North Head near Manly and VK2ZAC at Kings Tableland near Wentworth Falls. Elevation of the respective sights were 250 ft. and 2898 ft. above sea level and the path was near optical. The contact was maintained for one hour. This is a new record for 2300MHz.

Signal reports exchanged were 5&9 + both ways. Bill VK2ZAC created a sensation by removing the 4' parabola and substituting a 1 1/4" groundplane antenna. This resulted in a report of 5 & 6.

#### Equipment

VK2BDN Transmitter: Solid state 144MHz exciter and 30 w PA. (28 w out at 144MHz). Varactor doubler chain to 2304MHz. Estimated Po = 2W. NBFM Mod. Antenna: 4' dish with dipole feed. Receiver: xtal locked converter, 1N21F Mixer to 144MHz receiver.

VK2ZAC Transmitter: Valve 144MHz exciter and 30 w (input) PA. Varactor doubler chain to 2304MHz. All the rest as above except for use of 50MHz IF.

The above notes courtesy of VK2ZAC via VK2BDN.

#### FEDERAL CONVENTION

##### Fm Nets & Repeaters.

It is not worth wasting space here detailing the "1973 2 metre Bandplan" as it is readily available from official sources. Suffice to say that it's a messy conglomeration — and few would disagree.

Only one state has announced its intended moves with regard to the results of the Federal Convention on this issue, and that is VK3. On their regular sunday morning broadcast of 29-4-72 they announced the following changes: Prime Simplex channel: ch. 40 - 146.00MHz. Secondary Simplex channel: ch. 56 - 146.80MHz. Geelong Repeater: New channel 4 - input 146.4MHz, output 147.00MHz. Melbourne: New channel 5. Mount Macedon: New channel 6. Bendigo, Gippsland and Mildura: New channel 11. The changes will occur on sunday 3rd june subject to PMG approval.

It appears however, that in VK2, there is quite some reaction against the "1973 2 metre Bandplan" and negotiations may be instituted to propose a more acceptable compromise. It's like changing your mind in the middle of an abortion.

##### Novice Licensing

The proposed novice licensing structure went through - with the request for an added segment of 200kHz on 28MHz. The proposed segment was 28.100MHz to 28.200MHz. It may have been better for amateur radio in Australia to have novices also allowed operation on segments of six and two metres.

Favourable consideration of novice licensing by the PMG should see an increased and hopefully an improved amateur service in Australia.

##### 50MHz

A proposal to allow use of a segment of 50 to 52MHz outside ch. 0. hours and in areas outside ch. 0. service areas was passed by the Federal Convention.

This is of particular interest to 6 metre DX men who want to chase elusive TEP such as VS6, KR6 and W contacts. If favourably considered by the PMG a number of Australian amateurs could participate in the TEP observations programme of WB6KAP.

Another possibility is a study of 50MHz propagation (possibly long range Es or F2 disturbances) between Australia, South Africa and the Antarctic continent.

Six metre moonbounce has been achieved in the USA. As this activity is located close to 50MHz, the implementation of this suggestion opens avenues here as well. ZTB

#### OSCAR REPORT

with Alan Hennesy VK2RX

The latest AMSAT Newsletter contains quite a bit of information of interest, some of which is précised here.

Present indications are that the one year life expectancy of Oscar 6 will be reached, perhaps exceeded. Amateurs in 50 countries have sent signals through A06 thus far, and DJ4ZG has performed some ranging experiments, using SSV, for elementary orbit measurements.

From France F9FT reports some interesting effects on signal quality on 10m. Quite often, at LOS in the 1200/1400Z range, signals become extremely rough, as though reflected by aurora; we think it could be interesting to investigate. CW signals are about T4, T5 and SSB signals unreadable. The phenomena happens about 80% of the time at LOS, always around the time mentioned above. We never notice the phenomena at AOS, and also at LOS at other times and in other directions. (Editor's notes: This effect may possibly be observed at AOS for the most southerly states in VK. Monitor the 29.45MHz beacon about 5 mins prior to AOS. It is possibly

caused by travelling ionospheric disturbances or large scale ionospheric disturbances in the high latitudes. Other odd propagation effects may be noticed at LOS when the satellite passes over the equatorial ionosphere on evening passes after 2000hrs local time when 'ledges' appear in the ionosphere.c.f. A.R., may-june 1972. Please report any such interesting effects to the Editor.)

In using the satellite it is very important that all stations refrain from transmitting through the translator on the scheduled OFF days to permit telemetry data to be taken and the battery recharge.

Finally a quote from the January meeting of the ARRL board of directors. The comment regards the amateur satellite programme.

"This programme is the state of the amateur art; it is in bold contrast to 'appliance operators' who derive only enjoyment and contribute nothing to their hobby. This programme is in the best traditions of amateur radio."

The AMSAT Newsletter editorial, by Tom Mitchell (WA3THD), states that amateurs have a moral responsibility to contribute to the advancing of the state of the radio art and that this responsibility is imposed in a special way on satellite experimenters.

## OSCAR 6 PREDICTIONS

A	B	C	D	A	B	C	D	A	B	C	D
DATE	ORBIT No.	PASS START TIME GMT	LONG. WEST of crossing								
4-5-73	2512	0838	151	18-5-73	2688	0951	171	1-6-73	2863	0917	162
	2513	1025	180		89	1144	200		64	1108	191
	14	1218	209		90	1337	228		65	1301	219
	15	1413	237		94	2045	343		69	2013	334
	18	1934	324		95	2238	12		70	2202	3
	19	2121	352		96	0037	41		71	2357	32
5-5-73	20	2314	21	19-5-73	2700	0855	156	2-6-73	76	1010	176
	25	0927	165		01	1044	185		77	1201	204
	26	1120	194		02	1237	213		78	1356	233
	27	1313	222		06	1951	328		81	1919	319
	31	2025	337		07	2140	357		82	2104	348
	32	2214	6		08	2333	26		83	2257	17
6-5-73	33	0011	35	20-5-73	13	0946	170	3-6-73	88	0912	161
	38	1020	179		14	1139	198		89	1103	189
	39	1213	207		15	1332	227		90	1256	218
	40	1408	236		19	2042	342		94	2008	333
	43	1931	322		20	2233	11		95	2157	2
	44	2116	351		21	0032	40		96	2352	31
7-5-73	45	2309	20	21-5-73	25	0850	155	4-6-73	2901	1005	174
	50	0922	164		26	1039	183		02	1156	203
	51	1115	192		27	1232	212		03	1351	232
	52	1308	221		25-5-73	75	0841		152	8-6-73	51
11-5-73	2600	0913	161	76		1028	180	52	1147		201
	01	1104	190	77		1221	210	53	1340		229
	02	1257	219	78		1418	238	56	1905		316
	06	2009	334	81	1937	325	57	2048	344		
12-5-73	07	2158	2	82	2124	353	58	2241	13		
	08	2353	31	83	2317	22	9-6-73	59	0040	42	
	13	1006	175	88	0930	166		63	0858	157	
	14	1157	204	89	1123	195		64	1047	186	
	15	1352	232	90	1316	223		65	1240	214	
	18	1915	319	94	2026	338		69	1954	329	
19	2100	347	95	2217	7	70		2141	358		
13-5-73	20	2253	16	27-5-73	96	0014	36	10-6-73	71	2336	27
	21	0054	45		2800	0836	151		76	0949	170
	25	0908	160		01	1023	180		77	1142	199
	26	1059	189		02	1216	208		78	1335	228
	27	1252	217		03	1411	237		82	2043	343
	31	2006	332		06	1932	323		83	2236	12
14-5-73	32	2153	1	07	2119	352	84	0035	41		
	33	2348	30	08	2312	21	11-6-73	88	0853	156	
	38	1001	174	28-5-73	13	0925		165	89	1042	184
	39	1154	202		14	1118		193	90	1235	213
40	1347	231	15		1311	222					



This series of articles will describe simple, practical equipment to enable the newcomer to UHF to get started on the first of our UHF bands. Interest in, and activity on this band is increasing monthly, in fact, in Sydney activity at times is so great that it is impossible to work everyone on!

Basically, 432MHz is an experimenters band, currently the favourite band of moonbouncers, not to mention the TV addicts on 426.25MHz.

This article from Roger Hord VK2ZRH describes a simple wavemeter, a very useful piece of equipment. When getting multiplier stages working it is extremely handy knowing which multiple you're coming out on. The wavemeter is also handy for checking the tuning of transmitter stages and for spurious outputs.

#### Construction

The wavemeter is actually a tuneable coaxial cavity made from brass pipe and plate. The cavity is  $5\frac{1}{2}$ " dia. and  $4\frac{1}{2}$ " high and houses a quarter wave line  $3\frac{5}{8}$ " long capacitively tuned. The capacitor discs are  $2\frac{1}{2}$ " dia., one fixed and the other soldered to a piece of threaded (approx. 30 tpi) brass for the purpose of tuning the cavity. The two coupling loops are mounted opposite each other and are connected to BNC connectors where they enter the outside wall of the cavity.

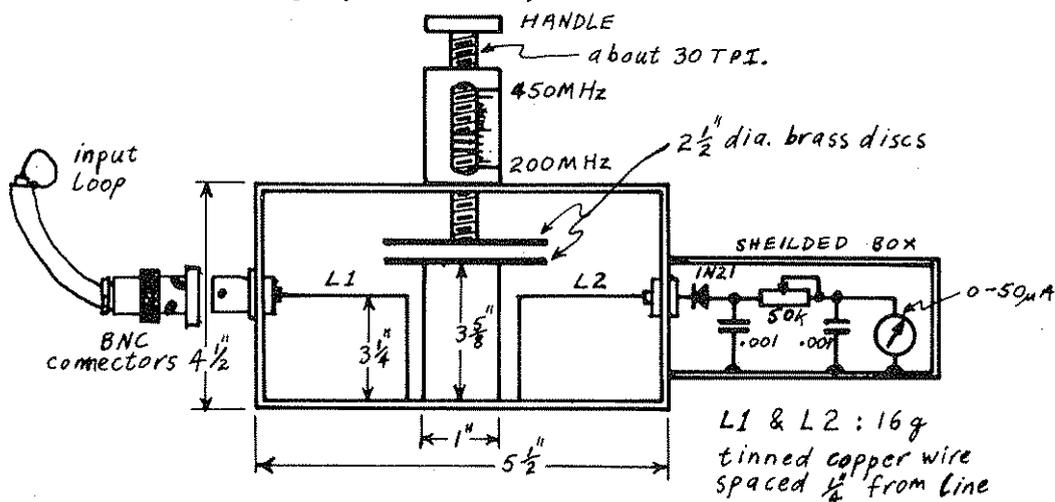
#### Calibration

By injecting a known frequency in L1, tune the cavity till a reading is observed on the meter. Reduce the input signal frequency voltage level so as to obtain a low reading to ensure the cavity and detector are not overloaded.

Mark the known frequencies on the scale then change the input signal frequency and calibrate again. Only sufficient frequencies are required around 400 to 450MHz for most purposes but a GDO can be used to calibrate the instrument to below 300MHz if so desired.

A ferrule of appropriate dia. (made from tubing) and marked or scored around its circumference can serve as a dial marker. Solder or glue it in place after slipping it over the threaded rod and positioning it appropriately.

Now you have a simple, effective, UHF wavemeter.




---

#### THE OTHER SIDEBAND

"I'd rather have the Albury plan than the present mess" — VK2ZDD

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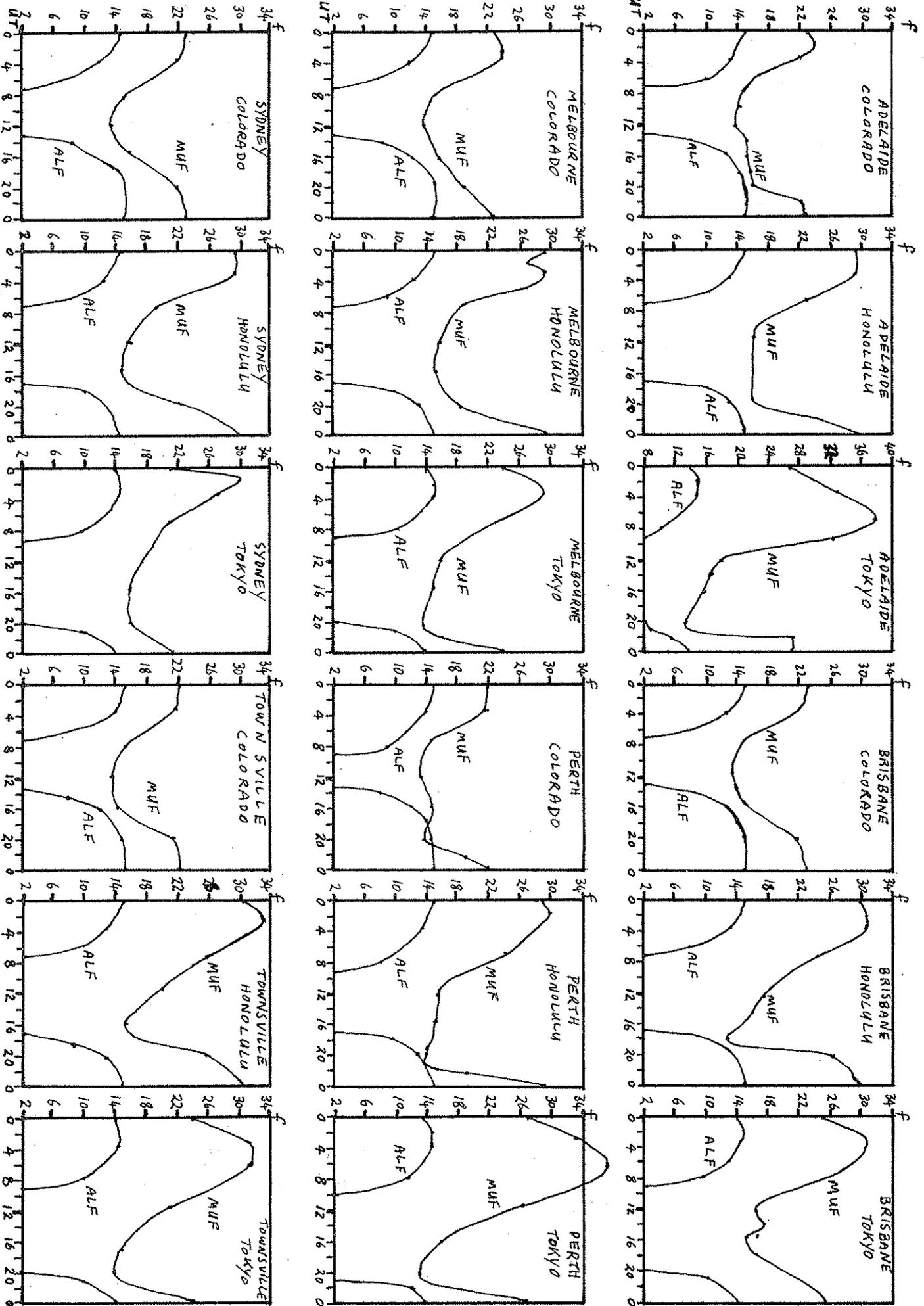
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Insert in 6UP, may 1973

SORRY, CAN'T STOP THE PRESS ITEM

AMSAT HAVE ADVISED THE FEDERAL EXECUTIVE VIA THAT FUTURE SATELLITES WILL USE THE SEGMENT 145.8 to 146.0MHz OF TWO METRES AND THAT FULL COOPERATION IS DESIRABLE IN KEEPING THIS SEGMENT CLEAR OF TERRESTRIAL USE.

IT LOOKS LIKE THE RECENT COMPROMISE IS NOW INVALID.  
ANYONE FOR ALBURY ?

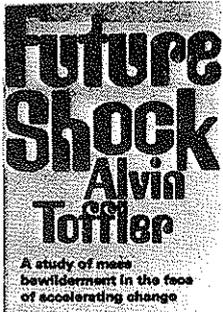
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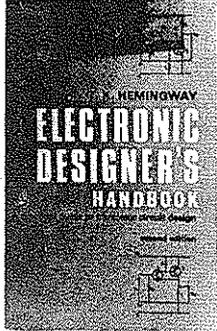
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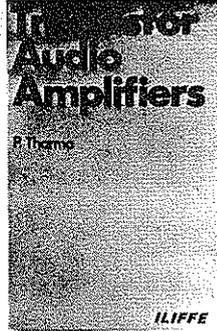
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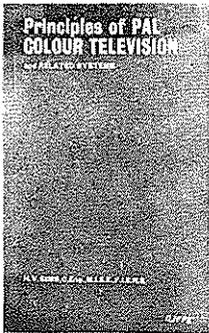
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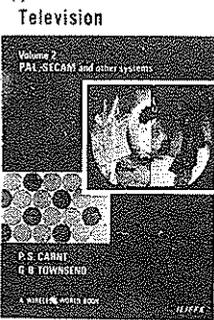
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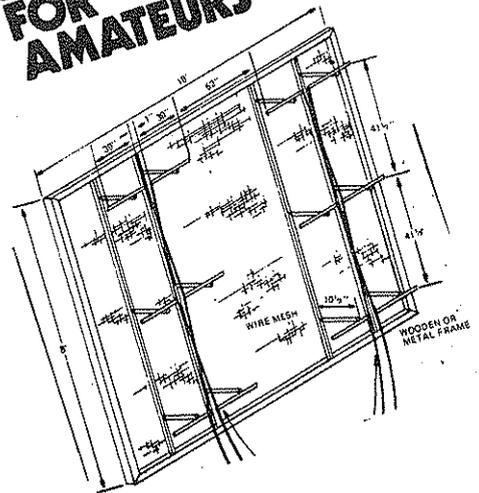
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