

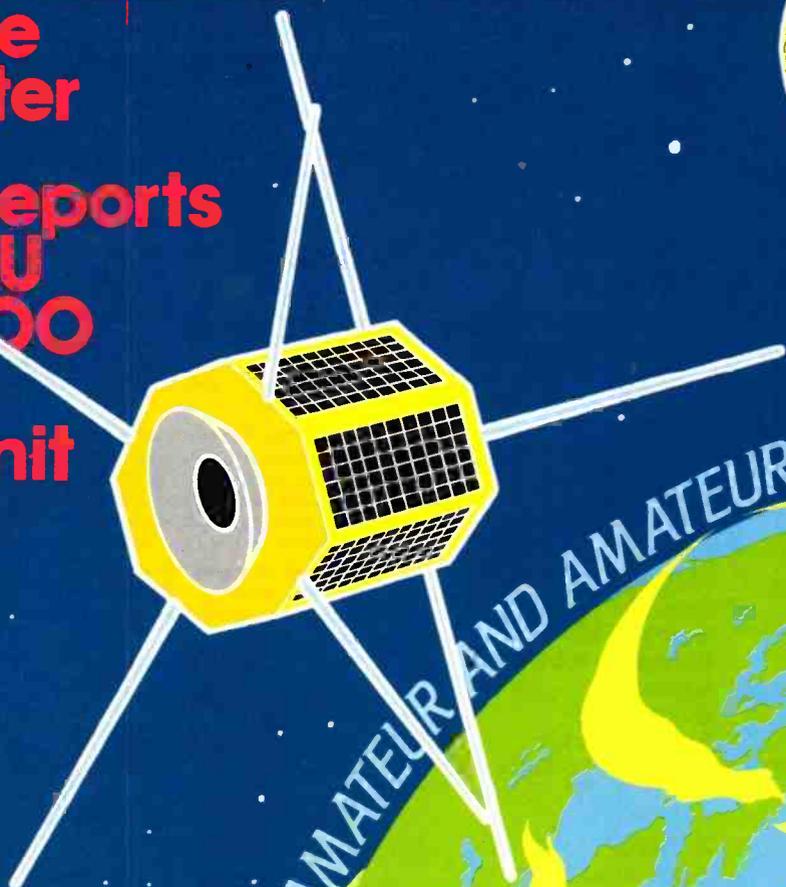
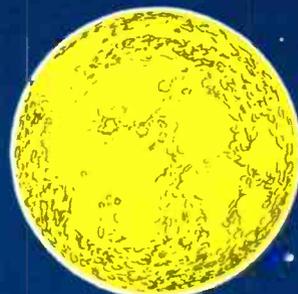
The **SHORT WAVE** Magazine

March 1985

Volume 43 Number 1

GW4 BCD builds a Six-Metre Transverter

G3 RDG reports on the TAU SPC-3000 Antenna Tuning Unit



FOR THE RADIO AMATEUR AND AMATEUR RADIO

MICROWAVE MODULES LTD



2 METRE MULTIMODE TRANSVERTER MMT144/28-R

NEW RELEASE

FEATURES

- 25 Watts Tx Output
- GaAsFET RF stage
- Transmit ALC Circuit
- 13.8V DC operated
- Repeater Shift (normal, simplex, reverse)
- High Level Double Balanced Rx Mixer
- LED Bargraph Power Meter
- RF VOX — Adjustable Delay and PTT Override

SPECIFICATION

GENERAL

INPUT FREQUENCY RANGE :	28 – 30 MHz
OUTPUT FREQUENCY RANGE :	144 – 146 MHz
MODES OF OPERATION :	SSB, FM, CW, FSK, AM
REPEATER SHIFT :	Simplex, Normal (– 600 kHz) Reverse (+ 600 kHz)
INPUT/OUTPUT IMPEDANCE:	50 ohm
RF CONNECTORS :	SO239 (PTFE)
POWER CONNECTOR :	5 pin DIN socket
DC POWER REQUIREMENTS :	13.8V DC at 6 Amps peak

TRANSMIT SECTION

OUTPUT POWER :	25 Watts
INPUT LEVEL RANGE :	¼ mW to 300mW
ALC RANGE :	20dB
LEVEL OF SPURIOUS OUTPUT :	– 65dB or better

RECEIVE SECTION

CONVERSION GAIN :	22dB +/- 1dB
NOISE FIGURE :	2dB or better
3rd ORDER INTERCEPT :	+ 19dBm (output)

DESCRIPTION

The MMT144/28-R is a high performance solid-state 2 metre multimode transverter, designed to allow users of existing HF band transceivers to establish a first-class transceive capability on the 144 MHz band.

The transverter incorporates many new and exciting features previously not found on equipment of this nature, which combine to make this product simply superb.

The MMT144/28-R can be used with virtually any 28 – 30 MHz transceiver having a low level output power in the range ¼ mW to 300mW. (An external attenuator can be used to allow a higher power level to be used if necessary.)

A noise-matched NEC GaAsFET preamplifier together with excellent filtering and a double balanced mixer produces a rugged receive converter, which has excellent strong signal handling characteristics and excellent immunity to overload and cross-modulation.

The transmit section produces a highly linear 25 watts output and incorporates an ALC circuit to ensure that a particularly clean signal is produced. This is an important feature which will virtually eliminate compressed signals and the resultant problems caused to local stations. A visual indication of relative output power is displayed by the front panel mounted LED bargraph display.

The unit incorporates the usual repeater features: – simplex, normal repeater (– 600 kHz), and reverse repeater (+ 600 kHz) and is ideally suited for all modes of communication on the 2 metre band.

The MMT144/28-R is housed in an aluminium extruded enclosure, which has both excellent electrical screening and thermal stability characteristics. Connectors are located on the rear panel together with the input level control and the DC supply fuse. Protection against reverse polarity is included. Antenna changeover at 144 MHz is achieved internally by a low-loss PIN diode switch.

This new design utilises 15 transistors, 4 regulator IC's, 3 other IC's and various diodes and PIN diodes.

All plugs are supplied.

PRICE: £215 inc. VAT (p + p £3.50).



MICROWAVE MODULES LTD.
Brookfield Drive, Aintree, Liverpool L9 7AN,
England.
Telephone: 051-523 4011.
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SHORT WAVE MAGAZINE

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Editor: **PAUL ESSERY, G3KFE/G3SWM**

Advertising: **Charles Forsyth**

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AUTHOR'S MSS

Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of A4 sheets. Photographs should be lightly identified in pencil on the back with details on a separate sheet. All drawings and diagrams should also be shown separately, and tables of values prepared in accordance with our normal setting convention — see any issue. Payment is made at a competitive rate for all material used, and it is a condition of acceptance that full copyright passes to the Short Wave Magazine, Ltd., on publication.

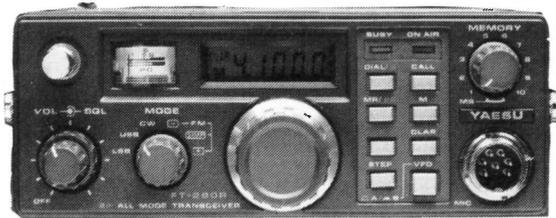
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All Mode Squelch
Triple Microprocessor Control
Matching Automatic ATU (Opt)
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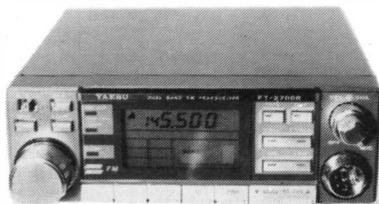
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2M or 70cms with Matching Transverter
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Matching Scanner VFO/Memories
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FT270R £325 inc
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Communications Ltd.



ICOM AT T

Come and hear the Icom range on stand A68-70 at the RSGB National Amateur Radio Exhibition

This year at the NEC, Thanet Electronics will have demonstration facilities only on our main stand, but the range and scope of these will enable you to appreciate fully the superb specifications and quality of all ICOM Amateur Radio Equipment.

You will be able to try out receivers and transceivers as base stations, mobiles and hand-portables in all the popular frequency ranges.

Buying ICOM equipment at the NEC. will not be a problem as it will be readily available at any of the authorised ICOM dealers exhibiting at the show.

A new exciting set will be seen at this years show, it is the ICOM IC-3200E FM Dual-band transceiver (144-430/440 MHz). This is the smallest transceiver available.

The IC-3200E employs a function key for low-priority operations to simplify the front panel. LCD display is easy to read in bright places, showing frequency, VFO A/B, memory channel duplex mode and S/R/F meter information.

Other features include a 10 channel memory able to store operating frequencies, Simplex or Duplex. A memory lock-out function allows the memory scan to skip programmed channels when not required. The IC-3200E has a built-in duplexer and can operate on one antenna for both VHF and UHF. Options include: IC-PS45 DC, power supply, HS-15 mobile mic, SM6 and SM8 desk mics, SP-10 external speaker and UT-23 speech synthesizer.

A great future is predicted for the IC-3200E against its rivals, due to the reasonable price of this model. For more details come and see us on stand A68-70. BCNU.



New!
IC-3200E

IC-290D/290E



290D is the state of the art 2 meter mobile, it has 5 memories and VFO's to store your favourite repeaters and a priority channel to check your most important frequency automatically. Programmable offsets are included for odd repeater splits, tuning is 5KHz or 1KHz.

The squelch on SSB silently scans for signals, while 2 VFO's with equalising capability mark your signal frequency with the touch of a button. Other features include: RIT, 1 KHz or 100Hz tuning/CW sidetone, AGC slow or fast in SSB and CW, Noise blanker to suppress pulse type noises on SSB/CW.

You can scan the whole band between VFO's/scan memories and VFO's. Adjustable scan rate 144 to 146 MHz, remote tuning with optional IC-HM1 microphone. Digital frequency display, Hi/Low power switch. Optional Nicad battery system allows retention of memory.

Soon to be announced!
IC-735 New Compact HF. R7000 VHF/UHF Receiver.

Thanet ICOM Thanet ICOM

RADIO SHACK FOR EVERYTHING IN AMATEUR RADIO

SPECIFICATIONS

Frequency range:
66-88 MHz Low Band
138-144 MHz Extended UHF Range
144-148 MHz 2-Meter
Amateur
148-174 MHz High Band
406-420 MHz Extended UHF Range
420-450 MHz 70-cm Amateur
450-470 MHz UHF Band
470-512 MHz UHF 'T' Band

Size: 9"W x 3"H x 9 1/2"D

Weight: 3 lbs.

Power Requirements: 12V DC

Audio Output: 800 Milliwatts RMS

Antenna: Telescoping (supplied)

Sensitivity: 1.0µV for 12 dB SINAD

Scan Rate: Selectable, 5 or 15 channels per second

Connectors: External speaker card edge connector (optional accessory Model No. WH-1)

Performance and Value. Bearcat® 200FB

16 channels.
Program 16 frequencies for automatic scanning in any combination of bands and frequencies.

Patented Track Tuning.
Electra-patented feature allows scanner to peak on each transmission automatically for optimum reception.

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Lets you sample a designated frequency, on Channel 1, every two seconds to prevent missing important calls.

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Dual scan speed.
Scan at either 5 or 15 channels each second.

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Sets lower and upper frequency limits for Automatic Search. Also used to "step down" through frequencies in Manual Search.

Automatic lockout.
By-pass any channel not of current interest for faster scanning cycle.

Single Antenna.
Single telescopic antenna provides optimized reception without the need for long low band antenna.

Crystal-free.
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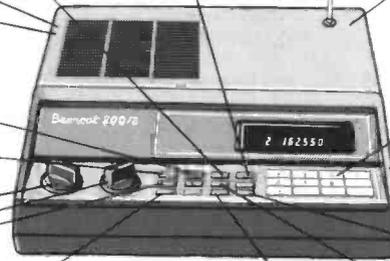
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- 1/100 1W in 100W out. £148.00.

All Ex-stock

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All prices include delivery (UK only) and VAT at 15%. Independent reviews shown in (brackets).

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SRB2 Automatic Woodpecker Blanker as seen on a well-known TV science programme. (SWM Sept. 83, Ham Radio Feb. 84, World Radio TV Handbook 84). **£86.25**

ANF Advanced stand-alone automatic whistle removal filter for SSB, plus CW filter. (SWM July 83, Ham Radio Oct. 83, R&EW July 83). **£67.85**

FL2 SSB/CW/RTTY Variable audio filter. (Rad Com, Aug. 80) **£89.70**

FL3 SSB/CW/RTTY audio filter (as in FL2) plus automatic whistle remover. **£129.37**

FL2/A Fully assembled PCB module with hardware and instructions to convert FL2 to FL3. **£39.67**

RF SPEECH PROCESSORS

ASP The fully automatic definitive RF Speech Processor ("73" July 81) **£82.80**

D75 Manually controlled RF speech processor **£56.35**
D75/K Uncased version of D75 **£40.70**

MORSE EQUIPMENT

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MK Deluxe Self contained keyboard morse sender with memories. (SWM April 82, Amateur Radio April 83) **£137.42**

RADIO DIRECTION FINDER

This system turns any NBFM rig into a radio direction finder which really works. It is currently in use from HF to UHF by Government Departments, professionals of all kinds, and amateur "Wally Hunters". (Rad. Com. Jan. 84, Citizens Band Jan. 83).

DF + DFA2 Display unit with magmount antenna combiner. Just add four quarter wave whips and your receiver. (Antennas also available). **£182.85**

MINIATURE ACTIVE RECEIVING ANTENNAS

You don't need unsightly rambling antennas for HF reception. Be discrete like the professionals and use a Datong active Antenna. Your neighbours will definitely approve. And so will you when you hear the DX!

AD370 Complete active dipole receiving antenna. Covers 100kHz to 100 MHz. Weather-sealed for outdoor mounting. With mains power unit. (Rad. Com. June 82). **£69.00**

AD270 Indoor version of AD370 **£51.75**

RF CONVERTERS AND AMPLIFIERS

Other companies also make converters and preamps. When you choose check the "fine print" first. You can trust Datong to "do it right".

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PC1 Get "no-compromise" reception from 50kHz to 30MHz on your existing 2-metre all-mode. (Rad. Com. April 82) **£137.42**

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SELECTIVE CALLING EQUIPMENT

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CODECALL 4096 channel Selcall for any FM, AM, or SSB rig. No internal connections needed. One needed per rig. (R&EW June 82). **£33.92**

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RFS-1 Wideband RF signal detector and locator **POA**

DF2 Microprocessor controlled direction finding system. **POA**
POA = PRICE ON APPLICATION

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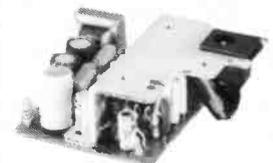


The new SS-2 Heil Sound System contains two five watt amplifiers, a 3.5" woofer with a half pound magnet a 1.5" tweeter with a 12 dB per octave passive crossover network. The tweeter is crossed over at 1500 hz, right where the response of the human ear starts to fall off and the huge woofer fills out the mid-range and low frequency response. No single cheap speaker can begin to give you this type of response.



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Kenpro 250.....	£65.55
KR400C.....	£132.50
KR600RC.....	£189.50
KR500 Elevation Rotator.....	£125.50

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SP10X.....	£28.75
SP15M.....	£41.00
SP45M.....	£59.75
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SWR25.....	£15.75
HK 708 Morse Keys.....	£16.30
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SWL 2 way Ant Switch.....	£4.75
V33 way Ant Switch.....	£10.50
V44 way Ant Switch.....	£11.95
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TH3JNR 3EI Tribander Bea.....	299.00
205BA 5 Element 20m Beam.....	£399.00
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TE214 14Element 2m Beam.....	£74.40
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9 Element 2m Yagi.....	£17.71
17 Element 2m Yagi.....	£37.66
19 Element 432MHz Yagi.....	£20.70
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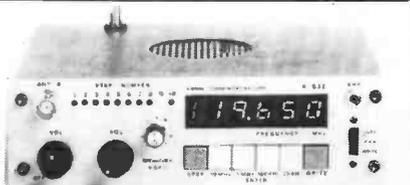
1/4 wave 2m Whip mobile.....	£2.54
5/8 wave 2m Whip mobile.....	£11.26
7/8 wave 2m Whip mobile.....	£17.06
5/8 wave Base Station antenna.....	£42.68
GPV-52m Base Station Co-Linear.....	£35.27
GPV-770cm Base Station Co-Linear.....	£35.35
GPV 720 144/432MHz dual base station.....	£25.00
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LW5 5EI 2m Yagi.....	£15.33
LW8 8EI 2m Yagi.....	£19.55
LW10 10EI 2m Yagi.....	£25.30
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Sensitivity: Better than 0.75 microvolts 10dB /SN.
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Weight: approx. 1Kg. (including memory backup batteries).

FOR THE RADIO AMATEUR AND AMATEUR RADIO



EDITORIAL

Various Topics

Firstly, congratulations to Frances Woolley, G3LWY, on the award of the British Empire Medal for her services over many years to RAIBC, an honour which she so richly deserves.

Next, congratulations to Joan Heathershaw, G4CHH, on being the first YL President of RSGB. Despite the weather some 150 people turned out to see her installed, and we understand she was featured in her shack at home by Yorkshire TV in their "Calendar" programme. This is very much the sort of publicity amateur radio needs, and we wish her a happy and successful term of office.

Thirdly, those appalling British-Telecom handsets — in particular the 'Ambassador' range — which carve up the two-metre band very effectively. RSGB Hq needs to know of all cases which can be pinned down to this box of tricks, as the whole business is to be pursued with the authorities. In other words, they want evidence — chapter and verse, with any available confirmatory data.

Finally, still with this problem of atmospheric pollution by RF, readers should be aware that any car having 'computer control' of its inner economy is almost certain to rebel if it is used for mobiling, whatever the band. Anyone who is involved with this problem again should pass RSGB the word, with in particular a sketch of the layout showing how the /M gear is wired, the feeder run, the aerial location, and so on. If you've cracked it, or if you have had sensible words with the car manufacturer or agent and the problem is solved, again pass on the information. There is a need to know! The more data is accumulated, the more weight there is to force makers to screen, or improve, their products until their cars work properly.

*John
R3KFE.*

WORLD-WIDE COMMUNICATION

VHF BANDS

NORMAN FITCH, G3FPK

JANUARY proved to be a rather mediocre month. The severe weather took its toll and those with outside and loft shacks probably preferred to keep in the house. Detuning of antennas due to ice, snow and frost can be a problem, especially with PA stages which give up if they do not "see" a 50 ohms resistive load. However, one consolation was a good *Aurora* on the 28th and which is reported in the 2m. section.

Interference

The pollution of the RF spectrum from digital devices continues to increase. The *RSGB* has received many reports of problems with *British Telecoms' Ambassador* handsets. A local informant who works for *BT* has taken his 2m. Rx to an establishment which has several systems installed, and reports quite a lot of hash coming from some. One system, known as *Ensign*, is a very common two-wire installation allowing many instruments to be connected together in a simple internal network. These contain three ICs in a plastic case and radiate badly.

Another potential source of QRM is the *Type CT22* blue Pay Phone. These are of Swiss manufacture — *AGITELCO* — and those in public call boxes are in metal cases. However, they are common in pubs, clubs and hotels, where they are not in metal screening. These radiate well, too, it seems. There are also many imported call-connect systems adding to this general pollution.

Home computers are a well known source of interference and this is being made very much worse now due to the way they are being connected to TV sets. Most home computers use the domestic TV set as a VDU, tuned to Channel 36 through a UHF modulator in the computer. Until recently, most people unplugged the TV antenna and plugged in the computer. However, the current fad is to use a *diplexer* so that the computer is permanently connected to the TV antenna via the *diplexer*. Many users leave their loaded computers on all the time, even though the TV is off, thus turning the installation into an illegal radio transmitter.

Ken Osborne, G4IGO, reports a local case from a house some distance away. He is able to tune his TV to Ch. 36 and pick up the computer buff's display. He has reported this case to the local interference people asking they take some action. It will be interesting to see what happens. Ken commented upon the remark in the January VHF that the Amateur Service is not a protected one. He suggests that, while that is true within the official meaning, there is also an obligation on others not to cause "undue interference to other services."

That is relatively easy to deal with if a spurious emission from a licensed Tx appears and bothers another service. For example, a bad spurious signal from *Radio Bangladesh* which appeared daily in the 15m. band was dealt with promptly with a Telex message a couple of years ago. But quite how the "undue interference" idea could be used to deal with computer and telephone hash is not clear to your scribe. Until wide ranging legislation is passed to limit radiation from all digital devices, the situation will only get worse. Manufacturers will not voluntarily entertain suppression measures because of additional costs. Some countries have such legislation already. We must hope that the British Government can be persuaded that similar laws are needed here.

Awards News

Congratulations to Dave Dibley, G4RQK, from Marlow, Bucks., who is member no. 44 of the 144 MHz QTH Squares Century Club. His certificate was issued on Jan. 15 for 125 confirmed squares. 83 QSOs were on SSB and 42 on CW. Propagation-wise, there were 75 tropo., 22 MS, 21 Ar and 7 Es contacts in the list. Dave has been interested in the hobby since 1965 and passed the *R.A.E.* in 1980. His Class B call was G6EFX the present call being obtained after passing the Morse test in October 1982. His station comprises a *Yaesu* FT-101ZD, transverter and PA with 85w output. A BF981 preamplifier is taped to the mast and he has built a keyer for MS operating.

Repeater Notes

Chris Young, G4CCC, of the *RSGB's Repeater Management Group* advises of an Open Meeting on March 31 in Scotland. The venue is the Lilliardsedge Caravan Park on the A68 between Jedburgh and St. Boswells in Roxburghshire and the event is being hosted by the *Scottish Borders Repeater Group* whose A.G.M. will be held in the morning. The meeting is scheduled for 1400 and further information can be obtained from Bruce McCartney, GM4BDJ.

GB3GD, located on Snaefell Mountain, 2,036 ft. *a.s.l.*, was due on at 0001 on Feb. 1. It is on 2m. channel R1. To avoid mutual interference, the Anglo-Scottish relay GB3AS was to QSY to R0 at the same

time. On Feb. 5, a new UHF RTTY repeater, GB3MT, was due to commence operation from Winter Hill, near Manchester, on RB12. It runs 50 *Bauds* RTTY and can be accessed by typing its callsign. Reports should go to Gordon Adams, G3LEQ. In Guernsey UHF relay GB3GU began operation on Jan. 27 on RB13. Reports on this one go to Mike Allisette, GU4EON.

Contests

From *GB2RS*, brief details of the 2m. CW contests last November. Winner of the 24 hour affair on the 3rd/4th in the Single-op section was G4NDG/P, while G4NUT/P won the Multi-op. part. The *RSGB* six hours event on Nov. 4 saw G4MDZ lead in the Single-op. section and G4VXE/P head the Multi-op. part.

Results are in for the *B.A.R.T.G's* Autumn RTTY Contest in which G4DCV, with 82 QSOs, won the Single-op. section with 670 points. GU4YMV was second with 619 pts. and G8SFM third with 542. Winner of the Multi-op. event was ON1UI/A with 1,088 pts. from 90 QSOs. G4IVV/A with 895 pts. was second and GW2OP with 668 pts. came third. In his report, the contest manager mentioned that of the 264 participants, only 35 bothered to send in entries.

The *Verulam ARC's* January *Newsletter* includes the results of the 1984 *Verulam Clubs* Contest in which 22 entries were received. G3UFB/A was the clear winner with 1,162 pts., G8HRC/P came second with 942 pts. and G4RLF/P third with 879 pts.

The last three legs in the 70 MHz *Cumulatives* are on Feb. 24, Mar. 10 and Mar. 24, from 1000-1200. These are all Single-op., no separate sections sessions with radial ring scoring. The 144/432 MHz and SWL Contest is on Mar 2/3 from 1400-1400 and is a two section — Single-op. and Multi-op. — event. Radial ring scoring with usual exchanges. Entries for 144 MHz only will not be accepted. In the above events, the Maidenhead locators should be used.

Saturday, Mar. 16 is the date for the *AGCW-DL* UHF CW Contest from 1900-2300 which is strictly for Single-ops. There are three classes: "A" is less than 3.5w, "B" is less than 25w and "C" is more than 25w RF output. Exchanges to be in the form of 579001/A/EL25a, the "A" being your Tx class. Note that the old European QTHL is to be used, not the Maidenhead one. Scoring per QSO is: A with A 9 pts; A with B 7 pts; A with C 5 pts; B with B 4 pts; B with C 3 pts. and C with C 2 pts. Stations who do not send you a proper report count one point. There are multipliers — one for each square and five for each WAE country worked. Final score is QSO pts. times total multiplier. Entries to DK3UZ at P.O. Box 38, D-2358 Kaltenkirchen, German Federal Republic. Entries post-marked before Apr. 30.

Two contests clash on Mar. 31 from 1300-1700. The *Barking Club's* 144 MHz event is an all-mode one, section one being for full legal limit power, while section two is low power, 20w PEP or "equivalent," whatever that means. The exchanges to consist of usual RS(T) and serial number plus the *administrative* county or Scottish region. Each QSO is worth one point with G3XBF and G8XBF counting 10 pts. Multiplier is the total of different counties worked plus the countries outside the U.K. Entries to:- BRS 31976, 32 Wellington Road, Rayleigh, Essex, SS6 8EZ post-marked Apr. 13 or earlier.

The other event on the 31st is the 432 MHz CW Contest, another "no separate sections" affair with usual *IARU* exchanges. Radial ring scoring. The *B.A.R.T.G's* Spring VHF/UHF RTTY Contest is on Apr. 13/14 and the 70 MHz Contest is on Apr. 21. More details next time.

The Satellites

The latest *UOSAT Bulletin* to hand, no. 110, includes a report on the status of the Soviet RS satellites originating from Leonid Labutin, UA3CR. RS-5's battery is "almost ruined." In early January RS-5 was identifying itself as RS-3 and send-garbled telemetry. RS-7's battery is in "mediocre condition," but RS-8's is in good order, apparently. All these will be off on Wednesdays Moscow time, which is from 2100 on Tuesdays, to 2100 on Wednesdays, GMT.

A new satellite RS-9 is now complete and undergoing bench tests in Moscow. It is another Mode A transponder with a beacon on 29.400 MHz, launch expected later this year. RS-10 is being developed and will also have a Mode A capability, plus a new Mode K — 15m. uplink/10m. downlink.

The *Digital Communications Experiment*, or DCE, has successfully demonstrated its "store-and-forward" techniques with recent exchanges between the UoS, NK6K and amateurs in Hawaii. This experiment in U-0-11 is devised to develop an eventual satellite "electronic mailbox," known as PACSAT — Packet Communications SATellite.

In response to user feedback, the schedule for U-0-9 was altered from Jan. 18. One revision is that at weekends, the *Bulletin/Digitaler/Telemetry* mode now transmits 3 minutes of 1,200 b.p.s. telemetry, alternating with about 6½ mins. of Bulletin. The *Digitaler* has been shifted to Mondays when it will alternate with 1,200 b.p.s. TLM.

The British Meteor Society

With so much interest in MS activity, membership of the *British Meteor Society* is well worth considering. Paul Whatton, G4DCV, is a member and has sent a small leaflet he has prepared and which includes an application form. British Isles

ANNUAL VHF/UHF TABLE

January to December 1985

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		23 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	Counties	Countries	
G6XLL	—	—	45	7	12	2	—	—	66
G1EZF	—	—	37	13	9	2	—	—	61
GM4CXP	5	2	34	10	6	2	—	—	59
G3FPK	—	—	49	9	—	—	—	—	58
G4YCD	—	—	50	7	—	—	—	—	57
G4SEU	13	2	28	3	5	1	—	—	52
G6ZPN	—	—	25	2	9	2	—	—	38
G4MUT	7	1	15	3	2	1	—	—	29
G4TIF	5	1	12	4	1	1	—	—	24
G6MGL	—	—	11	3	3	1	4	1	23
G8VFW	—	—	13	2	—	—	—	—	15
G4YIR	—	—	12	2	—	—	—	—	14
GW4HBK	7	1	—	—	—	—	—	—	8
GW4TTU	—	—	—	—	—	—	2	3	5

Three bands only count for points. Non-scoring figures in italics.

membership is £5.00 and overseas surface mail rate is £6.00. All members get the *BMS Handbook* and the quarterly publication, *Meteoros*. They also publish the *Radiant Catalogue* and issue Amateur Radio Reporting Sheets which members and non-members can complete and return for analysis. Anyone interested should send an s.a.e. to Paul at 55 Kingsdown Road, St. Margarets at Cliffe, Dover, Kent, requesting an application form.

VHF Convention

A final reminder about the *RSGB's National VHF Convention* on Mar. 23 at Sandown Park Racecourse, Esher, Surrey. The venue is on the north side of the A307 Portsmouth Road, a few minutes west of the Scilly Isles roundabout. Full details are on page 551 in the February VHF. The equipment test facility by Don Hamilton, G8DON, is now officially billed and Brian Bower, G3COJ, advises that the U.K. Six Metre Group is holding its A.G.M. at 11.00 in one of the lecture rooms.

Four Metres

G4MUT (Berks.) operated in the Jan. 27 *Cumulatives* and Terry found several new stations active but some of the regulars were missing. He mentions FM nets on 70.45 MHz of local origin. Jerry Russell, G4SEU, (Warks.) lists his best DX in January as G4PCB (Devon) on the 3rd, G3YJX (Cornwall) on the 18th, and G4LDZ (Norfolk) on the 25th. Martyn Jones, G4TIF, (Warks.) used SSB in the *Cumulatives* which gave him five counties and one country for the Annual Table.

John Jennings, G4VOZ, (Leics.) asks that stations in the northeast use the band; they are hardly ever heard in the Midlands, it seems. In the CW Contest on Dec. 16, he worked 23 stations and contacted GW3MHW on Jan. 8. Dave Lewis, GW4HBK, (Gwent) reports below average conditions with no enhancement of any type up to Jan. 24, ". just lots of QSB."

Two Metres

Mick Allmark, G1EZF, (Leeds) found the *Quadrantids* shower excellent this year and he completed with:- IK4DCO (EE), YU7MAU (JF), LA1K (FX), LA1BOA, IW2BNA (EF), HB9PUY, DF9VS (EM), OE6WIG (HG), OK3KCM (JI) who gave a "59" report, HG0HO (KH), HG2KRB and OK1MG (HK). OH5NW (NU) disappeared after some good bursts. All those were random SSB QSOs. On tropo. on Jan. 26, Mick worked EI5FK (VL) and in the *Ar* on the 28th, a GI, some GMs, with OZs heard. QTEs were between 0° and 80°.

George Haylock, G2DHV, (Kent) will be in the Channel Islands between Mar. 30 and Apr. 7 on SSB/CW so listen for GU2DHV and GJ2DHV. G4DCV managed five new squares via MS; IW5BML (FC), YU1AFS (KE) and EA6QB (AY) on Jan. 3, the EA6 being a new country, SM3COL (IW) on the 4th and OE6WIG (HH) on the 6th. LA1K was also worked on the 3rd. The I, EA and LA were SSB QSOs, the others CW.

Gary Underwood, G4MEJ (Bucks.) had one CW sked success on MS on Jan. 3 with I0NLK (GB). On random, he completed with DG5MCL (FI), LA1K, OK1YA (HK), OE5EFM (HI) and YU1AVL, all on SSB. G4MUT heard his first station via the Moon on Dec. 22, K6MYC. This is excellent considering Terry only had a 9-ele. *Yagi* through 20m. of UR67 with a 3SK88 preamp. in the shack. The transceiver is a *Yaesu FT-726R*. He remarks on the popularity of WAB square hunting on 2m. and of the various informal nets in which mobile stations travel through rare squares.

G4SFY (Norfolk) has got off to a good start with 60 different stations on CW up to Jan. 25. On Jan. 17, Ray worked GW6CGR and GW3KJW, both in Gwynedd and XM square on SSB. The 19/20th brought lots of PA and D stations on SSB and CW but no real DX. On the 24th, G4FDX/LX (CJ) was worked on the key. Ron Bentham, G4SHC, (Lancs.) sent

a copy of a reception report of his *Ar* signals last Nov. 16 at 0115 from Henry Snip, PA3BWY/MM, on board the weather ship *Cumulus* in QR (IO07) square. He copied Ron's CW at S3 using a *Yaesu* FT-480R and a quarter wave ground plane antenna.

G4TIF got off to a slow start, Martyn's first QSO being on Jan. 13 when he worked GM4JJJ in Fife, a region missed in 1984. In the Jan. 28 *Ar*, he had SSB QSOs with GM6WQC and 6LXN in Highlands, GI8YDZ in Co. Antrim, GM4CXM in Strathclyde and G1HGJ in Tyne and Wear. Sue Frost, G4WGY, (London) is off up the Annual CW Ladder again with 34 stations worked up to Jan. 28, including 16 not worked before. She asks that new CW operators do not send faster than they can receive.

"VHF Bands" deadlines for the next three months:—

- April issue — March 6
- May issue — April 3
- June issue — May 8

Please be sure to note these dates.

Welcome to Martin Lowe, G4YCD, (Bristol) who has been a VHF reader for a year and now enters the table with 50 countries and 7 countries. His tally includes three Scottish regions and three Irish Republic counties, the best of the latter EI5BUB (VN) in Co. Galway. His station comprises a *Trio* TR-9130, *Tokyo* 160w amplifier and two 17-ele. *Tonna Yagis*. He reckons the *Quadrantids* peaked between 1300 and 1600 on Jan. 4 and managed to work OK2BFH (JJ). Heard were 11RO1, OE5EFM, OE3OKF, OK1YA and YU3TTM.

June Charles, G4YIR, (Essex) took advantage of the severe weather at the beginning of January to stay indoors and do some brass-pounding. This brought 29 contacts up to the 23rd in generally flat conditions. John Lemay, G4ZTR, (Essex) also has 29 in the CW Ladder. He had hoped to be able to work some DX on the key, but so far, most QSOs are with locals running *Yaesu* FT-290s with *Slim Jim* antennas in lofts. He has severe interference problems, so far unresolved, and which preclude the use of high power except in the early mornings.

Laurie Segal, G6XLL, (London) has got off to a good start to lead the Annual Table. In the Jan. 28 *Ar*, his best DX was GM6WQC (XR10d) at 746 kms, and GI8YDZ (WP67b) was a new square. His other *Ar* QSOs were GM4NFC and

GM6LNM in Strathclyde. He enclosed a copy of an unusual QSL card from G6UUR, couched in pseudo-legal jargon. It is always a pleasure to receive novel QSLs. Colin Morris, G6ZPN, (W. Midlands) reports, "... hardly anything of interest ..." but has managed a respectable total up to Jan. 27 with his *Yaesu* FT-726R running 10w to either a 5 or 9-ele. *Yagi*. Neil Clarke, G8VFV, (W. Yorks.) listened to the *Quadrantids* activity on Jan. 3 and reports LA1K as the best signal on the band.

Last month, the MS notes about the *Quadrantids* from Erik Gedvilas, G8XVJ, (Cheshire) were compiled from a conversation. He has now sent in a proper list which shows two completed skeds, IW5BML (FC) and I0NLK (GB). Random QSOs were completed with: SM5MIX (HS), LA1K (FX), LA1BOA, SM7GEP, LA6VBA (ES), DF8VK, HB9PUW, OK2BFH, OE5EFM, DH2NAF, YU2RQQ. Random backscatter contacts were made with G4KTP (ZO), and GW4TTU (YL). All the above activity was on Jan. 3. Erik's station comprises a *Trio* TS-700 with BF981 preamp. and a home built 4CX250B amplifier. A *Tempo* amplifier is also available and an MGF1200 preamp. The antenna is a 19-ele. *Cushcraft Boomer Yagi* at 45ft. a.g.l.

Derrick Dance, GM4CXP, (Borders) has sent in a comprehensive report on *Ar* events on Jan. 1, 8, 10, 23 and 28. On the 1st, GM4OCJ (YP) was heard at 2224. On the 8th, GB3LER was heard at 1912. From 1951, SM4GVF (IT), GM3JFG (XR), SM5CNQ (HS), GM4CXM (XP) and GM4OCJ (YP) were worked at QTEs between 0 and 40° with fade-out at 2056. On the 10th, GB3LER was *Ar* from 1853 - 1914, but only LA1BEA (CS) was worked. On the 23rd at 1635, GB3LER and LA9BM (EU) were heard very weakly.

On the 28th, Derrick was alerted to the *Ar* at 1645. Between 1703 and 1810, 13 QSOs were made with D, EI, G, ON and PA stations. GB3LER was *Ar* again at 2023. LA9BM and LA8SJ (FT) were worked before fade-out at 2035. A visual *Ar*, quite bright, was observed between 2145 and 2200 but with no radio effects.

Tom Melvin, GM8MJV, (Edinburgh) is a new reader who now has the *Magazine* on order at his newsagent. His main interests are MS and *Ar* on the band and his station is an *Icom* IC-251 fitted with the *muTek* board, a 250w amplifier and a 16-ele. *Tonna Yagi*. He inquires if the squares totals in the on-going table are confirmed. The answer is, "No". They are squares worked, but confirmations are required when applying for the QTHCC awards.

GW4TTU's only real activity was in the *Quadrantids* which Kelvin reckoned peaked around 1230-1300 on the 3rd. He completed with LA9BM, SM7GP (GP), LA1K, OK2BFH, OE5OFM, OZ2KZR

Station	QTH LOCATOR SQUARES TABLE			Total
	23cm.	70cm.	2m.	
GJ4ICD	41	116	238	395
G4FRE	42	112	68	222
G3JXN	72	110	172	354
G3XDY	59	109	159	327
G8TFI	51	109	126	286
G3PBV	41	106	189	336
G8FUO	39	105	88	232
G4MAW	43	105	52	200
G3IMV	—	100	370	470
G3COJ	42	97	170	309
G8KBQ	22	96	188	306
G3UVR	35	92	202	329
G4NQC	61	90	211	362
G4TIF	—	90	167	257
G8ULU	35	90	125	250
G8PNN	50	83	126	259
G4MCU	22	82	200	304
G8ATK	23	82	129	234
GJ8KNV	18	79	201	298
G8HHI	22	77	135	234
G4NBS	14	77	94	185
GW4TTU	25	73	215	313
G8XVJ	—	73	169	242
G6DER	27	72	142	241
G4NUT	—	72	111	183
GW8UCQ	1	70	120	191
G8FMK	36	70	80	186
GW4LXO	29	69	213	311
G4HFO	—	69	118	187
G4BWG	—	68	160	228
G4FRX	—	66	92	158
G4DCV	—	64	219	283
G8WPL	9	63	103	175
G4RKG	16	62	158	236
G4ROA	25	61	65	151
G4TJX	—	59	97	156
G4ZTR	35	57	82	174
G6DZH	—	57	107	164
G6IGI	17	54	127	198
GD2HDZ	13	50	91	154
G6NSL	—	50	—	50
G1IEZF	9	49	133	181
G4CQM	—	49	67	116
GW3NYY	—	48	219	267
G4STO	29	48	113	190
G6JNS	1	48	117	166
GJ8SBT	26	47	182	255
G4OAE	—	46	190	236
GM8YPI	—	43	109	152
G8ROU	1	43	86	130
GW8VHI	—	41	82	123
G4NRG	5	40	119	164
G3BW	9	38	250	297
G4KUX	—	36	232	267
G4HMF	2	35	152	189
GW3CBY	10	35	105	150
E4JLL	3	32	300	335
G6NLL	—	32	91	123
G8ZDS	—	31	104	135
G6XVV	1	30	46	77
GM8BDX	13	29	41	83
GM4CXP	—	27	175	202
GM8MJV	3	26	101	130
G6CSY	15	25	30	70
G8VVR	2	24	246	272
G4RSN	2	23	88	113
G6YLO	13	22	59	94
G6AJE	—	20	82	102
G4ERG	—	16	261	277
G6DDK	3	15	131	149
G4MJC	—	12	140	152
G6YIN	—	11	71	82
G4WHZ	—	8	49	57
G6HKS	—	6	169	175
G4GHA	—	6	112	118
G2DHV	—	3	25	28
G3POI	—	—	429	429
G4IJE	—	—	326	326
G8GXP	—	—	280	280
G4DHF	—	—	245	245
G4DEZ	—	—	242	242
GW4EAI	—	—	218	218
G3FPK	—	—	207	207
GM4IPK	—	—	201	201
G6ECM	—	—	185	185
G3BDO	—	—	177	177
G8LFB	—	—	177	177
G8TGM	—	—	174	174
G4MEJ	—	—	160	160
G4SFY	—	—	149	149
G4IGO	—	—	148	148
G4DOL	—	—	131	131
G4YUZ	—	—	125	125
G6HCV	—	—	109	109
G8VFX	—	—	108	108
G8RWG	—	—	103	103
G6NWF	—	—	86	86
G8XTJ	—	—	82	82
G4UJL	—	—	81	81
G4LZD	—	—	71	71

Starting date January 1, 1975. No satellite or repeater QSOs.
 Band of the Month, 70cm.

(IJ), G8XVJ by backscatter and YU2ISD. In the Jan. 28 *Ar*, he caught the last few minutes and worked GM4UFD (ZR), GM4PWR, GM4ILS, GM3WTA and

SM5CNQ, fade out in Gwent being at 1751.

Clive O'Hennessy, GW4VVX, (Gwent) is another new reader and lives near GW4TTU but 500ft. lower. Although a keen VHF operator, it has taken him over two years to work his 74 squares. He was inspired by the CW Ladder to concentrate on A1A and enters the table with 23 stations up to Jan. 29. The station comprises a *Yaesu FT-101*, a *QM70* transverter with 50w to a 13-ele. *Yagi* at 45ft., elevated 10° to point at the surrounding hills.

From G3FPK, the Jan. 28 *Ar* was the only interesting event of the month, it being discovered at 1345, thereafter rumbling on all afternoon and still on at 1730 when it was meal time. The QTEs were between 0 and 30° and GI, GM, LA and SM stations were worked on SSB and CW. It was a good event with the A index over 50. Your scribe overheard G4KTP and GM4CXM discussing the event on Feb. 4 and mentioning working SP, Y, UQ2, etc. Ray mentioned the usual problem of "locals" persisting in calling when he was specifically indicating he was listening for U stations calling him. The only other "goodie" at G3FPK was G6EBH/MM, in AO square, worked on SSB on Feb. 3 thanks to a tip-off from Mark Turner, G4PCS.

Seventy Centimetres

G4TIF found the band very quiet so only one QSO. G4YCD wrote that he hopes to be active soon on this band. G6XLL has opened the 1985 account with 12 counties including G8DDY (I.O.W.), G6WZA (Somerset) and GW4SMW (Gwent). G8XVJ enters the Squares Table with 73 worked. Erik uses a *Yaesu FT-726R* driving a home built K2RIW amplifier, the antennas being two 21-ele. *Tonna Yagis* at 50ft. GM8MJV is looking for contacts from Edinburgh and Tom uses a *Yaesu FT-780* and 100w to two 21-ele. *Tonna Yagis*.

The Microwaves

GM8MJV is QRV on 23cm. and transverts from 2m. with a *Microwave Modules* unit. Tom runs 150w to four 24-ele. antennas and is keen to make skeds from Edinburgh. He is also on 13cm. with 10w to a 1.2m. dish. GW4TTU reckons his table entries will be down this year as he wants to devote more time to construction.

Solar News

G4DCV relayed the contents of a most interesting letter from Robert McKenzie, the Director of the *British Meteor Society*,

**TWENTY-THREE CENTIMETRES
ALL-TIME TABLE
Final Placings at December 31, 1984**

Station	Counties	Countries	Total
G3OSS	55	15	70
G8TFI	46	16	62
G3XDY	44	15	59
G8PNN	44	15	59
G3UVR	44	11	55
G8FMK	45	10	55
G3PBV	45	9	54
G4FRE	39	12	51
G4ZTR	37	10	47
G8FUO	33	13	46
G3DAH	37	9	46
G4MAW	32	11	43
G4STO	33	9	42
G4ROA	32	8	40
G3COJ	28	10	38
GW4TTU	29	8	37
G6NB	28	7	35
G6CSY	30	4	34
G8LULU	23	10	33
G6DER	25	8	33
G8IFT	28	5	33
GD2HDZ	24	8	32
G8HHI	24	7	31
G4NBS	24	6	30
G8ATK	20	8	28
G8KBQ	21	6	27
G8LEF	16	6	22
G3BW	16	5	21
GW3CBY	8	4	12
G4DKX	7	2	9
G8OPR	3	1	4

about the solar cycle. He concludes we have reached sunspot minimum about one year early and suggests we may be in for a long, deep minimum lasting 3-4 years. No spots of any new cycle have yet appeared and the fall from maximum has been "... astonishingly smooth and fast... but the total magnetic flux from the Sun has remained constant."

Paul asked Robert to comment on the alleged poorer *Geminids* reflections last

ANNUAL CW LADDER

Station	4m.	2m.	70cm	µWave	Points
G4SFY	—	60	—	—	60
GM4CX P	3	38	1	—	42
G4WGY	—	34	—	—	34
GW4TTU	—	—	27	3	30
G4YIR	—	29	—	—	29
G4ZTR	—	29	—	—	29
GW4VVX	—	23	—	—	23
GW4HBK	8	—	—	—	8

No. of different stations worked since Jan. 1.

year. He wrote that observations visually were marred by bad weather in Australia and news from other countries was awaited. He says that meteor rates vary with solar activity, but almost out of phase.

The *B.M.S.* has a couple of interesting projects. One is the publication of a *B.M.S. Radio Handbook*, for which suitable contributions are sought, the other is the setting up of an automated,

continuous radio meteor monitoring system. If any reader is interested in either project, please contact Paul.

Final Miscellany

G4MUT asks if there is an 80m. VHF net and if so, he would like details of times and frequency. Anybody know? GW4VVX asks if CW QSOs made away from the home QTH can be counted for points. The idea was to encourage CW activity generally with the competitive aspect of lesser importance. It was assumed that participants would operate from the home QTH, though. Clive mentions going to the north of Scotland (XS) in the last week of July and the first week of August. He wonders if QSOs made as GM4VVX/A will be valid to add to his GW4VVX total, but that illustrates the problem, surely. So let us keep it to QSOs from the home station for fairness and simplicity.

A recent *GB2RS* Bulletin mentioned the susceptibility of *BL's* computerised fuel injection system on *Maestro* cars to strong RF fields. Vauxhall *Cavalier SRi* and some Ford *Sierra* models are similarly afflicted. This is nothing new, the problem having arisen years ago. The *RSGB* is asking members to report their experiences to HQ. Well, they will have chips with everything.

Stop Press

The Norwegian amateurs with 6m. permits are now QRV. Paul Turner, G4IJE, had a successful MS QSO with LA8AK at 2330 on Feb. 4 which was completed in under an hour. Reflections were reasonable. There was a fine tropo. opening on 2m. on Feb. 4 with very strong signals from the north and the near Continent. Your scribe and others also worked Damian, LA0DT/MM in AP square around 0130 on the 5th. He runs 150w and monitors the CW/SSB calling frequencies and transmits from half-past midnight shipboard time. That is GMT or one hour later, depending which "side" of the North Sea he is in. He is also QRV on all bands from 10-80m. HF. and on 70 cms.

Sign Off

That's it for another month. By the time the next issue appears, British Summer time should have begun that week-end — Mar. 31. All your "input" please to:— "VHF Bands", *SHORT WAVE MAGAZINE*, 34 High Street, WELWYN, Herts. AL6 9EQ. 73 de G3FPK.

The TAU SPC-3000 Antenna Tuning Unit

A User's Review

KEN MICHAELSON, G3RDG

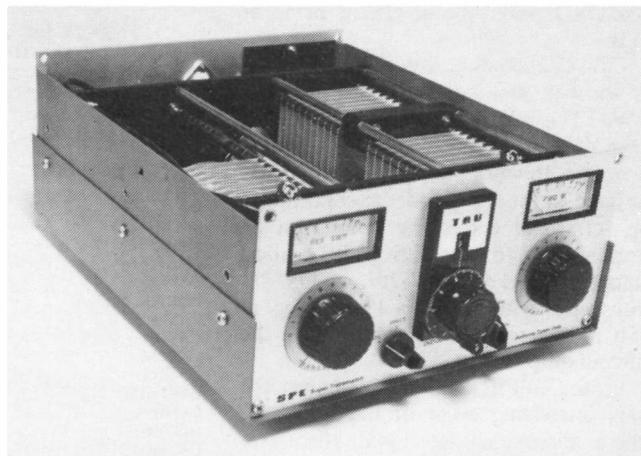
TO have this instrument to review has been a real treat. I have been used to antenna tuning units which, although perfectly serviceable and able to perform their functions, have been light in weight and undoubtedly fragile in the sense that if mishandled, parts would tend to distort. This is not the case with the TAU SPC-3000.

The manufacturers, TAU Systems Ltd., has returned to the original British way of workmanship and solid engineering: because this unit is 'engineered', make no mistake about it. The cabinet size is 12 $\frac{5}{16}$ " wide x 5 $\frac{3}{4}$ " high x 15" deep (313mm x 147mm x 380mm). It is made of steel, and finished in a battleship grey colour. The paint is an epoxy/polyester, electrostatically applied and baked on, and extremely tough and scratch resistant. The front panel is silver colour, brush finished, giving a matt hard wearing surface. The weight of this piece of gear is 21lb 4oz. (9.7 kg) no less! There are 'tilt' feet at the front so that the front panel can be adjusted for the best viewing angle.

The ATU circuitry is based on that devised by Douglas De Maw, W1FB, and the various components are incorporated in a special mainframe which ensures that the 'Q' of the circuit is of a high order, due to the fact that there is only one common link and the windings on the inductor are tapered. "S.P.C.", by the way, stands for series/parallel capacitance. This format substantially improves the harmonic rejection of the network.

When one removes the top cover to see what the unit is made of, it is apparent that a great amount of care has gone into the design. I, personally, have never seen an antenna tuning unit made on such a scale. The capacitors have a 5kV rating, (tested to 7kV and the stator and rotor blades are manufactured from a high-grade hard alloy which has been treated by a chemical etch/sealing process. The variable inductor is of a roller-coaster type and the wire used is hard drawn copper, silver plated to DTD specification. The actual inductor roller is made of a phenolic resin bonded laminate to BS1137, as are the mainframe endplates. The mainframe tiebars are of nickel-plated steel and the roller coaster wheel and shaft are manufactured from brass plated with a tin/nickel alloy. All the other components are made of solid brass nickel plated to a very high finish. There is also a 4:1 balun built into the cabinet, rated at 1kW.

There are two meters provided, top right and top left on the front panel. They are made to BS89:1977 and IEC51:1973. The

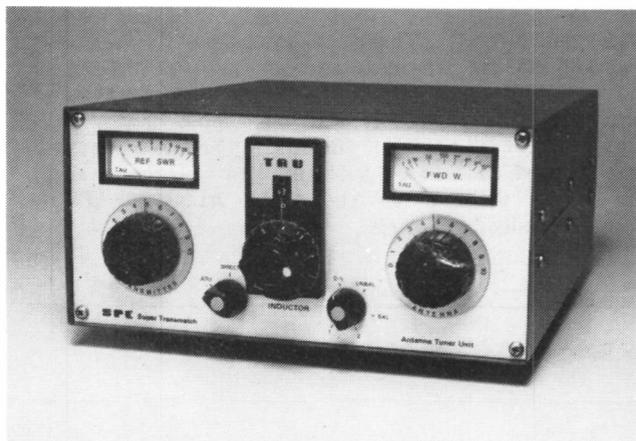


left-hand meter gives an instant reading of the SWR and the right hand one the power going to the antenna in watts. The power capability of the unit is no less than 1500 watts continuous, 3kW p.e.p. There are two switches on the lower part of the front panel, the left-hand one changing from 'ATU' to 'direct', and the right-hand one giving five positions, 'Ant 1' and 'Ant 2' for beam or dipole, '3' for balanced feeder, '4' unbalanced and '5' for dummy load (an external unit). The switches themselves are ceramic, approved to RCS154 Grade 1. The two capacitors, either side of the roller-coaster tuning knob, have numbered scales to facilitate the return to any previous setting. The roller-coaster tuning knob in the centre also has a numbered scale but of a different sort. The drive is on a reduction gear and incorporates a 'turns-counter'. There are approximately 45 turns of wire on the roller-coaster, and so the counter will read from 0 to about 45. However the surround of the crank handle has a scale marking from 0 to 100 and it is possible to return to the same setting, accurate to $\frac{1}{100}$ th of a turn. Fig. 1 shows the circuit of the ATU.

To use the ATU the following procedure should be adopted, and in passing I would comment that the Owner's Manual supplied with the unit gives very clear instructions for this operation. If you possess a dummy load, then tune the transmitter using it in the normal way on low power. However, it is quite easy to tune up without a dummy load, and it is done in the following manner. With the rig on 'receive' tune to the desired frequency, and place the two capacitors on the ATU in the mid position. Turn the crank handle until the received background noise is at a maximum, (which will, incidentally, be very close to the final position when the power is applied). Now apply low power and rock both capacitors back and forth until the minimum reading on the SWR meter is achieved together with the maximum output on the right-hand meter; if necessary, slightly adjust the position of the roller-coaster. Fine tuning of the two capacitors will now optimise the match between the transceiver and the antenna.

I used the unit with two different antennas, a Hygain 18AVT/WB vertical and an inverted 'L' which was intended for 80 and 40 metres, but in the event, also worked on 20 metres. This was due, I am sure, to the efficiency of the ATU which, as the manufacturer states, tunes anything to anything. I have been troubled with very strong 'frying' noises on 80 metres at this QTH, sufficiently strong at times to make it impossible to use the band. This was cut down by about 50% when using the TAU SPC-3000; it is really quite extraordinary. One could switch between 'direct' and 'ATU' and hear the background noise come in on 'direct', and get considerably less when the signal was put through the unit. Since my main activity is on 80 metres, this was a great help. When used with the vertical antenna, although the unit tuned the antenna perfectly, the signal from the vertical on 80 metres inter-G was down on the inverted 'L'. This was in no way the fault of the ATU but obviously due to the vertical polarisation of the 18AVT/WB.

I found the TAU SPC-3000 a beautifully made piece of equipment. The sort of thing all amateurs might aspire to own,



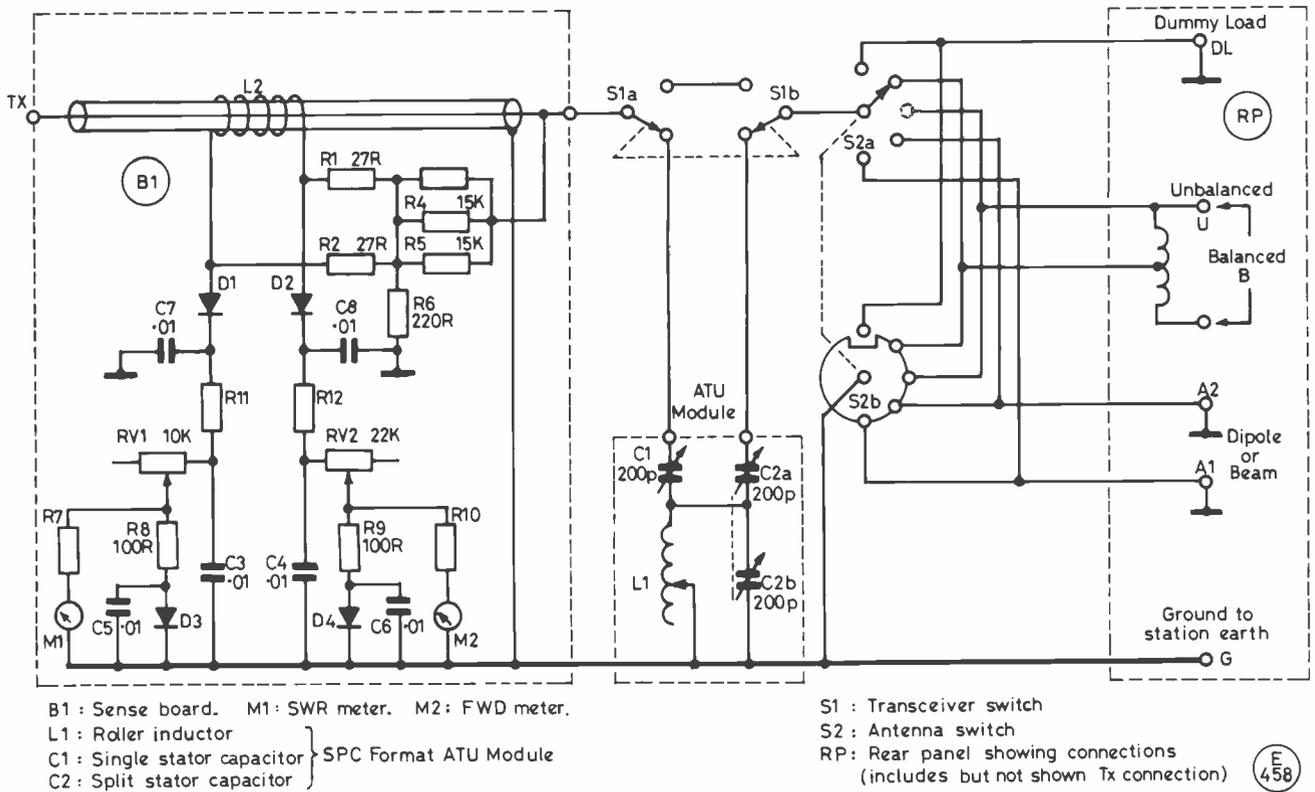


Fig.1 TAU SPC-3000 ATU

and which would be a 'once-for-all' purchase. However, I have one or two perhaps small points to raise as final observations. Firstly, I consider that slow-motion drives should be fitted to the two capacitors. I found it quite a fiddly job to get the exact point of resonance, and when compared with my own quite aged ATU which has this type of drive, the difference was most noticeable. And secondly, I dislike the scales on the meters — more particularly the 'Forward Power' right-hand meter. To have the scale lettered 5, 10, 50, 150, etc., with gaps between 10 and 50 and again between 50 and 150 seems to me to be most unhelpful. Again, I must refer to my old ATU which has the scale clearly marked in increments of 10, making it possible to see whether the output is, say, 60 or 85 watts, or whatever. With the scale on the SPC-3000 it is a question of guesswork between 10 and 50 and also between 50 and 150 (which, I feel, is the most used range of power output). I think, also, that a 50-ohm dummy load should have been provided inside the cabinet, as is the case in other units of the same type. This is not an inexpensive piece of equipment, and, in my view, this facility should have been provided. I had to make leads and arrange the various plugs and cables in order to have the

use of a dummy load, although I would agree that it is not vitally necessary as the unit and the rig can be tuned to the antenna as described above.

Examining the interior, it is impossible to fault the components and metalwork, with one exception. Why were cheap and nasty skeleton potentiometers used for VR1 and VR2? It would seem to me that this is "spoiling the ship for a haphorth of tar"! Surely a cermet trimmer, multiturn or direct, would have looked so much better. Apart from those slight criticisms which, should the manufacturer so decide, could be altered quite easily, I think the unit can be considered 'the last word' in antenna tuners, and I was very sorry to have to return it. The price of the unit is £349.95 including VAT, but excluding carriage. There is also available, I understand, a cheaper version of the same unit without all the extras, (meters, etc.) but essentially the same circuitry, at £249.95 excluding carriage, but that, of course, was not the subject of this review.

Since writing the above I have spoken to Tom Williams of TAU Systems Ltd., raising the points mentioned above. He tells me that the present and all future runs of this unit are modified to have (a) slow-motion drives on the capacitor shafts, (b) a revised type of scaling on the meters, and (c) a different type of potentiometer for VR1 and VR2; so it would appear that all my moans have been met apart from the inclusion of a carbon dummy load — which perhaps is another matter altogether. In view of this I would endorse the SPC-3000 Antenna Tuning Unit as being at the top of its class. Thanks are due to TAU Systems Ltd. of 51 Greenhey Place, East Gillibrands, Skelmersdale WN8 9SA, for the loan of it for the purposes of this review.

TAU authorised Retail Stockists

Amateur Electronics (UK) Ltd., Birmingham; Bredhurst Electronics, Handcross, Sussex; Dewsbury Electronics, Stourbridge; Hooker Electronics, Doncaster; Lowe Electronics Ltd., Matlock; Radio Shack Ltd., London; South Midlands Communications Ltd., Southampton and branches; Stephens-James Ltd., Leigh, Lancs; Reg. Ward & Co. Ltd., Axminster, Devon; R.A.S., Nottingham.



The Howes CTX80 QRP CW Transmitter Kit

A Simple 80-metre Crystal Controlled Kit, built and tested by

COLIN TURNER, G3VTT

THE last ten years have seen a terrific upsurge in QRP activity on both the LF and HF bands. This upsurge has also boosted the number of homemade transmitters heard on the bands. QRP operation, meaning the use of powers in the region of 2 or 3 watts RF output, allows the use of simple components often of the variety found in receiving equipment and simple constructional techniques.

The operator with little constructional ability has had the choice of more expensive commercial equipment such as the Heath HW-7 and the HW-8, both of which are supplied in kit form, and the Ten-Tec range of products including the PM2, PM3, and the famous 'Argonaut' range of transceivers. This equipment is expensive even if purchased second-hand and many first time QRP-ers construct a simple transmitter at least to give them the basic experience of low power operating.

Historically the simpler transmitters are usually crystal controlled. This can lead to QRM problems where a popular frequency is used, such as the QRP calling frequency of 3560 kHz; however it does make the transmitter design simpler and allow for stable operation and the need for only the one channel to be monitored. Like many operators the writer prefers to work in the shack with the station receiver running and then ensnare any station coming into the receiver's passband, after it has been tuned to the transmitter's crystal frequency of course.

Returning to the subject of kits there has been nothing available catering for the simple transmitter requirement, the Heathkit range of products being fairly expensive although of excellent circuit design, and so it was with some considerable interest that the writer saw the C. M. Howes range of kits now includes a CW QRP transmitter complete with crystal.

C. M. Howes has offered a range of kits which have been easy to build including a speech processor, sidetone unit and an excellent range of direct conversion receivers for 160m, 80m, 40m, 30m. or 20m. The latest kit is the CTX80, which is a complete kit with crystal, for under £13.

Building the Kit

The **Howes CTX80** kit consists of a printed circuit board of good quality, toroidal inductors which have to be wound by the constructor, the correct number of resistors and capacitors all of which are of good quality, and the four RF devices which consist of BC237B's and the BD135 PA transistor.

The PA transistor is a device capable of some 5 or 6 watts output which puts this transmitter just out of the real QRP class at least for the purposes of awards, although a drive control is fitted to allow the RF output power to be reduced. The writer has adjusted his kit to give an output of 2 watts for awards operation which incidentally gives an 'ice cold' heatsink when operating.

The printed circuit board has the position of each component marked on it, *i.e.* R1, R2, R3, C1, C2, etc, along with the outline of the large PA heatsink. No step-by-step instructions are given, the components are merely selected from the box and fitted in the spaces provided in the board. Each resistor is given a description, *e.g.* "R2 100K Brown, Black, Yellow", which ensures that those of us with rusty resistor colour codes can still fit the right component.

General instructions are given for building the kit which list the tools needed and how to wind the coils. The writer is an experienced constructor and was pleased to see details of winding both the toroids, the small matching driver transformer and the oscillator coil — which, incidentally, also give an excellent tip for winding coils of this type.

One small point, the instructions mention that each end of the coil wires must be scraped clean with a knife before tinning: this was not found to be needed, the wire supplied was of the self-fluxing variety. This meant that to tin the wire ends they were just heated with the soldering iron and then solder applied in the usual way.

After the components are fitted the instructions advise that the board is checked for poor soldering and that all parts are in the right places, including electrolytic capacitors which could have been fitted the wrong way round giving incorrect polarity. Full details are given for tuning the CTX80 into a dummy load. The writer would also advise that the heatsink is checked with an ohmmeter to the collector of the PA transistor, TR4, in case of the collector being shorted to ground *via* the securing bolt through the transistor centre.

Operation

A particular nice aspect of this kit is the crystal supplied which allows the kit to be built, tested and operated without waiting for a particular frequency crystal to be ordered. The frequency supplied is 3.579 kHz which is some 19 kHz or so HF of the QRP channel on 3.560 kHz. Some QSO's will no doubt result from the use of this channel because of other stations usually found on this frequency; it is popular due to it being used in American colour TV receivers as a subcarrier crystal and in some clocks. **Howes**

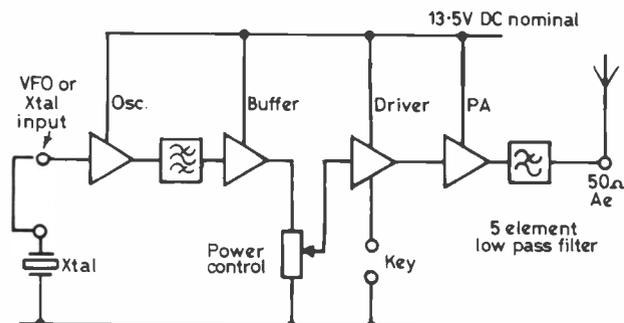


Fig. 1 BLOCK DIAGRAM

• • • SWL • • •

SHORT WAVE LISTENER FEATURE

By Justin Cooper

WE must start this time — thanks to P. Cardwell of Sheffield — by thinking about the absolute limitations of a receiver, at HF. Noise, both man-made and static is the limiting factor in this region. The man-made stuff is increasing year by year, and comes from such diverse sources as unwanted signals of high power near to, but not on, the wanted frequency, images, harmonics generated when large RF signals run up against an oxidised metal contact (the 'rusty bolt effect', so-called), the large lumps of signal often being caused by rotating machinery like washing machines, fans, electric fires, central heating (and who is going to turn *that* off during this cold snap?), plus fluorescent tubes and all the other things. As for the static, this is mostly generated terrestrially — distant thunderstorms and so forth — but lots comes from outer space, and we are stuck with it.

Now, our perfect, ideal receiver, would detect a CW signal at or even slightly below the noise, with the minimum SSB signal about 12dB greater than this — the precise limit in the latter case depends on how acute your hearing is and how near you insist on 100% copy (the trained mind can put back much of the missing bits). For simplicity we refer to the CW case, because it's easy to make a repeatable measurement, and we obviously do it on the bench, so we eliminate static and man-made noise; this level we may call the minimum detectable signal or MDS for short. If the noise level into the aerial terminals of the receiver is greater than the MDS, then chances are there are signals we can't copy because they are buried in the noise.

Right; now at the other end of the scale, we can imagine a small signal alongside a thumping great big one, and measure how big the big one gets before the little one disappears, due to receiver overload. We have talked of this in terms of the receiver, but it doesn't need a genius to deduce that the ideal receiver would overload in each stage simultaneously — no good the front-end being great if the audio is blocking! The measure used for this is often quoted as 'third-order intercept point' in dBm, but this is not a measurement that relates directly to real life, although it is a valuable tool for comparisons. The difference between these two levels, in dB, is called the *dynamic range* of the receiver. A good receiver of the valve era could have 90dB, most solid-state receivers are not that good, but the best modern receivers can go to better than 100dB of dynamic range.

Some SWL's have aerial problems, and can't put up a receiving aerial of any size, so they go out and buy an 'active aerial' — reader Cardwell has one, of foreign manufacture. Now, this device consists of a short aerial and a transistor amplifier which latter must be wideband from nearly DC up to 100 MHz or so. Imagine, now, that you are listening on a dying ten-metre band as the opening drops out, and a CB-er next door opens up in his own band on legal power. The active aerial overloads, or if it doesn't it passes on a well-amplified signal which overloads the receiver. Bang goes your DX! And, be quite clear about it . . . *it isn't the CB-er's fault*. We have a situation that is beyond the combination of receiver and active aerial. In practice, we know that the receiver used by SWL Cardwell will start objecting when it is on a ten-metre vertical dipole and a CB station opens up from 250 yards away, line of sight — the receiver on 28.5 MHz and the CB-er on a channel at the 'far' end of his band!

Of course, modern and skilled design can ensure the greatest possible dynamic range in the receiver and indeed in the active aerial element — but it must be accepted that modern design

trends and the basic requirements for an active aerial covering a broad band don't help. A further problem in the equation is the widespread availability of megawatt BC stations for any country with money to buy them to spout their propaganda. If country 'A' has, say, 100 kW beamed on country 'B', then it upsets country 'C' which promptly gets a megawatt and a rhombic to put out its own version of the truth . . . and so it goes on *ad infinitum*. The end result is that there are thousands of stations putting volts into the receiver front-end. With the best will in the world, a station, say 20 kHz from your 7 MHz DX (but outside the band) will ride through to the input electrode of the receiver RF stage — about the only thing to stop it would be a crystal filter in the aerial lead! There is no answer to this, save RF gain controls and aerial attenuators, but it must be accepted that these will themselves make the MDS much larger; better to be able to work the bigger signals than nothing at all!

The Mail

Besides his active aerial, P. A. Cardwell also has a Hy-Gain vertical, and he wonders what he would get if he buckled an end-fed to his ATU and selected any one of three to choice. A Good Question! Variety, one would think!

B. Patchett (Sheffield) is still debating just what to do about getting onto a band, as he operates from work only. The sunspot cycle is a full two years from minimum (going on past experience — but you can never be certain!), and with a side interest in languages, the answer would seem to be 7 and 14 MHz, as well as the existing 28 MHz FM set-up, which managed some 25 countries last year using the Icom ICB-1050 conversion and a linear.

We were saddened to hear this time from H. M. Graham (Chesham) that his XYL suffered a fatal heart attack on December 19. J.C. is quite sure that the sympathy of the Magazine staff, some of whom know him, is also accompanied by that of all the regular readers of this piece.

Just one new prefix is claimed this time by J. Routledge (Hartlepool) as he has been working hard to complete a model railway, and when he could escape from that, the bands were not very good anyway.

Another active aerial user is W. G. Shipton (Rye) who uses the Datong AD270 in conjunction with a Tandy DX-302. In a very brief note, George indicates that activity has been rather inhibited by snowy weather in his neck of the woods.

ANNUAL HPX LADDER

Starting date, January 1, 1984

SWL	PREFIXES		
C. Burrells (Stevenage)	412	M. R. Warburton (Bury St. Edmunds)	309
M. Newell (Kenilworth)	330	S. Wilson (St. Andrews)	323
S. Wilson (St. Andrews)	323	P. Everitt (Bluntisham)	277
Mrs. T. Carmichael (Lincoln)	311		

This is the last showing of the 1984 Table. A new Table, starting date January 1, 1985, commences in the next SWL.

Minimum of 200 Prefixes to have been heard for an entry to be made, in accordance with the HPX Rules — see p. 19. At score 500, transfer to the All-Time Table is automatic.

Nice to hear from *C. Burrells (Stevenage)* that he is much better now, and is again mildly active on the HPX front — not much else he can do while the weather is so fierce!

List number 78 comes in from *E. W. Robinson (Felixstowe)* and it takes him up to 2344, with a nice balance between the rare DX and the new Russian prefixes.

E. M. Gauci (Sliema, Malta) has been trying to use his BBC 'B' computer for list-saving, the list in fact being his HPX; Eddie put some 400 in okay, then in a second session about another 400. After that, when the 'Break' key was pressed, he didn't get it back. Started again, retyping 800 prefixes in, plus now another 500, and tried to 'Save' them on to cassette with again no success! That, of course, is the labour-saving aspect of the computer . . . seriously, we would think Eddie ran out of usable RAM. Any knowledgeable BBC 'B' user who can help could do worse than drop a line to Eddie at 70 Stella Maris Street, Sliema, Malta, before he goes spare!

Next we turn to *N. Fox (Wakefield)* who indicates a certain lack of activity thanks to the Christmas and New Year festivities and relative-visiting. On a different tack, note has been taken of our comments on the dearth of Africans, last time around, and as they say 'it is being pursued with vigour'.

The home-brew at *S. Wilson (St. Andrew's, Fife)* has been laid aside in favour of an FR-DX500 receiver plus FL-DX500 rig from the local ham shop in Glenrothes; the transmitter is in need of repair, which will be done a bit nearer the time. Meanwhile, there is the joy of a fine receiver which has improved the DX reception ability of the station considerably. Stuart also notes that he is attending the local RAE classes.

Next we have newcomer *D. Pye (London W2)* who has an R-600 receiver and an aerial problem. In essence, the local council don't like aerials, so when (and if) they spot his, it will have to come down. What to do. Perhaps the first move is to make sure it is as near as possible to being *invisible*. The technique is to use very thin wire — the Editor has had lots of success with 28 s.w.g. but one can reduce to as thin as 36 s.w.g. The trick is to realise that the wire can always support itself, but the thinner you go, the less extra you can load it with: extra in this context meaning insulators, coaxial cable, centre fittings, ropes and all the rest. *Everything* must be reduced in due proportion. For example, replace the rope by nylon monofilament of the clear variety used by fishermen, knot it direct to the end of the wire and forget the insulator. The nylon string is quite good enough. As for the centre of the dipole use a small scrap of polythene or Melinex, small diameter coaxial cable if used, and don't forget to paint the coaxial and the centre piece to match the colour of the brick; and of course, be prepared to do a bit more frequent replacement after snow or icy weather. What are the arguments against this method? The first is the losses and these are indeed present, but probably add to less than 1dB. 2. Birds will have it down by collisions. Not often so in practice. 3. It just won't work. It does! 4. You can't transmit up it when the time comes. You can! J.C. has sat in the G3KFE shack in a contest and seen the full licensed power going up the spout on SSB for hours on end with no problems, using a 28 s.w.g. wire. By the bye, the preferred type of wire is enamelled copper, simply because it isn't so visible as tinned stuff!

The letter from *M. G. Toms (Rayleigh)* says he now has his new shack sorted out; it's on the first floor and has convenient access to the flat roof. On Top Band, the aerial is 130 feet, taken up to the apex of the roof and down the garden at around 30 feet high. The two-metre 9-element is also at about 30 feet, and with a clear take-off the results on both bands have been outstanding, with VK and ZL both logged on Top Band and a total of forty countries. On VHF, the score has been boosted by hearings during the meteor showers recently.

A. P. Lincoln (Aldershot) has been writing a machine-code program for his computer to store HPX on; the idea obviously to save memory space and speed up operation. Of course, it has slowed down activity on the band, but that's the price one pays! On a different tack, Peter has had several calls on the landline

HPX RULES

- (1) The object is to hear and log as many *prefixes* as possible; a prefix can only count once for any list, whatever band it is heard on.
- (2) The /M and /MM suffixes create a new series: thus G3SWM, G3SWM/M and G3SWM/MM all count as prefixes, and where it is known to be legal, /AM also.
- (3) Where a suffix determines a *location* the suffix shall be the deciding factor, thus W1ZZZ/W4 counts as W4. Where the suffix has no number attached, e.g. VE1AED/P/SU, VE3UJ/P/SU, they are arbitrarily counted as SU1 and SU2 respectively, and the same holds good for similar callsigns.
- (4) When the prefix is changed both the old and the new may be counted; thus VQ4 and 5Z4 both count.
- (5) The object is to hear *prefixes* not countries, thus there is no discrimination between say MP4B and MP4K which count as one prefix.
- (6) Only calls issued for Amateur Radio operation may be included. Undercover and pirate callsigns will not be credited, nor any MARS stations be claimed.
- (7) G2, G3, G4, etc., all count separately, as do GW2, GW3, GW4, etc., and in the same way K2, W2, WA2, all count separately even though they may be in the same street.
- (8) Send your HPX list, in alphabetical and numerical order showing the total claimed score. With subsequent lists, it is sufficient to quote the last claimed score, the new list of prefixes, and the new total. Give your name and address on each sheet, and send to "SWL", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts., AL6 9EQ, if possible to arrive before SWL deadline for that particular month.
- (9) Failure to report for two consecutive listings, *i.e.* four months, will result in deletion from the Table, although there is no objection to a "Nil" report to hold your place.
- (10) Starting score 200. Phone Table is mixed AM/SSB, with a separate CW Table. No mixed Phone/CW Table, nor will AM-only or SSB-only entries be accepted.
- (11) List will be based on those shown in the current "Radio Amateur Prefix-Country-Zone List", published by Geoff. Watts (*see Advertisers' Index* in any issue of SHORT WAVE MAGAZINE).

from SWLs starting in RTTY, and offers some suggestions from his own experience. Active frequencies are around 3.6, 7.040, 14.080-14.100, 21.080-21.100, and 28.080-28.100 MHz, though some signals may be found elsewhere. Most amateur signals are at 180 Hz shift, with commercials sometimes using 425 or 850 Hz shift. The RTTY selector on most Japanese receivers tunes the American high note standard of 2125 Hz mark. However, lots of TUs use a mark frequency of 1275 Hz. Most amateur RTTY is at 45 baud, with some 50, and the occasional one at 75 or 100 bauds. The standard is for USB to be used on *all* bands, but occasionally you will come across one the 'other way up'; in this case you can either switch to LSB or use the 'reverse' switch on the decoder. ASCII code may be heard and is usually at 110 baud, but AMTOR cannot be decoded without an AMTOR unit — these are beginning to appear commercially, or you can of course home-brew. Finally, of course, you need a stable transmission and receiver too, else you are all the time tuning to hold the signal. However, most times, juggling with speed and reverse shift controls will pull some sense out of the signal; an oscilloscope having X and Y inputs connected to mark and space outputs is a handy tuning indicator but not usually needed. Thanks for that summary, Peter!

Next we come to *R. Fox (Northampton)* who says he hasn't

much to report this time; much of his listening time has been spent listening to *Oscar*. Problems still exist with the RTTY set-up, which has been transferred from Apple to Spectrum, which has brought back the RFI problem with a vengeance, and aeriels have been 'dealt with' by gravity! Still with RTTY, your old J.C. is on the look-out for an RTTY program for his Spectrum too, preferably one that does it all without an outboard TU — any suggestions from out there? Indeed, anything in the way of an interesting program for the Spectrum, related to amateur radio in some way, would be of interest, while we get the hang of it all. Who said "old scrounger"?

M. R. Ribton (Gillingham) played in the White Rose contest but found things rather dismal on the bands, although Mike logged some 225 QSOs, to hear 49 countries on 3.5 MHz and 13 on 7 MHz. Like so many others, Mike was imprisoned by thick snow at the time of his letter, although as we write it does seem to be thawing.

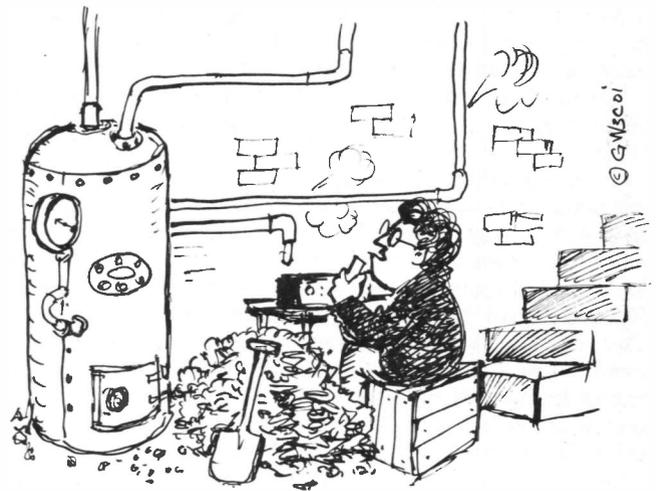
S. Baker (Cwmbran) seems to be progressing nicely, even though Dad, GW6VZW, has been altering the shack and aeriels; but two-metre prefixes, and even DX heard on 14 MHz using the two-metre beam as aerial, all count. Probably the VHF feeder was acting as a vertical aerial.

B. F. Hughes (Harvington) prefers sitting by the fire in the shack to doing jobs outside while the snow is with us; and this approach has had its effect on the score, of course. On another tack, he refers to the question of the Russian Vega receiver, which he has owned for many years and finds quite good for BC reception at DX — it often goes in the car when Bernard is on holidays, or for lunch hours at work.

We turn now to *J. H. Roskell (Sheringham)* who wants to know all about WAB and HAB. As we have covered the subject in recent issues of *SWL* we answer reader Roskell by referring him to G4HPU (QTHR) as the WAB contact-man.

The letter from *P. Oliver (Paisley)* refers to his HPX additions this time as "pathetic" but it is still quite a few, boosted quite a bit by new European and Russian prefixes and a sprinkling of DX.

Many years ago, *N. Henbrey (Northiam)* came to the *Short Wave Magazine* stand at an exhibition with son David; David was a little older than the J.C. offspring, who is now married, so David must be an adult. Certainly he is proving handy for Dad, having just built him the Cirkit 144MHz pre-amplifier. Of course, at VHF, the Henbrey's are, as it were 'in the big league' with a 48-ele multibeam on 70cm., for instance. Norman is in fact seriously thinking of trying the old-fashioned method of a



"I heard you on so I fired up the rig . . ."

converter on the end of this aerial, into the station KW-77 receiver.

The second letter from *M. Ribton (Gillingham)* raises an interesting point — where has LORAN gone? The thing we used to know on Top Band was LORAN 'A', which has now been superseded by LORAN 'C', which is more accurate as a navigational aid, and uses a different frequency. Pretty well all the LORAN 'A' stations have been taken off the air now.

Two letters to deal with this time from *Mrs. R. Smith (Nuneaton)*, the first one being a little adrift due to the slow mails. Listening time has of course been on the short side, thanks to the Christmas chores, but the score still goes on rising, even if not so fast!

Another second letter came in from *C. Burrells of Stevenage*, which seems to indicate he is well on the mend now — keep it up Charlie!

An optimist is *G. Carmichael (Lincoln)* who wants to see better propagation in 1985 . . . but in the meantime is nibbling away at the DX which is to be found on 80m., while 14 and 21 MHz are so dead at the times he can listen.

That micro bug has really got to *Norman Jennings (Rye)* even though he has had to go back in to hospital for a short spell. On a different tack Norman is looking for a book on the Maidenhead Locator Squares — we would have thought that was an ideal subject for a computer program: lat. and long. as input, square number as output. Anyway, nice to hear Norman is active again after all the problems of health over the past months.

Our final comment this time must be to thank all those correspondents who sent in Christmas cards and greetings, too many to answer individually . . . but Thank You all.

Tables

This issue contains the last of the 1984 HPX listings; we already have some 1985 entries, and of course more will be welcome — the first appearance of the 1985 Annual HPX Ladder will be in next time's *SWL* — appearing in the May issue of *Short Wave Magazine*.

Deadline

The date for your letters for next time to arrive, by first post, is Thursday, **March 21st**, addressed as always to your scribe, "SWL", SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts. AL6 9EQ.

HPX LADDER (All-Time Post War)

SWL	PREFIXES		
<i>PHONE ONLY</i>			
B. Hughes (Harvington)	2913	P. Lincoln (Aldershot)	886
Mrs. R. Smith (Nuneaton)	2447	M. Ribton (Gillingham)	793
E. W. Robinson (Felixstowe)	2344	B. Patchett (Sheffield)	750
H. M. Graham (Chesham)	1749	J. Heath (St. Ives)	749
E. M. Gauci (Sliema, Malta)	1745	R. Wooden (Staines)	716
Mrs. T. Parry (Blackpool)	1649	A. J. Chapman (Newark)	549
G. W. Raven (London)	1547	N. Fox (Wakefield)	529
M. Rodgers (Harwood)	1470		
N. E. Jennings (Rye)	1346	<i>CW ONLY</i>	
N. Askew (Coventry)	1325	E. B. Ward (Ruddington)	1848
R. Fox (Northampton)	1305	J. Goodrick (I.o.W.)	1705
S. Baker (Cwmbran)	1302	A. F. Roberts (Kidderminster)	1344
N. Henbrey (Northiam)	1287	R. Fox (Northampton)	463
D. Shapiro (Prestwich)	1272		
P. A. Cardwell (Sheffield)	1238	<i>RTTY ONLY</i>	
P. Oliver (Paisley)	1183	N. E. Jennings (Rye)	596
G. A. Carmichael (Lincoln)	983	P. Lincoln (Aldershot)	472
G. Shipton (Rye)	923	J. Routledge (Hartlepool)	311
J. Routledge (Hartlepool)	901	N. Henbrey (Northiam)	293

Minimum score for an entry is 500 for Phone, 200 for CW or RTTY. Listings to be in accordance with HPX Rules — see p. 19.

A Six-Metre Transverter

130 watts at 50 MHz, with a 4CX250B final

R. I. THOMAS, GW4BCD

THE author has been active on two and four metres for some years using home-brew transverters, which have proved to be very reliable over a long period of time. (See *Short Wave Magazine*, September 1980.) When a 50 MHz licence was obtained in February, 1983 it was decided to use the same approach for the design of equipment for this band. The block diagram is shown in Fig. 1. No apologies are offered for the use of valves in the transmit side of the transverter, as these are a lot easier to deal with than transistors when anything other than QRP is required at VHF. This transverter produces 130 watts of RF at 50 MHz, the 4CX250B final loafing along at this power level.

Circuitry

Local oscillator and buffer. See Fig. 2. An EF80 oscillator at 22 MHz driving an E180F buffer amplifier was found to give more than adequate injection to the transmit mixer. No stability problems were found with the circuitry shown, although when an EF80/EF183 oscillator/buffer combination was tried, this showed signs of being unstable. Note that the receive converter

mixer takes its local oscillator injection from the anode of the E180F via a two-turn link.

Transmit mixer and buffer. See Fig. 3. The transmit balanced mixer is a QQV03-10A, which receives 22 MHz RF inductively coupled to its grids at 28 MHz RF at its cathode. This is a well-tried arrangement and no problems have been encountered. The mixer produces about 750mW of 50 MHz RF, which is fed to the 50 MHz buffer amplifier, another QQV03-10A. This is included in the design to attenuate the unwanted mixer products rather than deliver power gain, and whilst the mixer will drive the final amplifier direct, it would be unwise to omit this stage as its tuned circuits attenuate considerably the inevitable unwanted mixer products.

Transmit final power amplifier. See Fig. 4. With this design it was decided to try a different approach from the QQV06-40A final used in the author's previous transverters. An SK-620 base and chimney were available, so a 4CX250B final was used. This, much to the author's delight and surprise, worked beautifully from the moment of switch-on. The 4CX250B produces a very

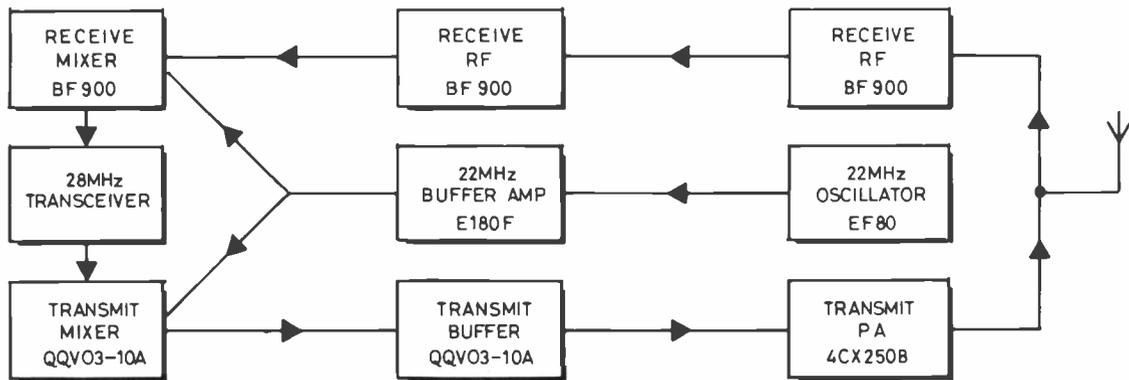


Fig.1 BLOCK DIAGRAM OF THE 50MHz TRANSVERTER

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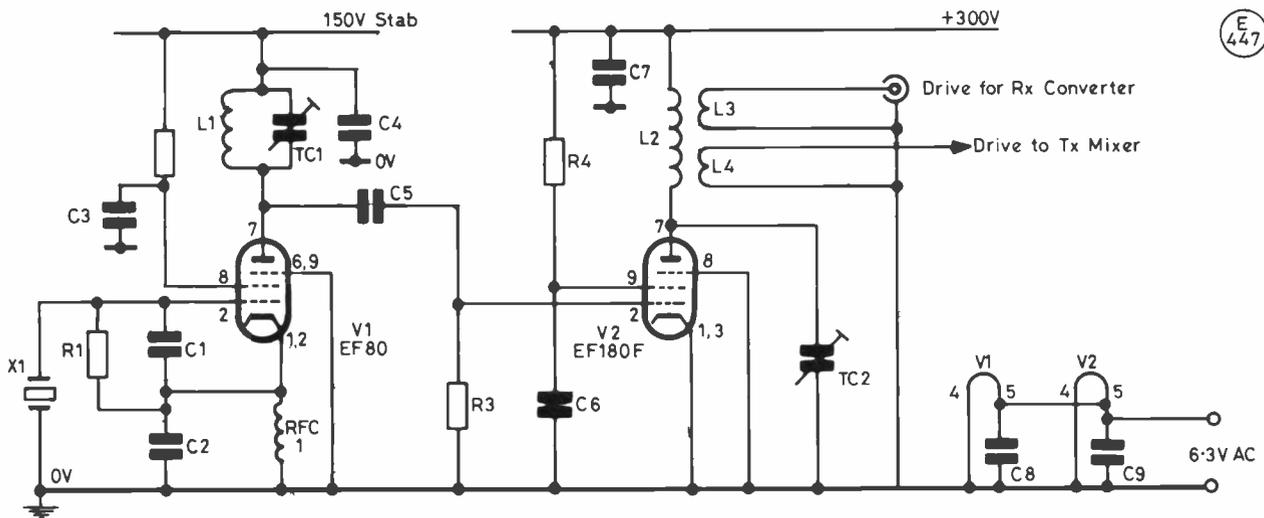


Fig. 2 CIRCUIT OF 22MHz LOCAL OSCILLATOR AND BUFFER

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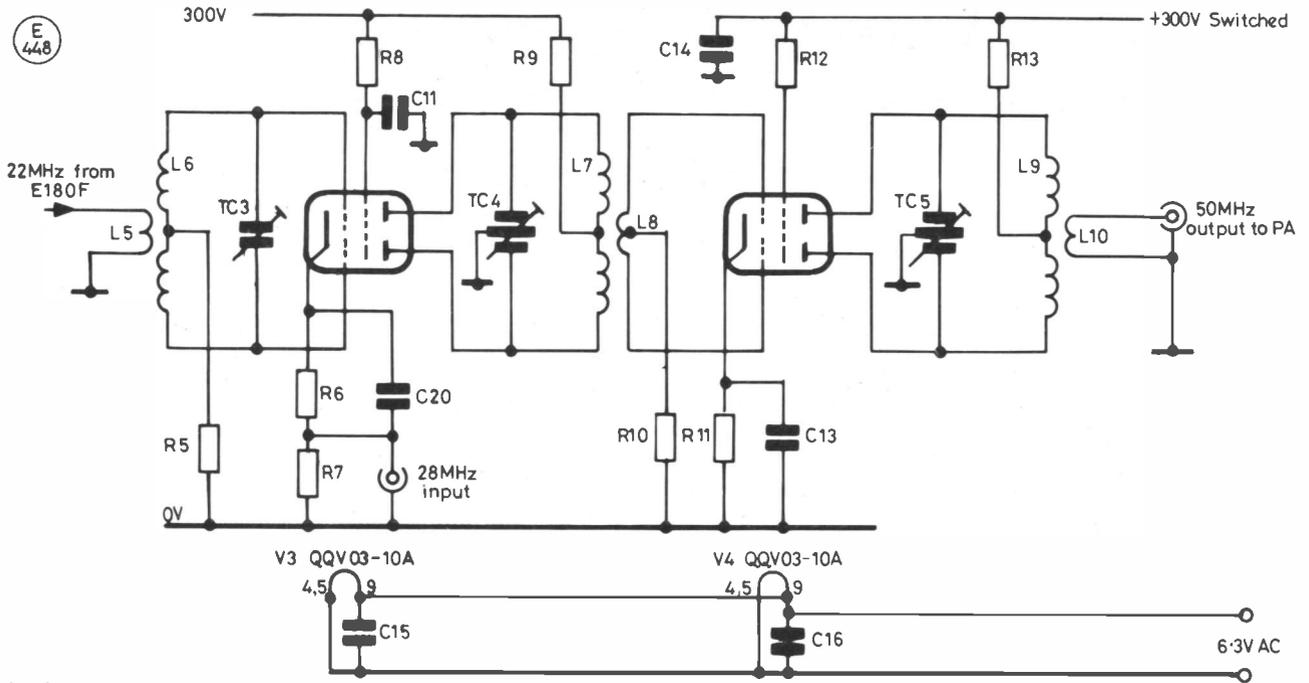


Fig.3 THE TRANSMIT BALANCED MIXER AND BUFFER AMPLIFIER.

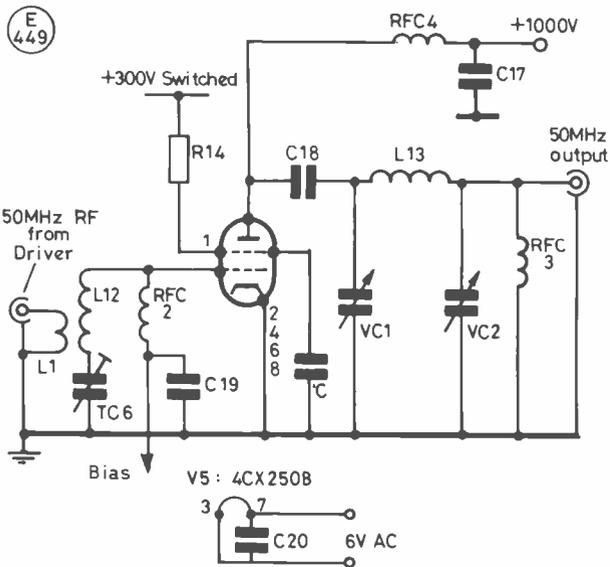


Fig.4 50MHz PA. (Note that the filament takes 6 volts rather than 6.3V. The capacitor 'C' is built into the SK620 valve socket).

Table of Values

Figs. 2, 3 & 4

- R1 = 100K
- R2, R3, R4, R8, R12 = 47K
- R5, R6, R10 = 1K
- R7 = 50R
- R9, R13 = 100R
- R11 = 330R
- R14 = 100R, 5W
- C1 = 39pF silver mica
- C2 = 390pF s/m
- C3, C8, C9, C10, C11, C12, C15, C16 = 0.001µF, 1kV d/c
- C4, C6, C7, C13, C14, C19, C20 = 1000pF, 1kV d/c
- C5 = 50pF
- C17 = 1000pF, 3kV
- C18 = 500pF, 3kV
- TC1, TC2 = 30pF beehive trimmer
- TC3, TC4, TC5 = 38 + 38pF butterfly
- TC6 = 50pF
- VC1 = 50pF wide-spaced
- VC2 = 150pF
- L1, L2 = 22t, 28 swg, on 3/8" former
- L3, L4 = 2-turn links on L2
- L5 = 1-turn link centre of L6
- L6 = 20t, 28 swg, on 3/8" former tapped at centre for R5
- L7 = 8 + 8t, 20 swg, airwound, 1/2" dia.
- L8 = 1-turn link centre of L7
- L9 = 8 + 8t, 20 swg, airwound, 1/2" dia.
- L10 = 1-turn link centre of L9
- L11 = 2-turn link centre of L12
- L12 = 16t, 20 swg, 1/2" dia. airwound
- L13 = 5t, 10 swg silver-plated, 1 1/2" dia., 3" long
- RFC1 = 2.5mH choke
- RFC2, RFC3 = 33 µH choke
- RFC4 = 22-ohm wirewound resistor, 5-watt
- X1 = 22 MHz crystal
- 4-off B9A valve bases
- 1-off SK-620 base and chimney

Note: all resistors are 1-watt unless otherwise stated.

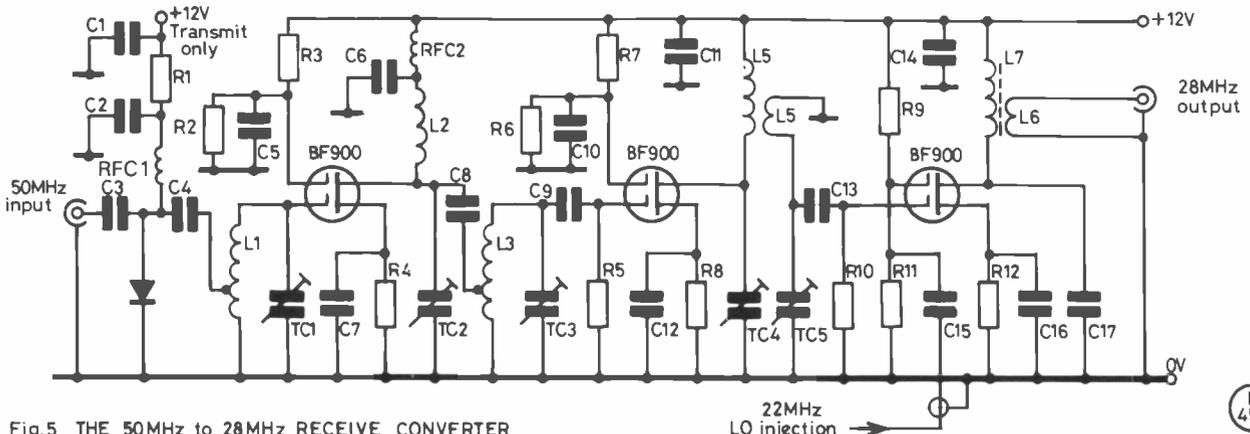


Fig.5 THE 50MHz to 28MHz RECEIVE CONVERTER

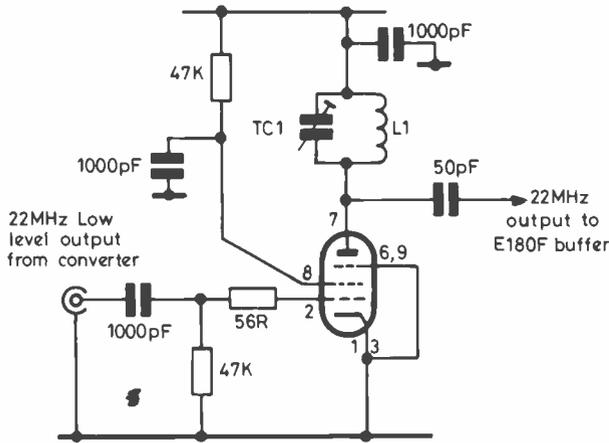


Fig. 5a Arrangement used by GW4BCD to amplify a 22MHz low level signal

E 451

Table of Values
Fig. 5

- R1 = 150R, 1W
- R2 = 47K
- R3, R7 = 100K
- R4 = 270R
- R5, R9, R10 = 270K
- R6, R11 = 22K
- C1 to C6, C10, C11, C12, C14, C15, C16 = 1000pF d/c
- C8 = 3.3pF (1-turn link on earthy side of L2 as alternative)
- C9, C13 = 33pF
- C17 = 10pF
- C7 = 270pF
- L1 to L5 = 10t, 20 swg, 3/8" dia. airwound
- L7 = 19t, 28 swg, on 3/8" dia. cored former
- L6 = 2-turn link on earthy side of L7
- TC1 to TC5 = 30pF beehive trimmer
- RFC1, RFC2 = 33 μH choke
- D1 = OA90

Note: all resistors are 1/2-watt unless otherwise stated.

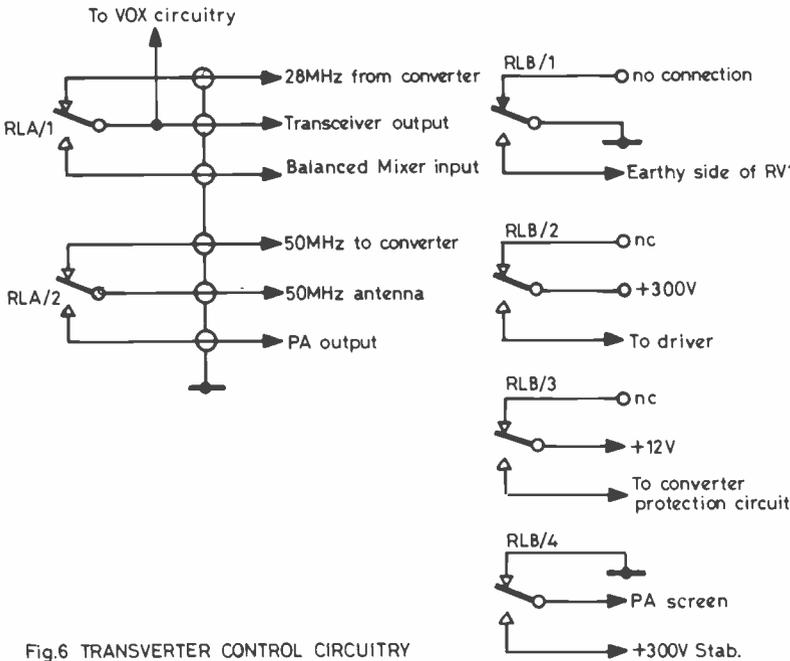
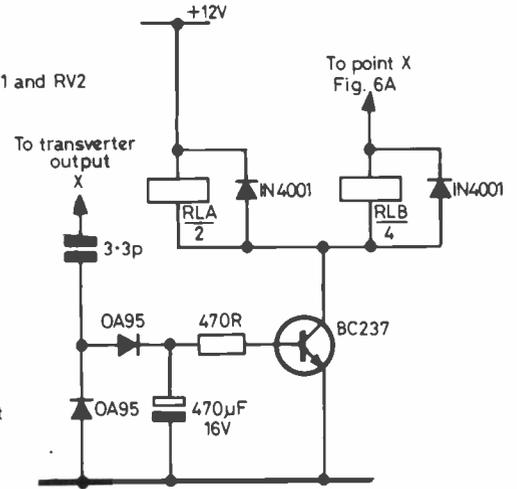


Fig.6 TRANSVERTER CONTROL CIRCUITRY



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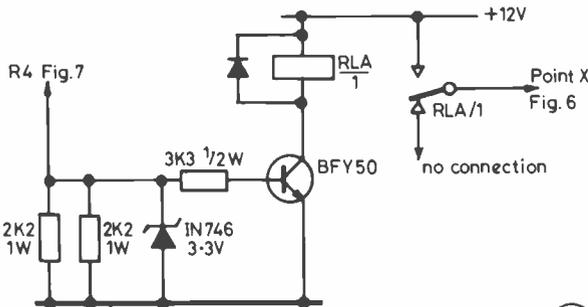


Fig. 6a PA screen protection circuitry used in GW4BCD's transverter

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comfortable 130 watts of 50 MHz RF with a 1000 volt HT line, the valve almost idling along at this power level. No neutralizing is needed providing the PA sees a reasonable match of 50 to 100 ohms at the antenna. The grid input circuitry uses half-wave lumped constants which contributes greatly to the stability of the stage. A conventional pi-network is used on the output side, the PA being around 45% efficient, which is quite reasonable for this type of PA. Note that the 4CX250B needs forced air cooling even with only heaters on, so the fan should be interlocked with the heater supply. Control circuitry is described in more detail later in this article.

Receiver converter. See Fig. 5. This is a completely conventional design, using BF900 Mosfets. A commercial unit could be used of course, and if one is chosen which has a 22 MHz local oscillator output it could be coupled to the grid of the EF80 which then becomes a buffer amplifier. This has been tried very successfully on the author's transverter. A *Spectrum Communications* 50/28 converter was used, its 22 MHz local oscillator output being applied to the EF80 grid as shown in Fig. 5(a); his arrangement produced more than adequate drive to the transmit mixer.

Control circuitry. See Fig. 6. Signal path switching is taken care of by RLA/1. RL2 switches 300 volts to the driver stage and PA screen, earthing the PA screen on 'receive'; RL2 also provides a blocking bias to the PA grid. RL3 applies protection to the receive converter during 'transmit' periods. These relays are activated by the simple RF VOX circuitry shown. Hard switching can be used of course, using a spare contact on the 28 MHz exciter. As mentioned earlier the 4CX250B needs forced air cooling even with only heaters on, the primary of the heater transformer being interlocked with the fan supply. This is shown in the power supply circuit diagram (Fig. 7). It is well known that a 4CX250B can be destroyed in milliseconds if the anode supply should fail with screen voltage present. Reference to the power supply circuit diagram shows the method adopted by the author to ensure this does not occur. Another method of screen grid protection is

The 50 MHz PA. The mixer and driver are on the right, and the fan on the left.

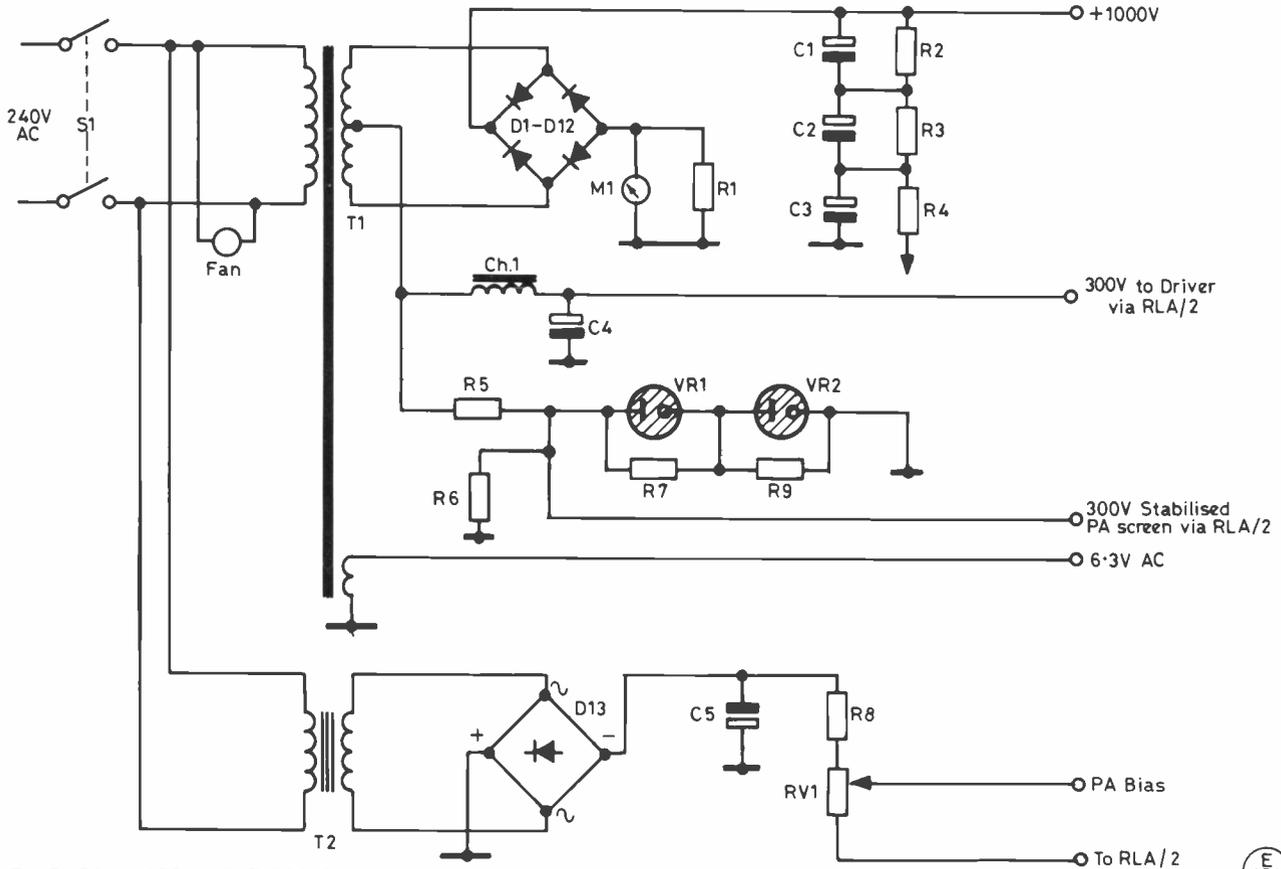
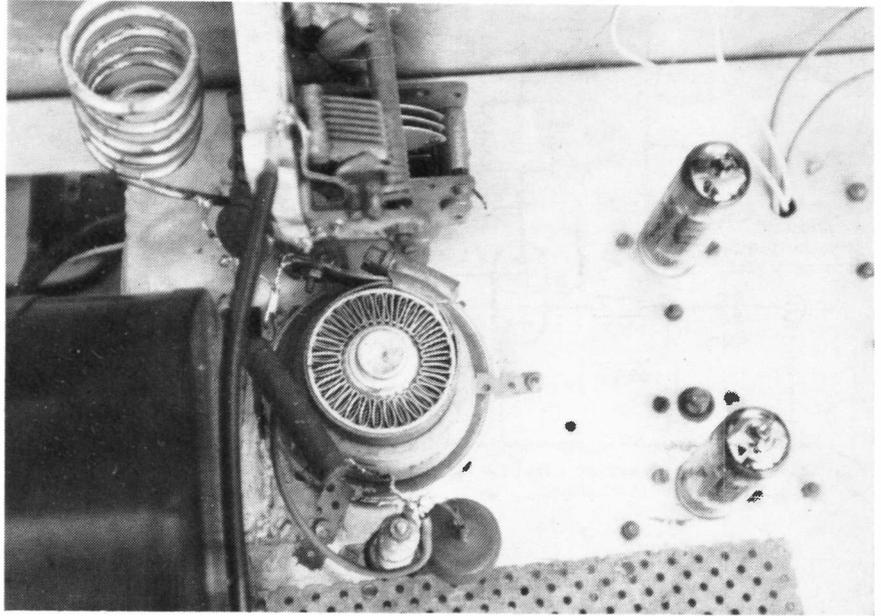


Fig. 7. PSU USED IN THE PROTOTYPE TRANSVERTER



Table of Values
Fig. 7

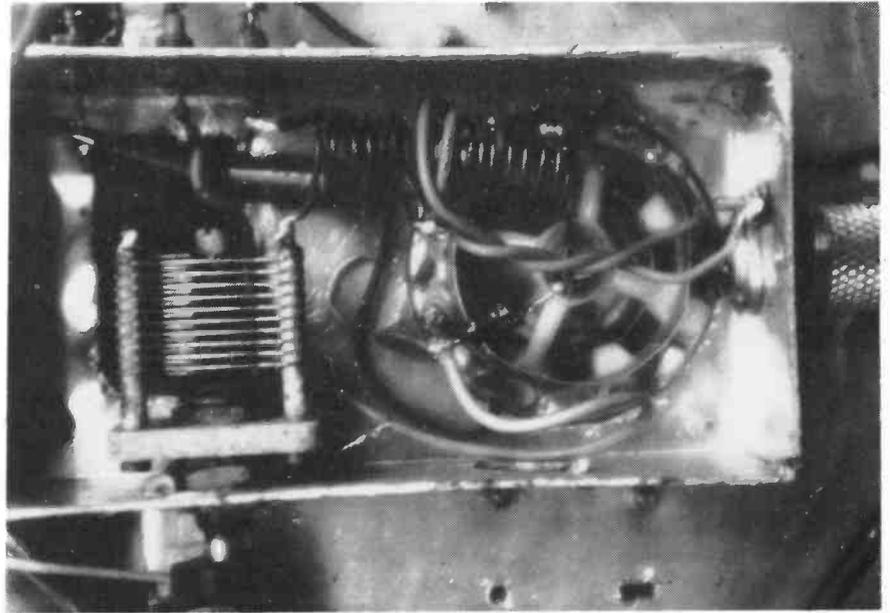
R1 = 22R	VR1, VR2 = OA2 stabiliser tubes
R2, R3, R4 = 220K	D1 to D12 = 1N4007
R5 = 7K, 15W	D13 = bridge rectifier, 500 pIV
R6 = 22K, 5W	500V
R7, R9 = 100K	T1 = .350-0-350V 500mA, 6.3V
R8 = 10K, 1W	7A
C1 to C5 = 100 μF, 450V	T2 = 0-125V 50mA
Ch1 = 100mA choke	M1 = 500mA

shown in Fig. 6(a); this has been incorporated in the author's HF linear amplifier (see *Short Wave Magazine*, December 1980) and is known to work well, having saved a pair of valves on more than one occasion.

Construction

This is not critical as long as standard VHF practice is followed — liberal use of decoupling capacitors and minimum lead length of components associated with tuned circuits is essential. Complete layout details are not given as most constructors will

The PA grid circuitry, showing TC6 on the left and RF input on the right.



have their own ideas. See Fig. 8 for the layout used by the author for major components.

Alignment

Before this is attempted all tuned circuits should be checked with a GDO to make certain that they resonate on the correct frequency. Tuning TC1, TC2 and TC3 will result in the QV03-10A mixer current rising to around 60mA. The coupling between

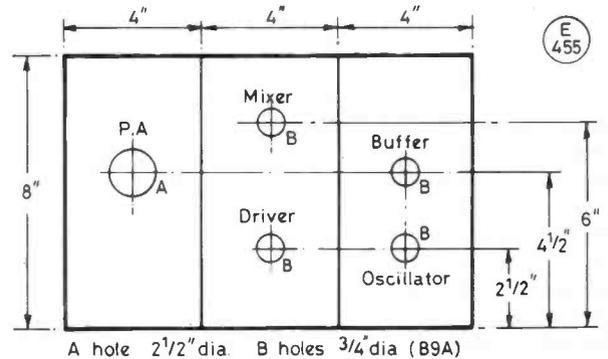
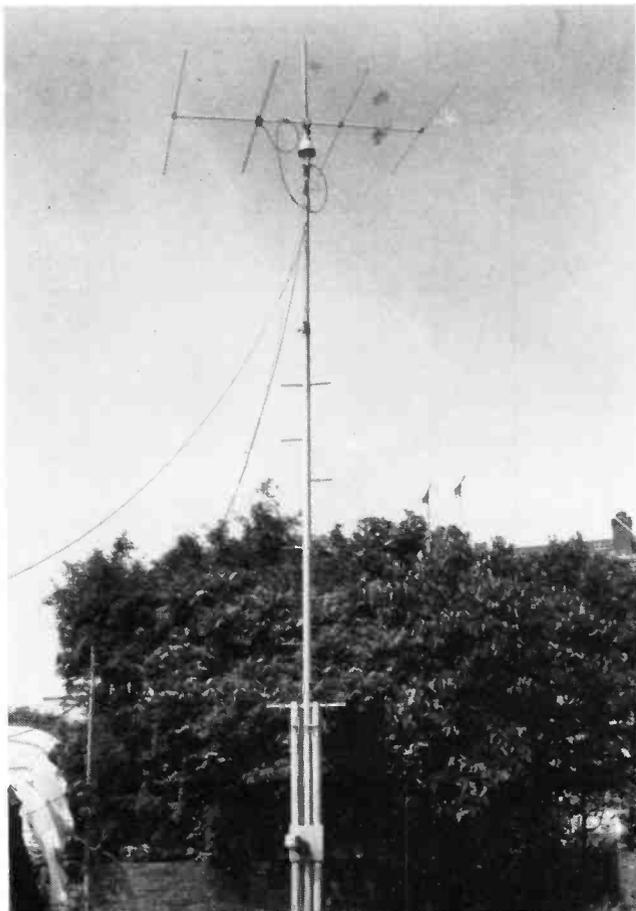


Fig.8 Suggested layout of the transverter



GW4BCD's homebuilt crank-up, tilt-over 45-ft. mast, with a 4-ele 6m. Yagi on top.

L5 and L6 should be reduced until mixer current reduces to 25mA. Keep retuning the relevant trimmers whilst doing this. With 500mW of 28 MHz RF applied to its cathode, tuning TC4 should result in the mixer producing about 750mW of 50 MHz RF. Buffer amplifier current should rise to 30mA, falling to 20mA when 28 MHz RF drive to the mixer ceases.

The buffer produces about one watt of RF; this is sufficient to drive the PA to more than 300 watts input. Provided the grid and anode circuits of the PA have been checked with a GDO, alignment of the PA is simply a matter of tuning TC5, TC6, VC1 and VC2 for maximum output into a 50-ohm load. The usual checks for parasitics and stability of the PA should be made, of course, even though, as mentioned earlier, the PA in the prototype is perfectly stable and free from parasitics. If the SWR the PA 'sees' rises to more than 3:1, the PA in the prototype can be made to oscillate. However into a reasonable match it is as stable as a rock.

Aligning the receive converter is straightforward and should pose few problems.

With the circuitry shown GB3NHQ, the RSGB 50 MHz beacon at Potters Bar, is copiable most of the time, over a QRB of 150 miles.

Conclusion

The author's prototype transverter was built in a fortnight or so of three hour evening sessions, and whilst not utilizing state-of-the-art technology on the transmit side, it is an easily reproducible design which can be tackled by anyone who has a little experience in VHF construction.

• • • "Practically Yours" • • •

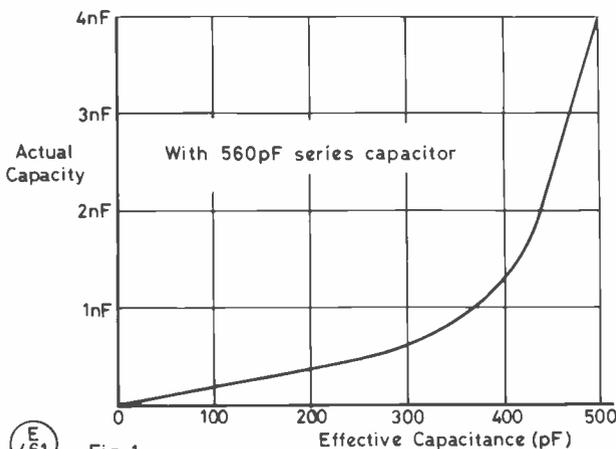
with GLEN ROSS, G8MWR

Capacity Tester Update

THERE has been a lot of interest in the capacity measuring unit which was recently described ("Practically Yours", Jan. '85). Some comment was received on the possibility of extending the range of the unit. This is possible but the original idea was to use the instrument specifically for measuring small values with good resolution. The extension of the range is simple to achieve but the scale then becomes somewhat cramped especially at the higher capacity end of the range.

Modification

The method is to put another capacitor in series with the one being measured so as to reduce the effective capacity; by this means it is possible to check capacity up to 4000pF. Fig. 1 clearly shows the effects. It is not worth trying to push the system any further as the scale becomes far too cramped. Perhaps the best method of implementing the modification is to mount the new series capacitor inside the case with a small switch connected across it so that it may be short-circuited when not required. This would give the original advantage of good resolution on the lower capacity range and the ability to check higher values with reduced resolution.



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Fig. 1

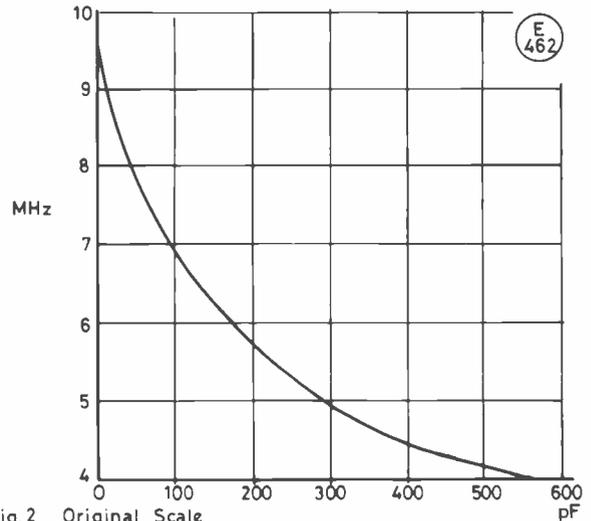


Fig. 2 Original Scale

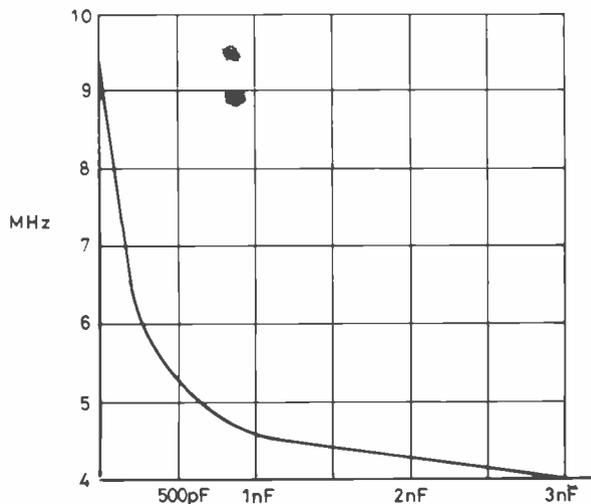


Fig. 3 Scale for extended range (560pF series capacitor).

Calibration

Several people have asked for calibration curves and these are shown as Figs. 2 and 3; they are based on an original calibration point of 9.5 MHz. Fig. 2 is for the original and Fig. 3 is for use with an additional series capacitor of 560pF. All the foregoing is based on ideas and information supplied by Roy Oxley.

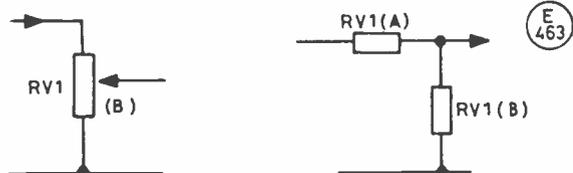
ATTENUATORS

It is frequently found that the level of an available signal is too high for the required purpose and that it must be attenuated to a more suitable level. The attenuator employed may take many

forms, possibly the simplest example being the ordinary volume control. Although this is an example of a continuously variable control when set to the required level it can be thought of as two resistors of suitable values to perform the required attenuation, see Fig. 1. There is a basic problem with this type of control when used in more demanding applications and that is that the impedances which are seen by the equipment connected to each side of the control vary as the control is adjusted. This is of little consequence in an audio amplifier but is obviously very important in matched RF circuits.

T and Pi Circuits

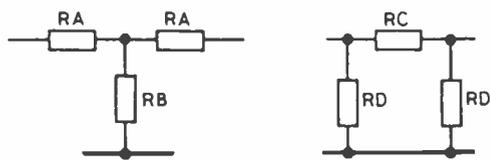
The way round this problem is to use three, rather than two, resistors and to connect them in a T or Pi type circuit as shown in Fig. 2. By this means it is possible to design for any required degree of attenuation and also to maintain an accurate impedance match on both the input and output ports. It is even possible to design for different impedances on the two ports and so achieve impedance matching; this usually involves fairly high degrees of attenuation and will not be described in this article.



(a) Standard volume control
Fig. 1
(b) V/C redrawn as an attenuator

Precautions

Particularly if the units are going to be used to provide high rates of attenuation at VHF and above it is essential to minimise the coupling between the input and output connectors, this is usually accomplished by fitting screening between the various sections. It is also better to arrange the attenuation in, say, three steps of 20dB rather than in one of 60dB. If the attenuator is to be used at high frequencies it is essential to minimise the amount of inductance included in the unit; this means short leads and no wirewound resistors. Some commercial attenuators, or "hot boxes", for the amateur market were made with wirewound resistors but these were intended to be used on a narrow frequency band and the effect of the inductive element of the resistor was taken into account, which explains why the resistor involved seemed to be of the wrong value to give the claimed loss. Another point to keep in mind is that the power rating of the resistors must be such as to safely dissipate the heat generated. On a Pi network this is usually only of importance on the input resistor but on the T system the ratings of the first two resistors should be considered.



(a) "T" Attenuator
Fig. 2
(b) "Pi" Attenuator

Resistor Values

These very often turn out to be non-standard, to say the least, if extreme accuracy of attenuation is required, but for a lot of work the nearest standard values may be used with acceptable change in the loss and impedance matching. The table gives the resistor values for a range of attenuation values and also includes series and parallel combinations that may be used to make up the "odd" values to something approaching the ideal. The table is arranged so that either T or Pi connections may be made up and the headings are marked to correspond with the lettering given in the diagrams. The information is given assuming 50 ohms input and output terminations.

Loss dB	T		Pi	
	RA	RB	RC	RD
1	2.9 P,12,12,12,12	433 S,390,39	5.8 P,12,12	869 S,820,56
2	5.7 5.6	215 S,180,33	11.6 P,22,22	436 S,220,220
3	8.5 P,15,18	142 S,120,22	17.6 P,33,33	292 S,270,22
4	11.3 P,22,22	105 S,82,22	23.8 P,47,47	221 220
5	14 P,39,22	82 82	30 S,22,8.2	178 180
6	16.6 P,33,33	67 S,33,33	37 S,33,4.7	150 150
7	19 P,39,39	56 S,47,8.2	45 S,39,5.6	131 S,120,10
8	21.5 22	47 47	53 S,47,5.6	116 S,100,15
9	24 S,12,12	41 S,22,18	62 S,56,5.6	105 S,100,4.7
10	26 P,47,56	35 P,68,68	71 S,56,15	96 S,82,25
11	28 P,56,56	31 S,15,15	82 82	89 S,82,6.8
12	30 S,15,15	27 27	93 S,82,12	83 S,68,15
13	32 S,22,10	24 S,12,12	106 S,100,5.6	79 S,68,10
14	33 33	21 S,10,10	120 120	75 S,68,6.8
15	35 S,18,27	18.4 18	136 P,270,270	72 S,56,15
16	36 S,27,10	16 P,33,33	154 150	69 68
17	38 S,27,10	14.4 P,39,22	173 S,155,22	66 S,56,10
18	39 39	12.8 S,10,2.7	195 S,180,15	64 S,56,8.2
19	40 S,27,12	11.4 P,22,22	220 220	63 S,47,15
20	41 S,22,18	10.1 10	247 S,220,27	61 S,39,22

Against any required loss the top line of figures is the correct value to obtain that attenuation, and the lower line shows how this value can be approximated using standard value resistors. As examples P,47,56 means parallel a 47 and 56-ohm resistor whilst S,18,27 means series connect 18 and 22-ohm resistors. Next month I will show how to build attenuators to serve various purposes.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

The Bands

THERE are always two factors at work. . . . The first is of course the sunspot count, and the second is *activity*; how often can you hear a beacon from a distance, but no sign of activity. Then is the time for a good old CQ call, the result may not be spectacular, but others will hear it, and maybe try a CQ themselves. . . . and, lo! we have activity!

There is a third factor, and this one is getting worse all the time. The problem is caused by the flood of new electronic and electrical devices and the fact that in most cases no attempt whatever is made to silence the things. It is now the fashion — an idiotic one in many areas — to do as much as possible digitally, and of course the digital method generates QRM for mains leads and interconnections — a sort of permanent radiated electronic flatulence. The news that B.T. has approved telephones that cause QRM in the two-metre band is just another sign of the times.

The Mail — Top Band

G4AKY (Newport) starts us off this time. Dave found, in December, HV2VO and 1A0KM for a couple of new ones, SV0AA, a brace of YVs, 9Y4 and UM8, with AP2SQ, 8P6KY and D44BC all in the gotaway list. For January, CW worked to CT1BSN, AA1K, RF6QAI, UA9YGO, RL7LCT, VE3EK, EM8CSB, UA1ZEE (Murmansk), ON6RN — this was a 'test transmission' and if it turns out a good 'un would be G4AKY's 100th country on the band — UM8MU, RL7GDR, EA8AAU, OK4AWQ/MM in the Med., UA9KAA, W1PL, UL70B, VO1HP, VE1ZZ, EM8CIL (QSL via UC1IWB); gotaways included KA8GVS/KH2 (SSB), ZP5AR (SSB), 3B9CD (CW), TG9NX (CW), ZL3GQ (CW), 9J2LO (SSB), VS6DO (CW), JA5CPI (CW), JA6IEF (CW), JA6JPS (CW), 3A2GL (CW) various W0, W6, W7, LU7XP (Tierra del Fuego), and PJ7A on SSB. That little lot should cause enough wailing and gnashing of teeth to satisfy *anyone!*

Next G3BDQ (Hastings) who begins by noting that his Corsair's key-clicks required a 0.4 μ F in series with a 12 ohm resistor across the key contacts; fine, save that the TS-530 also has a filter, but one which needs a choke as well, which generates an interesting little conundrum when using the key with either rig. . . . However, the 0650 to sunrise period produced some 22 W/VE contacts, the

best being with K5GO (Arkansas), WA8MLV (Ohio), N4UB and W0ZV both in Colorado. VE7 was heard working DLs, but no W6 even heard. Other DX includes EA8QO, HZ1AB, UZ9AWZ, UA9SAA, UG6GAW, EU2C, EW1AA, EM8CSB, EO1AAK, all on CW, plus an unexpected one with PY1RO, Rolf, on the morning of January 9. VS6DO duly showed and was worked once on CW and the following morning on SSB for good measure, plus helping G4LMZ to get over. The contest weekend at the end of January yielded some 100 QSOs and 39 multipliers, the best of which was 7X4MK, worked after some forty minutes of chaos in the pile-up. One who had problems, worked in the contest, was UO5OB who seemed to be in need of a receiver overhaul! JAs and VKs noticeable this season by their absence. End of letter. Twenty-four hours later . . . letter the second, indicates that at 0730 on 31st, John had an unexpected QSO with ZL1HY; they have been corresponding and trying for some three years, using every sunrise and sunset period for that time at the ZL end — devotion indeed. Conditions did seem a little odd; at 0710 K8XX was followed by K2UU at 599, followed by AA4FF who only gave 449, but activity was low. A final CQ brought a call from a weak and broken-up signal, unreadable, that after a couple of QRZ calls turned out to be ZL1HY, peaking 449 this end and giving RST599. The frequency was 1836 kHz.

Turning to G2HKU (Sheppey), we find Ted has been mainly occupied with the defence of his fish-pond against a heron from the marshes who decided that G2HKU was an easier 'touch' than working for food. Hurried laying-out of some wire-netting over the frozen pond saved the fish, but the bird remained to inspect the workmanship for flaws. . . . The interesting bit, as G2HKU says is that a big bird like a heron flies round and between aerials and guy-wires with confidence, something the sea-gulls don't seem able to do, despite their smaller size. Naturally the weather made the shack more of a pleasure, and so Top Band yielded SSB contacts with LX1EA, I4OUT, DJ1SU, PA0PN, and EA9KF; CW went out to EI0CZ, EI9J, UT5AB, OH4NV, OZ1W, GM3HBT, EM8CSB, HB0CZS, UC2IDZ, UB5VDO, SM6CTQ, OK1GT, W1CF, OH0BA, DL1BU, OY7ML, GM0AAS, LA7JO, UP1BWR, PA0LOU, EA9EU, GU3HFN, DK6AS, 4X4NJ, UA1DZ,

LA4O and F3AT, with VS6DO heard several times both on CW and SSB but not worked. On a different tack PA0PN has now received his by-pass operation on his heart and is home again but not yet, at the time of writing, in the shack and operating.

G4OBK found December not a very good month, but in January things perked up somewhat. Reading G3XAP's articles in *S.W.M.* back in the summer sparked off some thoughts and Phil now has a more potent signal on the band. On SSB the month brought ZL2BT for a new one, AB1A, W2JPN, K8CCV, W8RA, WB3GCG, W4YJ, EI8H, VE3KQS, K3UA, HB9ADQ, C31YA, C31OF, EA9KF, OE1DH, LZ1KUZ, N4WW, N1ODY, K1ZM, KA1SR, N4CQC, KB3AF, W1RR, UA2FFH, LX1EA, G3BDQ for a natter, and VS6DO. On CW there was W1PL, VE1ZZ, VS6DO, SV0AA, K2RIH, K80QL, WN4KKN, EO9ACS, YU3RW, UO6DBN, 4X4NJ, OH0BA, ZL3GQ, UZ9AWZ, TK5VN, K6NA (California), W2FJ, OY6FR, W9SMY and numerous small fry. The ZL2BT QSO was at 0800z in the a short peak on January 11, but the ZL3GQ on 12th was a terrific opening, with Peter R5 from 0805 till 0825, peaking 579 at about 0810; as for VS6DO, he has been audible in U.K. around 2300, peaking just after, with lots of Europeans working him. Turning now to the CQWW 160 Contest weekend, G4OBK was active from his Chorley home on both nights. Up to about 0200z on both nights the QRM was *awful* — lots of activity, some bad operating, and a few with no receivers — but from 0400z onwards the band was really good to the States. During the contest weekend G4OBK worked some 39 countries and 21 states/VE provinces; among the highlights were contacts with various East Coast Ws, OY7ML, W0ZV (Colo.), K5GN (Texas), VEs, W9AZ (Illinois), N9MM (Indiana), EA9EU, OH0BA, 4X4NJ, RT5UL/UJ for a new one, KV4FZ for another new one, and G6ZY/EA6. The aerial used was the extended quarter-wave aerial — 60 feet up and 100 feet out, plus the ground radials — some twenty quarter-wave radials were laid out for the occasion, which, added to the existing ground field, makes up some 5500 feet of wire for the aerial to work against.

D. A. Whitaker (Harrogate) found conditions very good, and hoped for a peak in the *73 Magazine* contest. A week before the time of writing there was the

CQWW 160 contest, and here David was copying Ws as late as 0845z, a full hour after daylight. In all some thirty U.S. States were logged, plus VE1, VE2 and VE3. Before the contest, David notes he was getting Q5 copy of a W7 — his first ever — while also listening to GI3OQR struggling to complete a QSO — and one knows just what GI3OQR has in the way of a Top Band aerial system!

R.A.O.T.A.

From a Top Band operator who was at it when your scribe was too young to climb into a shack chair, and is still active (especially when juicy DX is to be had!), namely Dud, G6CJ, we have a note about the Radio Amateur's Old Timers Association; since most of us will not be DX-ing but wandering round the NEC on Saturday April 13, a time of 14.30 clock has been chosen for an Extra-Ordinary General Meeting for the Association at the NEC. The object of the exercise is to put things back on a footing which will give confidence for the future; this may affect the present constitution and will certainly consider ways to improve the activities of the Association. Anyone reaching the NEC and wondering where the meeting is to be held may get details from our own stand; and no doubt RSGB will have the same information. See you there, OT's!

Eighty

D. A. Whitaker listens quite a lot, and the following appears in his SSB log: Midnight on, KP4MO, WP4D, OD5JR, J37AH; 0100 on, J88AG, VP2MO, VU2GLI, UD6DJ, UJ8JCQ, UJ8JJ; 0300 on, 9Y4NP, 6Y5IC, 5B4MD; 0500 on, CO2LE; 0700 on, VP2MPB, TI2KD, J73LC, PU2KNE; 0800 on, JA long-path, FM5WD, FM4CL, TI2J, ZP5JCY; then evenings, starting at 1900, with TZ2XN (QSL via DK3HL), VK2AVA; 2000 on, A92EB, 6W1DY; 2100 on, OE8AJK/YK; 2200 on, 9L1CISV, 3X4EX, LU2FFD, YU5ANF; and 2300 to midnight saw HH7PV, UL7PS, FM5WS, 5N8HEM, 5N3RTE, KP2AH, ZD7CW and 7X2LW.

G2NJ (Peterborough) has a word of encouragement to the senior citizens struggling with the Morse. Nick mentions G4ZYD of Horsley, near Derby; Barney, who is in his seventies, stuck at it for two years and three months to reach 15 w.p.m. and on January 30 a three-way between G4ZYD and local G4RAR, with G2NJ as the third station was projected and no doubt came off. Our congratulations to Barney, G4ZYD, and hope to work you on the band some time; and all you doubters on account of age can take new heart from Barney Frearson's success. On a different tack, G2NJ noted a couple of /MM in the early afternoons, in PA3BLQ/MM, working PA0RZL, and OK4NH/MM, heard working OK2KR from near Kiel.

GW4BLE (Newport, Gwent) says that

since the mishap with the tower last year, when the weather gets lively the replacement skyhook is always cranked down; this is no help at all when one is trying to work the DX, but doesn't seem to stop Steve hearing it! Hence, the gotaway list is longer than this one of stuff worked: A71AD, CE0AE (Easter Is.), D44BC, HK5BCZ, TI2J/5, V3ZZ, KE5KK, XE1MDX, XE1L, and ZP5JCY. On a different tack, Steve managed to obtain a used (and in need of repair!) SB-220, which has now been restored to health and adds the odd extra dB to the outgoing signal.

As for G3BDQ, this month he hasn't done much on Eighty; a swap of reports on SSB with H44IA about sums it up.

Now Forty

G3BDQ offers a ragchew with ZC4CZ, discussing the possibility of some Top Band operation.

D. A. Whitaker didn't have a lot of luck on the band, his bag being EO9ACS at 1400, CT3DZ at 1800, TR8SC, D44BC, FR0FLO at 1900 to 2100; then K3WGR/VP2M appeared, and at 2200z TR8SJC again, accompanied by ZP5CDW; 2300 on saw UF7VWA, A92EB, A71AD. At 0400 there was a lone HK4CYR, and then at 0800 ZK2IK and H44IA were tibbits for breakfast.

New Bands

It is really too early yet to know if our suggestion of an 'Activity Day' on the first weekend in each month has borne fruit.

However, G2HKU does look at the band, and he offers a contact with SM0CXM.

In a letter from G4UXN (Leeds), Tony says he found, on 10 MHz, KD2KL, N4SU, JA1IFP and 4X4WF; 18 MHz showed with CT1BSN, SM2OTU, and again 4X4WF. ZL amateurs were allowed on to 18 MHz (not 24 MHz, though) from the start of this year and some considerable activity is reported from there, though nothing heard at Tony's receiver.

In a separate entry, G4UZN sent us a copy of the first of the *WARC Bands Newsletter*. This first issue comprises some personal comments from G4UZN, a reprint of the relevant bits for anyone interested in getting started, and a pretty comprehensive list of countries available on each band; and, very usefully, a listings of all loggings noted in 1982, 1983 and 1984 in RSGB's *RadCom*. Now, obviously, more members are needed and more input if the thing is to be kept going; membership costs you five pounds or ten dollars or twenty deutschmarks, and gets you four newsletters a year plus a membership certificate. There is a standard application form, which asks for name, address, callsign, country, and a note of the amount enclosed, and which can be obtained from: A. M. Quest,

G4UZN, 445 Street Lane, Leeds LS17 6HQ, England. We commend this idea to you and support it whole-heartedly.

Bits & Bobs

With their enormously increased membership, and the expansion of their interests, B.A.R.T.G. has decided to indulge in a Sunday-morning SSB gathering, to be called 'Datanet' — this will be on 3.660 kHz nominal, and will be for all those interested in RTTY, AMTOR, and packet radio; committee members will take part, so that discussions of group affairs with ordinary members will be practical. Sounds like a good idea, and we hope it gets off to a flying start. Look for it around 1000 GMT, and *listener* reports will be welcome, addressed to Stuart Dodson, G3PPD, 63 Malvern Avenue, South Harrow, Middx. HA2 9EU.

"CDXN" deadlines for the next three months:

April issue—March 7th

May issue—April 4th

June issue—May 9th

Be sure to note these dates

DXAC has voted, by 15:1 for separate country status for ZC4; and we understand the position to be that pre-1960 ZC4 and post 1960 5B4 cards all count for Cyprus; ZC4 QSLs post 1960 will count for the Sovereign areas, if it is known at the DXCC desk that these stations were, at the material time, in one of the SBAs. This will give them some checking problems, in that quite a few cards were from people who had a station in the SBAs but lived out, or had an address elsewhere for QSL purposes printed on their card. G3KFE himself has a couple which fall into this grey area.

YI1BGD reports that they now have 18 and 24 MHz permission, and should be operational in March/April, low band activity on SSB is 1830-1930z on 7070 kHz into Europe.

Marion Is. may soon be active again; we hear that the new operator is ZR6AOJ, and QSL Manager is ZS6BCR.

The general feeling about the Bouvet proposals is 'not very likely' but notwithstanding, a 3Y0AA appeared on January 28 who was quite definitely a phoney — the real one if it shows will sign 3Y0CG with 25 watts to a transceiver, no split, and a dipole only.

VE3COA/G3YXT, Hilda Collins, XYL of George VE3FXT, passed away on December 30 last; we hear therefore that, not surprisingly, the VE3FXT 100 countries DX-pedition is cancelled.

VE3FXT has our sympathy at this time.

All the above from *DXNS*. Turning now to *The DX Bulletin* we note — it is reported in *DXNS* too — that Lloyd and Iris Colvin have had to cancel their proposed African trip which would have begun last October, as business required their presence at home; the operation is therefore 'indefinitely postponed'.

There are some notes in *TDXB* on the proposal for U.S. expansion on the 7 MHz Phone band., written originally by K1XM in "Scuttlebutt" of the Yankee Clipper Contest Club and reproduced. As he says, such an expansion would help the chaps with big aerials such as K1XM himself; but he goes on to state, very ably, the case for *no* expansion of U.S. Phone facilities by describing graphically just what nasty things would happen to the Europeans and others who only have 7 to 7.1 MHz. Cheers to K1XM — thanks, pal!

The Mozambique operation of C9OA, C9OYL, and SM0DQE/C9, are all from the U.S. Embassy; the permission is from one of the seniors (presumably the ambassador) and is unofficial until the formal and official licence is received. Piracy is another word for it.

Now what about XU1SS? The word has it that Ampil village whence it emanated was over-run and operator Kimsan was among those who were evacuated.

There is a station on Kerguelen for about a year, signing FT8XB — look for him when he keeps skeds at 1900z on 14.180 MHz — at least you have a chance of hearing who he's working, which might give you a chance of getting a sked or whatever fixed up.

Navassa rumours are about, this time involving the activity of 6Y5NR plus several Stateside hams; the aim is to make a start around April 7.

Pitcairn now has WD9GQV operating from there as VR6BR; QSLs are *via* KA9W. We also note that VR6TC's wife, Betty, has passed her RAE in New Zealand, and is now VR6YL; that seems to mean VR6TC is outnumbered 3:1 by YL operators on the island all competing for a share of the limited supplies of power. Incidentally, Tom, VR6TC skeds DL8FL on 7050 kHz, Sunday mornings at 0700z.

That series on slopers by G4BUE (*S.W.M.*, Nov., Dec. '84, Jan. '85) seems to have touched some useful spots. G4ITL was pleased enough to go outside with cutters and soldering iron, and Steve GW4BLE also mentions it has caused him to make plans. The writer can recall first playing around with a quartet of slopers on, as we recall, 21 MHz, back in 1981, all dangling from the mast-head of the old boat as she lay at moorings, and being decidedly chuffed with the results.

Ten Metres

This band seems to have suffered its worst month for a long, long time.

GW4BLE says "Nothing to report" and G3NOF "Nothing heard on Ten".

Even that real *addict* of the band, G4HZW (Knutsford) reports sadly that until about ten minutes before starting his letter he hadn't had a contact outside the U.K. all month; then SM5POS and SM5NWX were worked in short order. The Z21ANB beacon was audible on January 21, but there was no response to a prolonged CQ call in that direction. As a change, Tony has been playing with the GIFTU RTTY program for the Spectrum, and finding it quite useful on Ten in the late evening, although, like any other unit lacking benefit of a TU, it might scratch a bit on a crowded band.

Fifteen

The upsurge in conditions between 14 and 21 January has probably been reflected in conditions, unexpected though it undoubtedly was. G3NOF found little in the mornings, but a few openings to Africa and South America around noon. North Americans were heard but not from the West Coast and with considerable fading. Don made SSB QSOs with A4XRS, A71BJ, CP8HD, FH4AA, FM5BX, KS5M, N2CYH/KP2 (Water Is.), TG9NX, TL8DC, and W1-2-3-4-8-9, XE1OE, ZS6AOE, 3X4EX and 9J2WS.

GW4BLE reports a 'nil' return — he has been on but found nothing worth writing home about.

Twenty

G3NOF noted the improvement in conditions over the period up to his letter and a week before; prior to that things were pretty awful. Don's beam was swung round for the long path VK/ZL contacts, but found them rather later than in previous years, 0830-1030z Africans have often come in around 1600-1800z but at times the band has stayed open to 2000z. The West Coast W6-7 stations and VE7 were audible around 1630 - 1800z and the East Coasters hung on a little longer as one would expect. A few VKs were to be heard on the short path around noon, and at the same time the West Indies. On a few evenings the South American signals hung in after 2000z. G3NOF worked AI5P/TF, KB7WD, N4NW/ZS, TF5BW, VE1CHG/4U/YK, VE4ZN, VE6BE, VE7DDQ, VE7DGI, VK2AHM, VK0GC (Macquarie Is.), VQ9CK, VQ9YR, XT2BR, W5XZ, W7IL, W0GZD (N. Dakota), ZP5CDB, ZS1AAQ, 5T5CS, 6Y5NR, and 7P8DE.

Again a 'nil' report from GW4BLE; and then we have only G2HKU, whose SSB reached VP8BDG (Brabank Island), VK3SP, and ZL3FV, while the CW worked G6ZY/EA6. That VP8 was of some interest; neither Ted nor the writer has been able to find Brabank Island on an

atlas — he is G4KMG on a joint services expedition.

Contests

The main one is the CQ WW WPX Contest. March 30-31 for the SSB leg, and May 25-26 for the CW leg, 0001 GMT Saturday to 2359 on Sunday. Rules are as in previous years, and the mailing dates are: SSB by May 20, and CW by July 10. Indicate SSB or CW on the outside of the envelope, and address to *CQ Magazine*, WPX Contest, 76 North Broadway, Hicksville, NY11801. Notice, only the one mailing address this year.

RSGB's Commonwealth CW contest is on March 9-11, noon Saturday to noon Sunday GMT; rules are shown in *RadCom*, and logs go to G4DJX, 44 Sherwood Avenue, St. Albans, AL4 9PQ. (This is between RSGB members and stations in the commonwealth or Mandated Territories, of course.)

May we remind you of the G-QRP Club Activity dates: CW March 16-17, SSB May 4-5. It will all happen around the usual QRP frequencies, and at times like this: 0900-1100 on 14/21/28 MHz, 1100-1300z on Eighty and Forty, 1300-1400 on 10106 kHz, 1400-1700 back on the HF bands, 1700-1900 on Forty and Eighty, 1900-2100 on 14 MHz, and finally 2100-2300z on Eighty and Forty. This is the CW plan, and on SSB it's the same except that the hour on 10 MHz is now given over to the HF band spell. Frequencies are 60 kHz up from the bottom on CW (except for 7.030, and the 10 MHz frequency already noted) and on SSB, 28.885, 21.285, 14.285, 7.090, 3.690 MHz. More details from the G-QRP Club, by way of G4BUE, Chris Page, 'Alamosa' The Paddocks, Upper Beeding, Steyning, West Sussex BN4 3JW (or by looking in SPRAT if you are a member!).

Finally, B.A.R.T.G. Spring Contest on March 23-25. Again all the details are in the BARTG Newsletter and the main thing to note is that G6LZB is doing the scoring, so logs go to him at 464 Whippendell Road, Watford, Herts. WD1 7PT. Log sheets can be obtained from G6LZB for 3 IRCs; a separate log sheet for each band and a summary sheet are called for, to reach Peter Adams by May 31.

Finale

That's it for this month. The very early deadline meant that some reports arrived just too late, so the 'crop' was somewhat thin. However, the deadline for next month (see the 'box') allows a bit more time for the arrival of your letters, so let's have plenty of 'em — the more the merrier! Address your reports to your conductor, "CDXN", SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts. AL6 9EQ.

Just think, it won't be too long before you have to start annoying your poor old mower for another season!

“Kitchen Table Technology”

A SERIES OF OCCASIONAL ARTICLES TO
PUT THE ‘AMATEUR’ BACK INTO
AMATEUR RADIO

REV. G. C. DOBBS, G3RJV

No. 8: Let’s be Open about Feeders

SOMETIME ago I was talking to a radio club and during the questions at the end of the lecture, one of the members began by saying, “As a technical author do you think . . .” Some mantles have to be cast off quickly, so I hurriedly said, “Sir, I am not a technical author, I am a mere amateur radio entertainer . . .” I repeat this story to parry the shots I may get from this article. I am a humble Church of England vicar who happens to be active in his hobby and enjoys sharing his experiences with other devotees. This article is about antennas and I am not an expert, but I do have views.

Speaking of antennas and feedlines, have you heard the one about the CB-er who went into his local radio emporium and asked, “I want some of that ‘Kodax’ cable and can you ‘swar’ it for me”; G3VTT swears he was there. It has become the convention in amateur radio to terminate transceivers and transmitters with a 50-ohm output impedance. This is fairly recent in the hobby because one does not have to look very far back to see transmitters which could be tuned for a range of output impedances, often through a pi-network on the output. Likewise most commercial aerials are sold to match a 50-ohm output. All very convenient and certainly a low impedance output has a lot of advantages. The concern that I have is that this standard is almost a case of the tail wagging the dog because the real reason for the choice of 50 ohms for the standard termination is the fact that coaxial cable is so readily available. It has little to do with convenience of design of the equipment or the antenna, in fact sometimes a lot of technical fiddling is required to meet the standard.

So the answer lies in the cable. But is coaxial cable the best alternative for the typical amateur radio station? All amateur radio stations use relatively low power at relatively high frequencies. Let us look at just one of the parameters for feedlines. Fig. 1 shows a simple chart of nominal attenuation in dB per 100 feet for several types of feeder which could be encountered in amateur radio use.

This table shows some interesting facts. The first, and obvious one, is that the cheap TV-type open line is better in terms of losses than the most expensive hardline coaxial cable. For those who don’t know hardline, it’s mighty stuff! It is usually described as semi-flexible, metal-jacketed, foam-filled cable. It is expensive, it has to be plumbed in with hacksaw and bending jig and the fittings cost a lot of money, if you can get them. Serious amateurs may use one of the more expensive flexible cables such as RG8U, which is expensive, but most of us use RG58/U or similar cable. What does it mean in RF terms? Roughly speaking, a 100 watts of RF signal at 30 MHz fed through a correctly terminated cable 100 feet long will have losses, with the resultant power delivered to the antenna being only 31 watts for the thin RG174, 81 watts for the good foam filled RG8/U, but around 96 watts for average openwire feeders.

Not much between good coax and openwire feeder, one might say, but that is only half the story. Losses are cumulative and every little loss adds to the next one. The real problem with the average radio amateur and coaxial cable is that he assumes that what he has to do is couple up his 50-ohm output transceiver *via* his bit of expensive coaxial cable to his commercial 50-ohm beam or vertical antenna. No point in having an ATU, its all matched. With any luck the output impedance of the transceiver may hold over most of the required coverage . . . just . . . but very few commercial antennas, even if they are 50 ohms at an optimum point, will have enough bandwidth to maintain the impedance over the frequency range required by the average amateur. Some of them are multiband too — fancy expecting to get a 50-ohm match over three or four bands, let alone over the whole of one band. But the common story is buy the gear, buy the commercial antenna and couple up the coax cable: no wonder the cat’s fur stands on end every time the transmitter is keyed! Could it be that coaxial cable is merely an expensive way of losing RF? What about openwire feeders?

Three Objections to Openwire Feeders

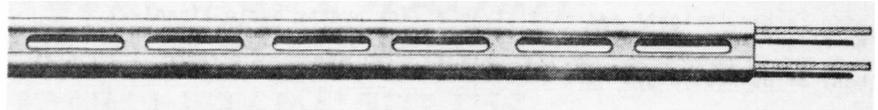
I commonly hear three main objections to the use of openwire feedlines:

1. “I can’t get it into the house through one small hole”.
Answer: My dear sir, that applies to most of the good things in life! If the amateur wants to get open feeders into his house he will find a way, two holes are not much more difficult than one. The methods are legion. Take out a brick and install an airbrick, perhaps with a plastic sliding cover. Drill two holes in the window

<i>NOMINAL ATTENUATION in ‘dB per 100 feet’ of some common feeder lines</i>		
TV Open Wire Feeder	0.19dB	Cheap (about £7 per 100m.) but not rated as being much good for open feeders.
RG197 Hard Line	0.25dB	A real hacksaw and plumbing job!
RG8/U Foam	0.9dB	Good amateurs pay a lot for this
RG58/U Foam	1.7dB	Popular stuff
RG58/U	2.3dB	
RG174	5.5dB	Sometimes used for portable use or a cheap alternative (but it’s about £27 per 100m.)

Fig. 1.

Fig. 2(a). Bofa GMP-6 slotted 300-ohm ribbon cable.



frame; if the frame is one of the modern "can we interest you in double glazing sir" metal frames, some amateurs have been known to replace a section of window with the new plastic, brickproof, substitutes which drill easily and can take neat terminals.

2. I will need to use an ATU. *Answer:* You probably ought to use one anyway. Not only for the reasons stated above concerning the terminations of equipment and aerials, but in the interests of transmitter hygiene, I believe all stations should be run through an antenna tuning unit. A good ATU makes a very significant contribution to harmonic suppression, that well known enemy of the urban radio amateur.

3. I can't buy openwire feeder. *Answer:* That's not true, even if you must buy it. I suppose it is sad that most radio amateurs will only use what they can buy but that's the way the hobby has drifted. Traditionally everyone made their own open feeder and text books not too far back in the hobby testify to the amazing variety of spreaders that they used. The classical spreader was made from nicely worked wood soaked for the requisite amount of time in paraffin or varnish, but I have seen plastic cut from 2-litre icecream cartons, plant labels, perspex offcuts — and did you know that the plastic drinking straws, the coloured ones used for children's parties, if cut into 1" long sections are amazingly strong as open feeder spreaders? A lot has been written about the correct spacing but in practice, as long as the lines are parallel, it makes little difference. The usual impedances of open line range from 300 ohms to 600 ohms but a good ATU should take care of most impedances. A typical spacing is around 2", but I use open feeders spaced at 1" apart.

For those who do not wish to make up their own open feedline, there are several easily available alternatives. The commercial ladder feedline available in the U.S.A. is not easy to get hold of in the U.K., although some amateurs, including me, have managed to get their hands on the stuff. Normal 300-ohm ribbon feeder of

the type cheaply available for TV and FM radio applications can be used but it has severe limitations. The problem is the insulating material, usually polyethylene, which is inadequate for outdoor use. Dirt, water, ice and snow all affect the dielectric properties and SWR can change with alarming frequency and rapidity. One

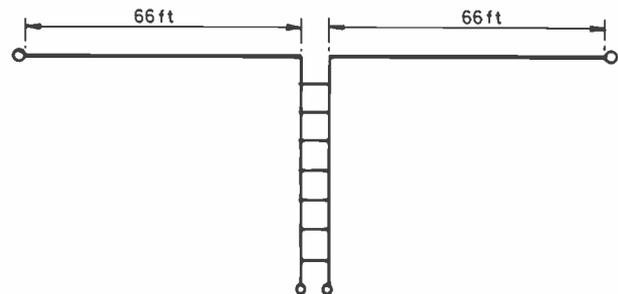


Fig.3(a) Classical centre fed doublet

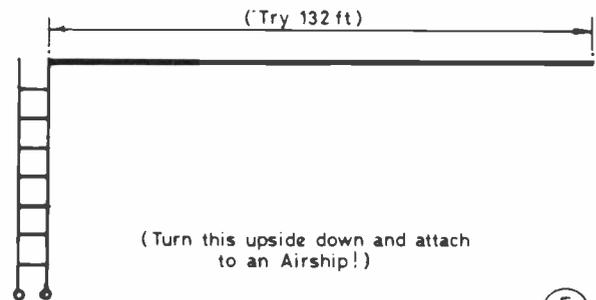


Fig.3(b) Zepp antenna

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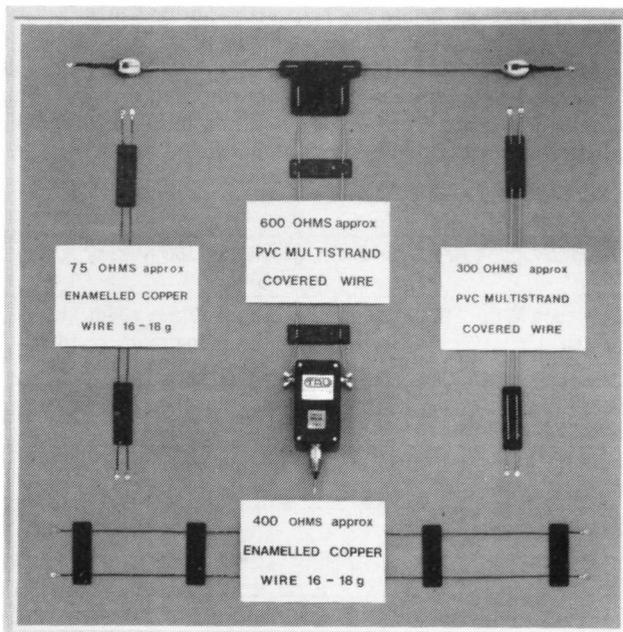


Fig. 2(b). Component parts for making openwire feeder, showing spacers, tee-piece, insulators and 4:1 balun, made by TAU Systems Ltd.

dodge often used by amateurs who cannot obtain any other form of ribbon feeder is to cut windows in the spacing web with a sharp modelling knife and this certainly helps. The process is tedious and almost as much trouble as making up one's own feeder.

Recently a stable form of ribbon has been available on the U.K. market. This is the Bofa GMP-6 ribbon cable sold by *W. H. Westlake*, Fig. 2(a). This is a slotted ribbon feeder of 300-ohm impedance which is not affected by rain or dampness. At around £18 for a 100m. drum it represents good value in feeder cable. I have also used a type of feeder sold as 240-ohm oval-twin; this type of feeder is made up with two parallel conductors enclosed in a sheath of foam and surrounded by a PVC outer coating. I bought mine from *S.M.C. Ltd.* and replaced homebuilt open feeder one winter when I did not relish making up new feedlines. It seemed to perform as well as my homemade open line and can be taken into the shack *through one hole!*

One very useful new product on the market is the *TAU Systems Ltd.* Open Wire Aerial Kit. This consists of a set of clip-on spacers, ceramic end insulators and a dipole centre tee-piece — in fact all that is required, except the wire, to make up an open-wire fed aerial. The spacers are made from ultra-violet stabilised copolymer polypropylene which is lightweight and weather durable; they are designed to simply snap onto the wire for a non-slip spacer. The spacers may be used in two positions, wide and narrow, and with common, inexpensive, PVC covered multistrand wire the wide spacing gives a 600-ohm line and the narrow spacing a 300-ohm line.

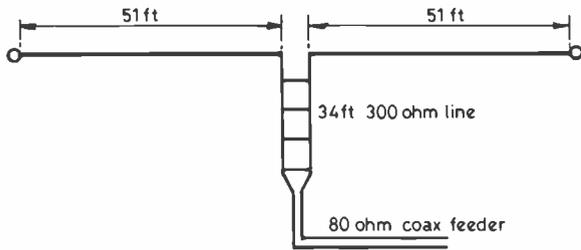


Fig. 4 (a) Usual G5RV configuration.

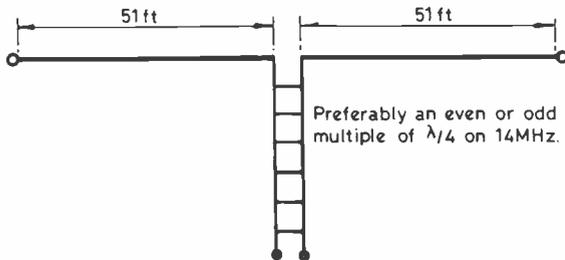


Fig. 4 (b) G5RV with open feeders

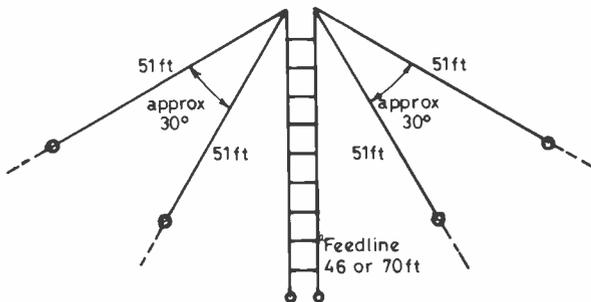


Fig. 4(c) Skeleton Cone Antenna
(Get the lengths right but the angles can be compromised to fit in smaller spaces as inverted Vee configuration).

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The manufacturer also says that using 16 to 18 s.w.g. enamelled copper wire in the narrow spacing gives a line that is around 75 ohms impedance. I have seen these kits and they appear to be an excellent way to produce openwire feeder in a very convenient and simple form. Another interesting product from TAU is their indoor 4:1 balun which could be placed at the end of the open feeders to match the line into any commercial ATU or a homebuilt ATU not designed for openwire feeder use. See Fig. 2(b).

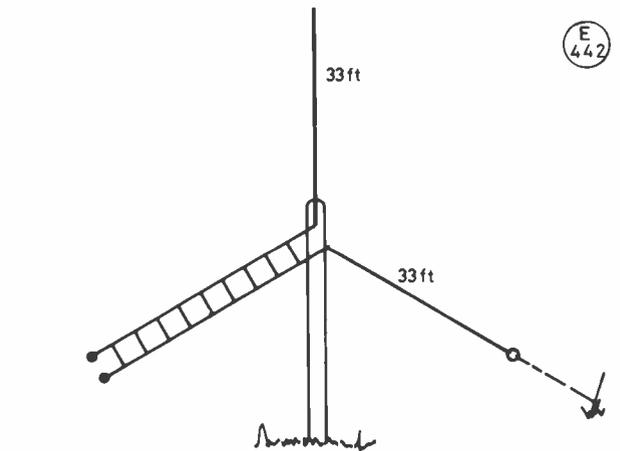
What Type of Antenna?

I well recall the advice of Jim Fisk, W1HR, onetime editor of *Ham Radio*. A man with years of practical experience in amateur radio but sadly no longer with us, who said "There is no doubt that the most efficient (and simplest) multiband antenna is a halfwave dipole cut to resonate at the lowest operating frequency, centre fed with openwire transmission line through an antenna tuner". I remember it because I was given exactly the same advice many years ago by my local old timer when I began the hobby. His version was: cut a dipole for the lowest band that you can fit into your space, get it up as high as possible, feed it with openwire feeders through a good ATU. The classical version of this advice is shown in Fig. 3(a); this shows an 80-metre tuned doublet. A very simple aerial to erect, it goes like a bomb on 80 metres and tunes up very nicely on all the HF bands above 80 metres. "But I can't get it into my garden, it's not long enough". Well, none of the gardens I have put this antenna into have ever been long enough. The easiest way to fit antenna quarts into pint pots is to run a lengthy antenna as an inverted vee. Having a tall centre pole and

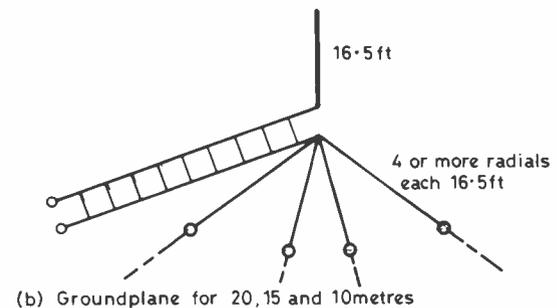
allowing the dipole legs to slope down saves an amazing amount of space. Try bending the ends under, or along in a dogleg at either end, if the inverted vee approach does not make it fit. Practically everyone I know in amateur radio has a 'small' garden but the keen ones get a lot of wire into it. The 132-foot long doublet tunes up well on the higher bands and give something like 1.9dB of gain on 40 metres at right angles to the length.

Sometimes the antenna described above is incorrectly called the "Centre Fed Zepp". The real configuration for a Zepp antenna is shown in Fig. 3(b). It is so called because it was used on the Zeppelin airships. To be strictly correct to the original the diagram of Fig. 3(b) should be turned upside-down and suspended from a dirigible. Not easy to come by these days, so the drawing shows how radio amateurs use it. Like most of these configurations it is an old idea. Read some of the old magazines or handbooks with sections on aerials and find out that not many ideas around now are new, and most new ideas are twists on the old. The Zepp is not as good as the tuned doublet as it is impossible to take up any slack tuning in the feeders. A balanced system is better because it can take up the electrical length required along the feedlines.

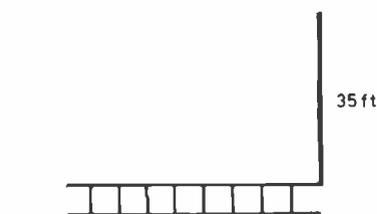
The newcomer cannot be in the hobby for very long without hearing about the G5RV antenna. The usual G5RV configuration is shown in Fig. 4(a). It has stood the test of time as an excellent compromise all-band antenna. The use of a 102-foot dipole tuned for a range of frequencies pre-dates G5RV but the method of



(a) Slanter for 40, 20 and 15m (Also works well on 80m)

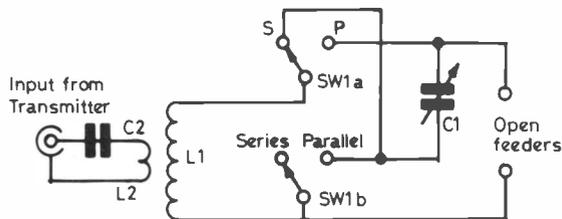


(b) Groundplane for 20, 15 and 10metres



(c) Vertical Zepp for 20metres

Fig. 5. SELECTION OF VERTICALS USING OPEN FEEDER



C1 : 200-500pF (max) airspaced } both made up from
 C2 : 750-1000pF (max) airspaced } tuning capacitors-see text.
 SW1 : 2 pole changeover switch (large toggle or knife)
 L1/L2 : See chart below

Band	No. of turns		Former diam.
	L1	L2	
160	50	5	2"
80	25	3	2"
40	10	2	2"
20	5	2	2"
15	5	1	1/2"

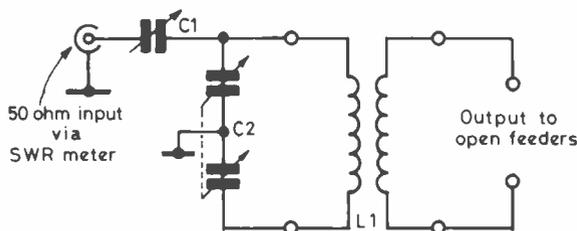
All coils close wound with 20-22 swg plastic covered wire ("bell-wire")

Fig. 6 SERIES/PARALLEL A.T.U

E 443

feeding via 34 feet of open 300-ohm line matching into 80-ohm coaxial cable or twin cable is the unique feature of the G5RV. Although I, and many others, prefer the G5RV with open feeders the whole way as shown in the drawing of Fig. 4(b). A quick rundown on the operation of the G5RV tells us that it works on 80 metres with the electrical centre about 15 feet down the feeders; it is two half-waves in phase on 40 metres; on 20 metres it becomes three half-waves; on 15 metres, two full waves in phase; on 10 metres two one-and-a-half wave lengths fed in phase. In all of these operations openwire tuned feeders assist the configuration and minimise the losses.

A version of the G5RV that I have used for some years with good results on low power operation is shown in Fig. 4(c). This antenna is sometimes called "The Skelton Cone". It is a modification of the G5RV aerial from W5ZBC. I was introduced to it by Bob Spidell, W6SKQ, who has worked some useful DX on low power with this antenna for many years. The original version had its apex at about 38 feet and the ends at 18 feet. My version is about 40 feet in the centre but the ends come down to about 14 feet and my angles are certainly not 33°, but it worked very well for me; the ends can be bent to fit confined spaces. I am not convinced by the claims that it has up to 6dB gain over a dipole on some of the higher bands but it certainly works. Strapping the feeder together and tuning the whole system against ground makes quite a useful aerial for 160 metres.

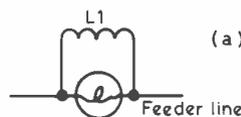


C1 2 gang 500pF variable airspaced capacitor wired in series : Total 1000pF
 C2 2 gang 500pF variable airspaced capacitor wired as shown
 L1 See chart

Fig. 7 SIMPLE 'Z' MATCH

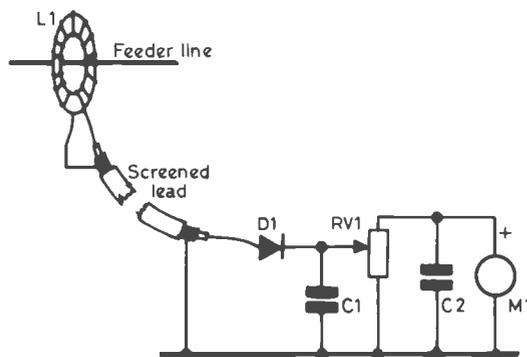
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For those with really restricted spaces openwire feeders may be used for a variety of vertical aerals. Fig. 5 shows a selection of such aerals suggested several years ago by Bill Stocking, W0VM. Fig. 5(a) shows a vertical slantler which is a tuned doublet for 40, 20 and 15 metres. It can also work on 80 metres with a suitable coil in the ATU. Although this version is shown on a pole it could run up the side of a house with just a portion above the height of the building. Fig. 5(b) shows a conventional ground plane, cut for 20-metre operation but with open feeders and an ATU it can be tuned for successful use on 20, 15 and 10 metres. The Vertical Zepp in Fig. 5(c) was used by W0VM for 20-metre CW operation with limited power. The base is at ground level and the supports can be very thin as there is no real weight since the radiator is made from wire. It could be strung from a tree or a bamboo pole could extend above the height of the house to give the top support point. The choices for openwire fed aerals is enormous, after all it was not so long ago that almost every amateur aerial was fed in this way.



(a) W9SCH Shunted bulb

L1 = 10turns 20-22swg en.cu.wire wound on a pencil, then self-supporting.
 B = Pilot lamp bulb according to transmitter power
 2V 60mA up to 5 watts
 6V 150mA - - 50watts RF



(b) RF Sniffer

L1 = Approx. 10 turns on surplus ferrite ring.
 D1 = Germanium diode
 C1/C2 = 0.1µF RV1 = 50K Carbon pot.(linear)
 M1 = 1mA FSD (or less) moving coil meter

Fig. 8 "MAXIMUM SMOKE" TUNE UP AIDS

E 445

Antenna Tuning Units

The same text books of yesteryear which describe open fed aerals are also a good source for ATU circuits and ideas. Many of the ATUs from this period were versions of the Series/Parallel Circuit shown in Fig. 6. I built up a version of this ATU from a rough sketch drawn out by C. F. Rockey, W9SCH. My version of this ATU used all junk items and worked very well indeed; offcuts of plastic piping held the coils which I arranged to plug into the ATU with a crude flylead method. Note that both variable capacitors (mine were salvaged from old domestic reject radios) are isolated from ground. A single gang from a broadcast receiver tuning capacitor became C1, and C2 was both sections of a similar capacitor wired in parallel. The circuit is a direct cull from an old 1920's circuit and offers series or parallel mode tuning to suit the aeral configuration.

Fig. 7 shows the trusty old Z-Match arrangement. These have been used for many years and at least two companies still make commercial versions of the Z-Match. I was inspired to build one

by George Burt, GM3OXX. My old Z-Match from the 1960's was a complex item with airspaced coils fitted into slotted perspex. This version has coils wound onto offcuts of plastic piping and the coupling is achieved by placing the windings side-by-side. When making a winding, do it with two lengths of PVC covered wire and place the wires side-by-side and wind them onto the former as for one winding; PVC covered twin cable can also be used for the coils. The chart shows suggested values for the coils but these are open to experimentation. In practice I can tune my Skelton Cone Antenna for 80 and 40 metres with one coil, and 30, 20, 15 and 10 metres with another coil.

Tuning Up

Most amateur radio stations tune up the aerial with the aid of a standing wave bridge (SWR meter) but these are notably absent from the earlier books on radio. The usual technique for tuning up was to use an RF current meter or a bulb and tune up for maximum output — tuning for ‘maximum smoke’. Although I have enough SWR meters around the shack to throw at tom cats, I tend to use the maximum smoke method of tuning. RF thermocouple meters are not common these days so an alternative is required. Fig. 8(a) shows a lovely simple method. It is not a new idea but I have called it the W9SCH Shunted Bulb Method because ‘Rock’ Rockey uses it as his only method of tune-up on the HF bands. The lamp and shunt depend upon the power output: a 2 volt, 60mA bulb serves for up to 5 watts, a 6 volt, 150mA bulb for up to about 50 watts, and so on. The shunt

consists of ten turns of almost any coil wire in the 20 to 22 s.w.g. range wound around a pencil to make the coil shape. The pencil is then removed. Most of the current goes through the shunt but enough should pass through the bulb to light it. It can be kept in the line, but the fastidious can switch it out to cut the small losses.

The method I use is shown in Fig. 8(b). This is just a simple RF sniffer formed by a coil wound on a toroidal former and slipped around one of the feeder lines. The circuitry converts the RF into a DC voltage which is measured on the meter, M1. The circuit is all very subjective: I used an old ferrite core picked up somewhere or other and I simply wound turns on it until I got a suitable reading on the meter for the power levels I use. Ideally there should be a sniffer on both feeder lines to check the balance but I have not such luxury. The meter may be one of the cheap ex-tape recorder types or any meter with a full scale deflection of less than 1mA. The control VR1 allows a range of meters to be used and also adjusts for differences from band to band and power level to power level.

I hope this rambling little article has given a few more people inspiration to try open feeders. They are cheaper, lose less power and encourage the use of ATUs . . . and that can't be bad.

SOURCES:

GMP-6 Feeder: *W. H. Westlake*, West Park, Clawton, Holsworthy, N. Devon EX22 6QN. (0409) 253758.

TAU Openwire Feeder Kits: *TAU Systems Ltd.*, 51 Greenhey Place, East Gillibrands, Skelmersdale WN8 92A. (0695) 24662.

CLUBS ROUNDUP

By "Club Secretary"

THE start of another month — and a bigger crop than usual of duplications thanks to those scribes who didn't look for the deadline around the Christmas period! On the other hand a lot of clubs have been removed for the want of a reasonably current update. Secretaries and scribes — please note!

The Mail

Acton, Brentford & Chiswick continue to be based on the Chiswick Town Hall; this is in Chiswick High Road, and on March 19 the lads will be listening to a talk on VMOS Power FETs, given by G4GRM, the meeting being started at 7.30 p.m.

Now to **Antrim**, where the club has the AGM on Monday March 11. For the venue, contact the Hon. Sec. — or write to them at PO Box 3, Antrim.

Still in Northern Ireland, we turn to **Bangor**, where the venue is the Sands Hotel on Bangor's sea front, and the first Friday of each month is the day. We don't at the moment have programme data, for which we must refer you to the Hon. Sec. — see Panel. Incidentally, it is nice to note that this group is now up to seventy members.

March 19 at **Biggin Hill** is down for a talk on Raynet; the venue is St. Mark's Church Hall, Biggin Hill.

Bishops Cleeve continues to have its main session at the British Legion Club in Windhill, on the third Monday of each month. In addition they have an informal session at the "Nags

Head" on the A120 Dunmow Road, going east out of town.

For 25 years the **Blackwood** club has served its members, and they are celebrating this with an Award — bronze, for ten members, silver for 15, and gold for 25 members worked; and, between April 1985 and April 1986, work as many members as you can, and win a Gold Cup. For all these, QSOs with club stations GW6GW and GW6BK each count as three contacts. All the other details are obtainable from the Hon. Sec. — see Panel for his address, and he can also tell you about the club at the same time!

The **Bolton** crowd foregathers every Wednesday evening at Horwich Leisure Centre; once each month they try to have a lecture or films, or whatever.

First and third Fridays is the word for **Bridgend** at the YMCA in the town, enquiries being to the Hon. Sec. at the address to be found in the Panel.

The **Brighton** group are now to be found in the Seven Furlong Bar at Brighton Race Course, every other Wednesday. More details from the Hon. Sec. — see Panel.

Now **Bristol**, at the YMCA in Park Road, Kingswood. On March 5 there is a talk on phase-lock loops by G8GFZ, and on 12th G4TRN discusses the business of converting a CB rig to 28 MHz FM. April 19 is club project night, and on 26th there is computer night.

Bristol Shirehampton has Twyford House, High Street, Shirehampton, as its base on Friday evenings, 7.30–9.30; they alternate as far as possible between planned events and informals, and have a nice shack and club rigs.

B.A.R.T.G. are growing very fast as the number of RTTY operators and SWLs increase due to home computers. All the details of the group from the Hon. Sec. — his address is in the Panel.

Next on the list is **British Railways**, with members in that organisation and its ancillaries. All the details from the Hon. Sec. — see Panel. We notice they have a meeting down for Torquay, over the weekend April 26–27.

Bromsgrove A.R.S. has the second and fourth Tuesday of each month at the British Legion club in Birmingham Road, Bromsgrove; at the time of their letter they were putting together their 1985 programme, for details of which we suggest you contact the Hon. Sec. — see Panel.

At **Bury** the group has a base at the Mosses Community Centre, where they are to be found every Tuesday evening. The 'formal' session on March 12 is a film show.

Cambridge (Repeater Group) is next in the pile; it's a bit late to publicise their Junk Sale Extravaganza on February 24 for most people, but here's hoping! It is at Pye Telecommunications Ltd, St. Andrews Road, Cambridge. This may well also be an opportunity for you to get the details on their activities — or contact the Hon. Sec., see Panel.

The **Cheltenham** Hq is in the Stanton Room, Charlton Kings Library, Cheltenham, where on March 1 they have their Annual Constructors Competition. The routine for this lot is "first and third Fridays", so the informal we guess will be on March 15.

Now we have the **Cheshunt** newsletter, and it tells us they foregather at Church Room, Church Lane, Wormley, near Cheshunt, Herts, every Wednesday evening. However, we gather that they are very actively on the look-out for a nicer venue. More details from the Hon. Sec. — see Panel.

We are a little confused about the **Chester** programme; we have them giving dates of March 12 for a talk on Racial test equipment applications by Tony Carey, March 19 is a surplus equipment sale, and on March 26 they have a talk on the oscilloscope and spectrum analyser — so what happens on March 5? Get the answer by contacting the Hon. Sec. at the address in the Panel.

The **Chichester** group is one of many to send their details and print their newsletters on dot-matrix printers; but at least their's has been treated to some ink and is readable! Other club scribes *please* renew the ink when it runs low. The club has March 5 in the Long Room, and March 21 as their AGM plus Constructional Contest in the Green Room, both at Fernleigh Centre, 40 North Street, Chichester. In addition they have a club net on 145.275 MHz (= S11) at 1900 local time on Wednesdays.

Colchester seems to be one of those clubs which is very happy with their Hq; in Colchester's case it is Sheepen Road, and Colchester Institute the name to look for, on alternate Thursdays. March 7 is a talk on Interference, by G3DPW, and on March 21 they have a talk about lifeboats and the RNLI by Norman Clarke.

For **Cornish** members the routine is to remember that Redruth has the luxury of two by-passes, and pick the old one . . . then you can find the Church Hall, Treleigh, and hence the gang. On March 7 they have a demonstration and calibration of the absorption wavemeter by G4STB; April 4 is AGM-time.

Baden-Powell House, 121 St. Nicholas Street, Radford, is the Hq of the **Coventry** crowd every Friday evening. The details can be summarised this way: March 1 mini lectures, March 8 and 22 on-the-air, March 15 a talk on 28 MHz FM, and on 29th a junk sale.

The **Crawley** crowd seems to be very active and a happy crowd to know — find them at the Trinity Church Hall, Ifield on March 27 for an exhibition of home-brew gear, and then you will have the chance to get to know where the informals for 1985 are to be held — a secret which we guess is one of the strengths of the club.

The **Crystal Palace** group is to be entertained on March 16 by the "Lights from Space" slide presentation from NASA, given by G2FKZ. This Saturday meeting will as usual be at the All Saints Parish Rooms at the junction of Church Road and Beulah Hill, Upper Norwood, opposite the IBA mast.

Derby Hq is at 119 Green Lane, Derby, every Wednesday evening. March 6 is a junk sale, and on March 13 Mr. Daws will talk about the Oddfellows (they are in fact the landlords, we understand) and on March 20 there will be the Annual General Meeting. Finally on March 27, G3VGW, the chairman, will give an illustrated (slides) talk about a rare DX spot, namely Ascension Is.

At **Droitwich** they are nicely settled in on the second and fourth

Mondays of each month at the Scout Hq in Union Lane. Here on March 11, G3HDQ will talk about weather forecasting with computers, and on March 25 the club is hosting a Microwave Society Open Evening, with everyone welcome. More details from the Hon. Sec. — see Panel.

The **Allied Centre**, Greenman Alley, off Tower Street, is the home of the **Dudley** club; March 4 is a committee and natter night, and on 11 and 25th, the programme was still to be finalised when they wrote, so we refer you to the Hon. Sec.

The **East Lancashire** group are nowadays based at the Conservative Club, Cliffe Street, Rishton, on the first Tuesday of each month for a lecture or demonstration, and informally on the last Tuesday of each month. March 5 is a surplus equipment sale, and on April 2 they have a talk by the local crime prevention officer.

The **Edgware** gang is booked in at 145 Orange Hill Road, Burnt Oak, Edgware, on the second and fourth Thursday of each month; March 14 is devoted to counterpoise systems by G4UBB, and on 28th there is a provisional indication of a session on transceivers.

Down now to **Exeter** where the locals have March 11 for a talk on weather satellites, by G4BZE; this is at the Community Centre, St. Davids Hill, Exeter. More details from the Hon. Sec. — see Panel.

At **Farnborough** they have booked G4BUE to talk to them about QRP on March 13; March 27 is down for G8VR to talk about meteor scatter.

The March 5 talk at **Fylde** covers "A Variety of Construction Techniques for Small Items of Equipment" by G3AEP; March 19 is informal and Morse. Both these are at the club Hq, namely the Kite Club at Blackpool Airport.

GM4ANB has the stand on March 17 for his talk about computing, at **Glenrothes** Hq at Provosts Land, Leslie, Fife. There are also informal meetings — details on these from the Hon. Sec. — see Panel.

On the last Thursday of each month the **Glossop** gang heads for the "Nags Head", Charlestown Road, Glossop; the March talk is on fibre optics for transmission, and in April it is hoped to have an RSGB representative along.

Turning to the **G-QRP Club** we notice the cover is adorned by our contributor G3VTT, caught sleeping in his shack . . . ! This club is the one for all the low power or home-brew equipment buffs: details from the Hon. Sec. at the address in the Panel.

The March 28 meeting at **Greater Peterborough** is shown in the letter we have we have to hand as still being sorted out; but we can say they will be gathering at Southfields Junior School, Stanground, on the given date.

Heading for **Grimsby** the venue is the Cromwell Club, Grimsby, for, on March 7, members slides, and on March 21 a talk on packet radio. Doors open at 7 p.m., meeting proper starts at eight.

An appeal from **Harlow** — they want us to make a note of their meetings every month to infinity! Only, please note (and it applies to every club, of course) if we get a clear update showing the venue, the Hon. Sec. name and address and the dates, every three months. Too many clubs make changes for our data to be reliable beyond that. Anyway, having said that we can say that the Harlow Hq is still at Mark Hall Barn, every Tuesday evening, this Hq being in First Avenue, Harlow.

We were saddened to hear that **Harrow** founder member G3SM, Don Morgan, died recently — he will be missed very much. The club meetings are every Friday evening, and alternate between activity nights, and talks/lectures of a more formal kind; we note that March 29 is AGM time, while March 15 will be entertaining, with G4FRX telling them about RSGB in his own inimitable style.

The **Hastings** crowd foregathers for its main meeting each month on the third Wednesday of the month, at West Hill Community Centre, Croft Road; in addition there are weekly informals on Friday evenings at the clubroom in Ashdown Farm Community Centre, Downey Close, which is off Harrow Lane.

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- YORK: K. R. Cass, G3WVO, 4 Heworth Village, York. 308: D. Davis, G6YQD, 13 Maple Road, Surbiton, Surrey KT6 4AA.

March 20 is the AGM.

Now we go to **Havering**; the venue for this club is the Fairkites Arts Centre, Billet Lane, Hornchurch, every Wednesday evening; recently they elected a new Hon. Sec. (see Panel for details) and he tells us that the March informals are on 6th and 20th. G8VR, Ken Willis, has the stand on March 13 to talk about two-metre DX, while on 27th the local crime prevention officer, Eric Baxter, will be talking on "Shack Security".

Turning to **Hereford**, we see they have a talk by G8ASO on

Raynet, on March 1, and then on 15th there is an informal club gathering. Both are at the club Hq in the Civil Defence Hq, Gaol Street, Hereford.

On to **I.R.T.S.**; the national society for Eire of course, but also 'in the other hat' one of the clubs in the Dublin area. This is the place to be in touch with if you want information on the amateur radio scene in EI, or the clubs that exist around the country. Details from the Hon. Sec. at the address in the Panel.

Turning now to **Kidderminster**, we find they are still at



On December 16th, 1984, Brenda (G4VXL) and Bernie (G4AOG) of *Amateur Radio Exchange Ltd.* extended their business partnership to marriage, and to mark the event two advanced-technology Icom handheld transceiver-cakes were designed and baked. We wish the happy couple, now Mr. and Mrs. Godfrey, every happiness.

Aggborough Community Centre, Hoo Road, Kidderminster, on alternate Tuesday evenings — they fill in with nets on S23 or 3.5 MHz CW on the alternates. March 5 features B. Meaden, under the title "Have Rig, Will Travel" (we wonder if this is in fact Brian, G3BHT); on March 19 there is a surplus sale.

Now to **Loughborough** which is based, if that's the right word, on the Top Floor of the *Brush Sports and Social Club*, 18 Fennel Street, Loughborough. Main nights are every Friday, when there is nearly always something going on; Tuesdays are devoted to setting the station to work, and some construction. They also have a library and a newsletter. Details from the Hon. Sec. — see Panel.

A new formation is noted at **Maxwelltown**, who usually get together twice monthly on Wednesdays at the "Tam O'Shanter Inn", Queensberry Street, Dumfries. However, it is suggested you contact the Hon. Sec. as we understand they quite frequently go elsewhere.

Now we go to **Midland**, and it seems strange not to be receiving one of the G8GAZ epistles — Tom has finally escaped after many years service, on health grounds — no other excuse was acceptable to the other cruel members! The club has their own place at 294A Broad Street, Birmingham, and this is operational every evening of the week, Monday-Friday, with the odd gap appearing on Tuesdays. Details from the Hon. Sec.

Back again to GI, this time to **Mid-Ulster** with details of their Mobile Rally on May 19 in the grounds of the Thomas Down Training Centre, Parkanaur, all proceeds to charity. The contact for details of the Rally is Assistant Sec. G11CFS, or of course you could contact the Hon. Sec. — see Panel.

Mid-Warwickshire has the second and fourth Tuesday at 61 Emscote Road; March 12 is a junk sale and on 26th they have the AGM.

North Cornwall gathers on the first Wednesday in each month at the R.A.O.B. Club in Camelford at 7.30 p.m.; they seem nearly always to have something organised. More details from the Hon. Sec. — see Panel.

"Micro Chips", Castle Street, Barnstaple, is the new Hq of the **North Devon** club; March 6 and April 3 are the next two meeting dates.

North Wakefield members are to be found at Carr Gate Working Men's Club, every Thursday evening. March 7 is an on-the-air night and 14th they receive G4FRX. A return quiz with the White Rose crowd is on March 21, and the monthly business meeting is on March 28.

For details of the **Poole** radio club and their activities we must refer you to the Hon. Sec. — see Panel for his details.

Now to **R.A.I.B.C.**; this is the one for all the invalid and blind folk who are into amateur radio, or SWL. Of course, the club also needs supporters and representatives, who are the people who make it all happen. These last are important parts of the system as we know — only lately we passed a letter on to the Hon. Sec. and she was able to say she had put the person concerned into the hands of a supporter who was getting him along the way. Clubs and individuals could also help by donations — our local one has done this at every AGM for years. Details from the Hon. Sec. — see Panel.

R.A.O.T.A. is the one for the Old Timers with 25 years or more in amateur radio. Details from the Hon. Sec.

On we go to **Reading**, and this means alternate Tuesdays in the Club Room at the "White Horse" in Peppard Road, Emmer Green, Reading.

Reigate are a wee bit adrift with the programme details, so all we can say is that they foregather at the Constitutional and Conservative Centre, Warwick Road, Redhill, on the third Tuesday of each month, giving March 19. For the rest, contact the Hon. Sec. or just turn up!

St. Helens lives in the Conservative Rooms, Boundary Road, every Thursday evening. Morse begins at 7.30 and the serious business at 8 p.m.

Deadlines for "Clubs" for the next three months—

April issue—February 22nd
May issue—March 29th
June issue—April 26th
July issue—May 31st

Please be sure to note these dates!

On we go to **Scarborough**; this means every Monday at The Pavilion, Scarborough Cricket Club, North Marine Road, Scarborough.

Sefton is still to be found at the Liverpool Prison Officers Club, Hornby Place, Walton, two minutes walk from Rice Lane station, every other Wednesday. March 6 and 20 are the dates for this time, and the programme is being put together as this is being written.

SARUG is a shortening of 'Sinclair Amateur Radio User Group'; the name is more or less self-explanatory and indicates that members are all Sinclair computer users. They put out a very useful newsletter, too. Details from the Hon. Sec. — see Panel.

South Bristol has its corporate being at Whitchurch Folk House, East Dundry Road, Whitchurch, Bristol. March 6 is G3HKA's date and his subject air-traffic control; on March 13 they have an HF activity night. March 20 was 'open' at the time of their letter, and on 27th they will be active on RTTY.

By the time this gets to print, **Southdown** will have had their new Hq opened by RSGB President Joan Heathershaw, G4CHH.

The new club rooms will be at Wealden District Council Offices on Tuesdays and Fridays. The new place is at Vicarage Field, Hailsham, but it seems the normal monthly meeting date, March 4, at the Chaseley Home for Disabled Ex-Servicemen, South Cliff, Eastbourne continues. More data from the Hon. Sec.

Now to **Stafford**; try the "Coach and Horses" motel on the A51 at Weston, on any Tuesday evening and you should find the club in session.

Stanley is based on the Kings Head Hotel, Stanley, Co. Durham, where they are to be found every Tuesday evening; they have construction classes and an RAE class on the go.

Stourbridge seems to be comfortably settled in the Robin Woods Centre, School Street, where they now have the first and third Monday booked.

Down to **Surrey** now, and here it is first and third Mondays at the Mess Deck on the first floor(!) of *TS Terra Nova*, 34 The Waldrons, South Croydon. We don't have details of the programme, but we can say that one is a formal, and t'other the informal.

Downs Tennis Club and **Sutton & Cheam** are synonymous for us; the Club is in Holland Avenue, Cheam; March 4 is a natter session in the Downs Bar, March 15 is the Constructional Contest, and on March 30 they have the Annual Dinner at "The Woodstock" in Morden.

Over to **Swindon** and here they have an Open Evening for the edification of the locals in matters amateur radio; March 21 is a talk on ATUs, while March 14 and 28 are informals. The venue is Oakfield School, Marlowe Avenue, Swindon, each Thursday.

March in **Thornton Cleveleys** goes like this: March 4, a visit by the Region 1 Representative on RSGB, G3XSN; March 11, advanced Morse class and operating; March 18, "Further Thoughts on Aerials and ATUs" by G3AOW, and on 25th an informal evening. All are at the club Hq at 1st Norbreck Scout Hq, Carr Road, Bispham, Blackpool.

On to **Verulam** which means the R.A.F.A. Hq in New Kent Road, off Marlborough Road, St. Albans — and March 26. This is the G3PAO Memorial Lecture, and will be given by G3YLA, Jim Bacon of the London Weather Centre. Jim has called his talk "There's a Bit of a Lift on" — conditions or Wx?

We have to hand the latest issue of the newsletter from **WACRAL**, the group for committed Christian radio amateurs and SWLs world-wide. We were interested to note that the SP branch of WACRAL ran their conference on the same day as the U.K. one; and that SP7JWZ is one member of the Polish group who still hasn't got his licence back, presumably because he is training for the ministry in Poland.

The Community Centre, Prospect Road, Ossett, near Wakefield, is the present home of the **Wakefield** club. They are booked in on March 5 for a three-part project and discussion night, and on March 19 they have an on-the-air plus natter night. Morse is run as required, starting at 7.30, before the meeting starts at 8 p.m.

The Annual General Meeting of the **Welland Valley** club is booked for Monday, March 18 at Welland Park Community College, Market Harborough.

West Kent has had its most successful year ever, since they moved Hq to new premises at the Adult Annex, Quarry Road, Tunbridge Wells, where they can meet every Friday evening, alternating informals with serious stuff. The latter for March includes G8SX's "Adventures in Amateur Radio", on March 8, plus on March 22 a talk on awards, by G4FDC, G40TV and G4KIU.

The **Wirral** gatherings are on first and third Wednesdays, at the Heswall Parish Church Rooms, next to the bus station. More details from the Hon. Sec. — see Panel.

On to **Wolverhampton**; March 5 is a talk on frequency synthesis by G6UDX, and on 12th there is general business meeting. March 19 is a committee meeting, though all are invited to attend; and on 26th they have a discussion as a follow-up to the recent "Child's Guide to SSB" series in the club newsletter. The

venue is Wolverhampton Electricity Sports and Social Club, St. Marks Road, Chapel Ash, Wolverhampton.

Now we must head for **Worcester**; here they have their club nights at the Oddfellows Club in New Street, while the informals are in the "Old Pheasant" in the same street. March 4 is a club night, topic to be announced, and March 18 is the informal. April 1 is the Constructional Contest and is at the "Old Pheasant".

Wednesday evenings are the ones for the **Worthing** crowd who outgrew their old place and are now at the Parish Hall, South Street, Lancing. Pay them a visit, or drop them a line, or ring up the Hon. Sec. — G4SWH, Worthing 208752.

Yeovil have G3MYM on aerial patterns on March 7, and on 14th G3GC will demonstrate his 1938/9 transmitter. March 21 is for G3MYM, this time to show radiation patterns of two aerials, and on March 28 there is a natter. All are at the Recreation Centre, Chilton Grove, Yeovil.

York are back with us after their AGM, and we note a junk sale on March 15, plus a home-brew night on April 19. Find this crowd any Friday at the United Services Club, 61 Micklegate, York.

Our final stop this time is with **308**, and this means The Coach House, Church Hill Road, Surbiton, Surrey; March 26 is the date, for a surplus equipment sale.

Deadline

This, of course is for your letters to arrive, and the dates are in the box. Address 'em to your scribe, at SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts. AL6 9EQ. Who knows, by next time it may have stopped snowing!

Ant Products

Messrs. Ant Products, manufacturers of the well-known *Tiger* and *Silver 70* range of antennas, recently opened a trade counter and factory shop at their premises on All Saints Industrial Estate, Baghill Lane, Pontefract, West Yorkshire WF8 2HA (tel: 0977-700949). In addition to stocking their own products they also sell a wide range of goods from other manufacturers, from plugs, cables, nuts and bolts, to aluminium tubing and complete transceivers. Opening times are Tuesday to Friday 10 a.m. to 5 p.m., and Saturday 10 a.m. to 12 noon, and the premises are located less than 1 mile east of Pontefract town centre and within 1½ miles of both the A1 and M62, with ample free parking.

Morse Tests at the NEC

Mr. G. Williams, G3YCP, will be representing B.T.I. for Morse Test examinations at the NEC Convention, 13/14th April. Tests will be available on both days on a pre-booking basis; a limited number of places will be reserved for RAIBC members and handicapped people. To book, please contact Mr. C. Astley, B.T.I. Radio Station, Worston Road, Highbridge, Somerset TA9 3JY.

Corrections

In "Kitchen Table Technology" on p. 517 of the January issue, the value of R6 in Fig. 1 is 470R.

In "A Stable, Surefire VFO for the LF Bands" on p. 556 of the February issue, the value of RFC in Fig. 1 is 1mH.



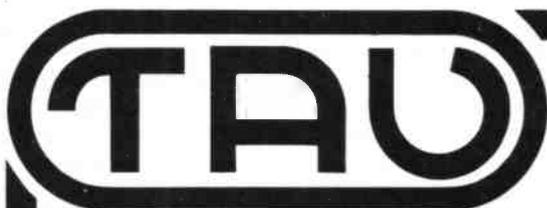
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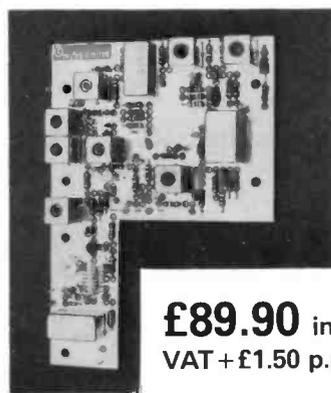
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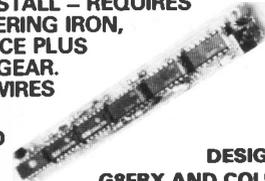
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