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Practical Wireless

The Radio Magazine

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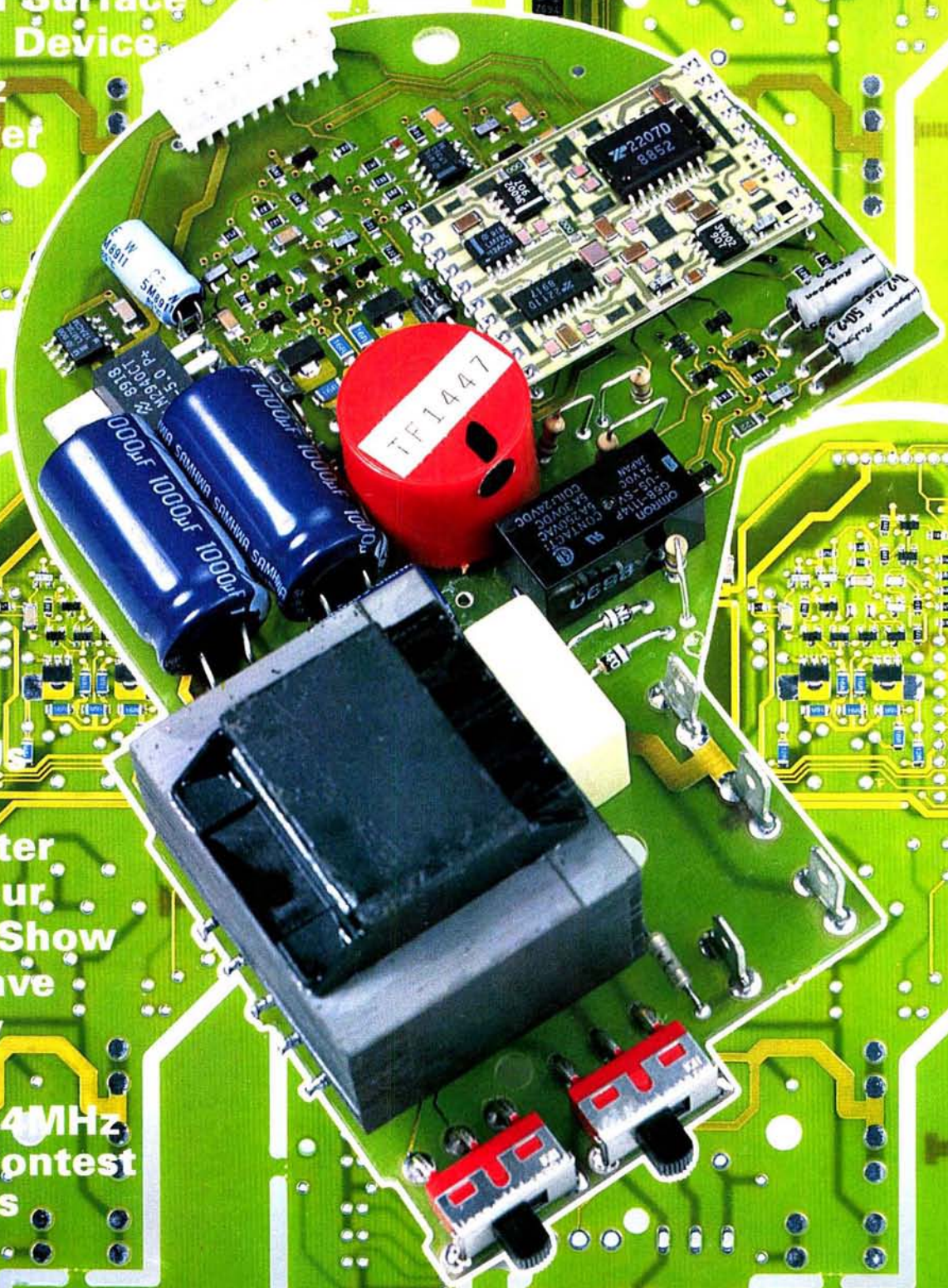

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Practical Wireless
The Radio Magazine

OCTOBER 1989 (ON SALE SEPTEMBER 14) VOL. 65 NO. 10 ISSUE 991

Our thanks to Verran Electronics Ltd, Cedarwood, Chineham 90 Business Park, Basingstoke, Hampshire RG24 0WD for allowing us to photograph their Verran AC DataLink, and to Surface Electronics, West Quay Road, Poole, Dorset for supplying the boards.

NEXT MONTH

FRIEDRICHSAFEN '89
a report on the annual radio fair

Designing Passive Antennas

Hilarious Ham Radio

and
All the usual features

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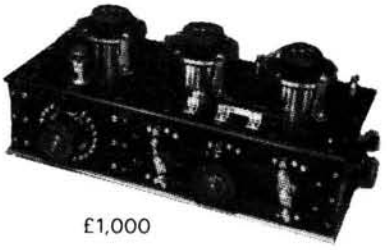

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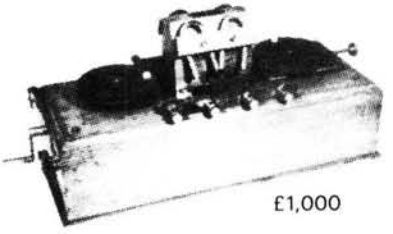

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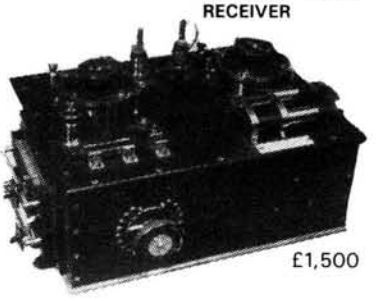

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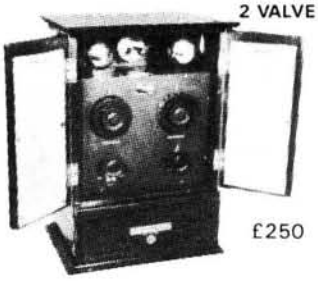

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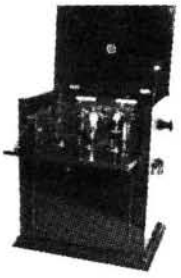
MARCONI V3



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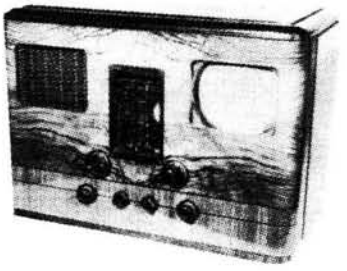

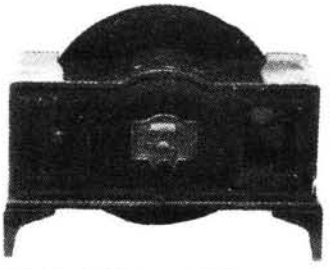

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SPECIAL OFFER

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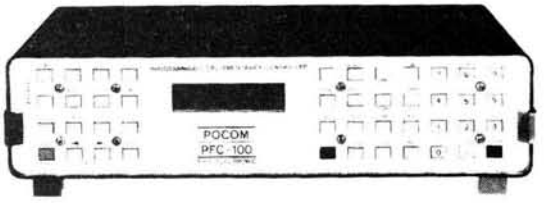

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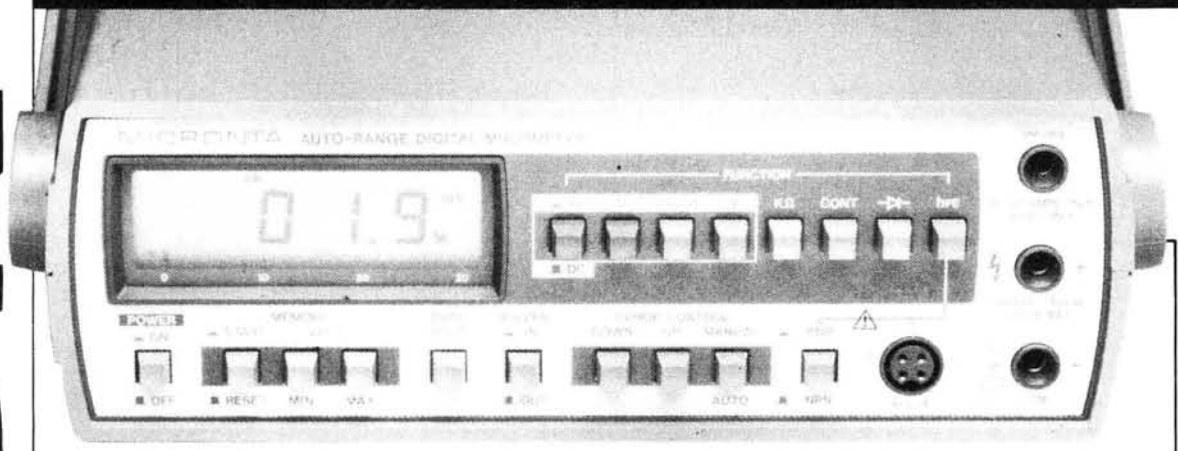

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STAR LETTER
£10 TOKEN WINNER

Brickbats...

It has become fashionable, in some areas of amateur radio, to look down upon those who choose to take an interest in preparing themselves for possible Emergency Communication activity. A somewhat condescending attitude can even be observed in some of the publications serving this hobby of ours. This is not merely the case in the UK; but can be found amongst operators on both sides of the "pond".

In addition to the above, any operator who has been around for a number of years will have noted a steady decline in operating standards and courtesy upon the air. A sad state of affairs which has been substantially highlighted very recently, as may be seen from the following.

A single-handed sailor, aboard his sailing vessel in mid-Atlantic, was filling his cooking stove with fuel. The stove exploded causing very serious burns to the man's face, arms, hands and stomach. Apart from suffering shock and very severe pain, the man was unable to work his vessel. This fact alone placed him in very great danger. In addition, being so badly burned and unable to use his hands, he was also unable to administer the medication that kept his diabetes under control. Altogether, a very nasty situation indeed.

After some hours in this state, he was finally able to send a distress call on 14.1406MHz, which was heard by the Canadian station, VE1AII. He immediately alerted the Emergency Services. A full-scale Search and Rescue operation was instigated.

Being several hundred miles north-west of the Azores and well away from commercial shipping lanes, the casualty had no prospect of immediate treatment. Suffering dreadfully and in a steadily deteriorating condition, the casualty could so very easily have succumbed. The fact that he did not is due, in very large measure, to the fact the Lorne VE1AII stayed at his radio for over sixteen hours, with no relief, calmly maintaining a steady conversation with the injured man and also acting as Communications Co-ordinator for the whole operation.

Long range aircraft, including Navy Rescue 345, surface vessels, professional communications systems, Port Authorities and many amateur stations were involved on both sides of the Atlantic. All of whom were dependant upon Lorne for effective control, as he was initially the only station in contact with the injured party.

Eventually, a surface vessel, I believe named the *Charlotte Rice* callsign LAHD2, was vectored onto the casualty's position. Demonstrating superb seamanship skill, they eventually effected the recovery of the injured man.

None of this would have been possible without the skill and determination and endurance of a radio amateur, Lorne VE1AII. The professionals passed on their gratitude and admiration to Lorne, which was well deserved. I also add my own congratulations upon a job exceptionally well done.

The other side of this coin is that communications were frequently disrupted by stations tuning up on that frequency, calling CQ without listening, operating one or two kHz on either side of the frequency and refusing to move when requested, etc. The biggest brickbat of all must go to the G0 station who, when asked to QSY as he was causing QRM to the Emergency Channel, refused to do so and went onto RTTY on 14.142MHz having used abusive and obscene language to the "sweeper" G4 station who was attempting to keep the channel clear of UK QRM! Eventually, a W1 station went onto RTTY and shifted him.

We can all learn from this operation. Let us all hone up our operating procedures, listening carefully before transmitting, checking either side of our chosen frequency to avoid causing any unnecessary interference and, perhaps, most important of all let us all think about the courtesy upon the air that was at one time the hallmark of a first-class amateur operator.

Best wishes to all those stations who co-operated in this emergency and to those who monitored all transmissions, acting as relays where necessary. Best wishes, in particular, to VE3OBH/MM, in the hope that he will make a speedy and total recovery.

A.P.T. Gwynedd

...And Bouquets

For a number of years I have wished that I had a tiltover tower in order to easily install and work on my Yagi. After a lot of discussions with my wife, we agreed that it would be an asset as I am not getting any younger and it would certainly make life easier.

I wrote to all the companies advertising tiltover towers and masts and Tennamast replied within a couple of days, all the other companies took anything up to six weeks to send details of their masts.

A couple of phone calls to Tennamast in Scotland concerning their masts indicated that it was a caring company and I decided to purchase their 40 foot model. On a number of occasions the Director contacted me to discuss delivery, as this can be a problem to the Isle of Man.

In short it all arrived safely, well packed and with excellent installation details. Again I was contacted by the company to find out if it had arrived safely and if I had any problems installing it.

It has been in use regularly since Easter even in high winds and at a height to 40 feet, I have had no problems. I have found the mast to be of excellent construction, with many well thought out details. It does exactly what it is supposed to do and it can be used at any intermediate height between 25 and 40 feet.

I am very satisfied with the mast and with the excellent service I received from the company, even on Sundays. It seems that your problem is their problem which is unusual in companies today.

C.G. Baillie-Searle GD4EIP
Isle of Man

UB40 holders

With regards to the letters from amateurs expressing their views on the RSGB and the value for money they get from the society.

I have been a member of the RSGB since 1981 and I have not seen the society bring in a cut price membership for any radio amateur or short wave listener who may be unemployed.

I am one of the ranks of the unemployed who held a UB40 card from 1983 to 1987 and since February 1989. I would like to see the RSGB get cracking and offer a cut price membership.

Colin Watson BRS46598
Cumbernauld

Send your letters to the Editorial Offices in Poole, the address is on our contents page. Writer of the Star Letter each month will receive a voucher worth £10 to spend on items from our PCB or Book Services, or on *PW* back numbers, binders, reprints or computer program cassettes. And there's a £5 voucher for every other letter published.

Letters must be original, and not duplicated to any other magazines. We reserve the right to edit or shorten any letter. Brief letters may be filed via our Prestel Mailbox number 202671191. The views expressed in letters are not necessarily those of *Practical Wireless*.

Taking it Back!

It is remarkable how sitting in another chair makes things look different - even words. I read G8EAN's letter (*sorry! - it should have been G4EAN-PW*) with increasing alarm. I then reread both booklets.

As Mr. Brothwell says, they are very similar. I would say that the BARTG booklet is more detailed and the Lowe booklet is easier to read but they contain essentially the same information.

I therefore withdraw the phrase "inferior version" in my original letter. As this is a chicken/egg situation I feel that I must apologise to both authors for unthinkingly accusing one of them of plagiarism.

The fact is I was looking for more information from the BARTG booklet and my judgement was coloured when I failed to find it.

I should also apologise to Mr Brothwell, he should never have had to write that letter.

As a footnote, I have had no other reaction to my letter, but I used my £5 voucher to buy the latest *Call Book* and was delighted to find in it details of packet mailboxes - data I have been seeking for some time.

Ted Cawkwell G8VEL
Winterton.

All About QSLing

I think that your correspondent D.J. Burton ("Write On", August Issue) is, perhaps unintentionally, being rather less than fair towards QSL bureaux.

By definition these handle cards in bulk and despatch by the most economical method, which is not the quickest. No-one however, especially in these days, has the wish (and certainly not the space) to delay cards any longer than absolutely necessary.

In fact much of the delay referred to is caused by the users themselves, for example those who do not QSL until after receipt of an incoming card are automatically doubling the overall transit time. It is also quite common to receive a box of outgoing cards dating back for years - no doubt the addressees will "blame the bureau" for which it is never the close season.

As regards watching mushrooms grow, it has long been known that this has a very beneficial effect upon sufferers from DXitis and prefix-mania.

E.G. Allen
Wimbledon

Further to my letter in the August *PW* about QSL Managers, I am in the process of compiling a list of amateurs who fail to QSL. That's all amateurs, not just QSL managers - although I would be grateful if you specify whether they are QSL managers or not.

I am especially interested in the low variety that pocket IRCs and either do not send QSLs at all or send them via the Bureau. To my mind this is theft and should be jumped on very quickly. There are one or two points I should add before you put pen to paper, (1) Make sure you have waited a significant period of 6-9 months and longer. (2) Make sure you haven't sent your card via the Bureau. (3) Make sure you have enclosed IRCs.

Having made sure of those three points, then by all means put pen to paper. I suggest that you write directly to me.

You may ask, what is the point? The point is by compiling this list I hope to rid the fraternity of these "blights". I intend printing this list in the ISWL *Monitor*, The ILA *Just Listening* & all the major British & American radio magazines. I am really determined to be rid of these blights.

Incidentally, I can put this list in *Monitor* and *Just Listening* because I am the editor of a column in both club magazines.

D.J. Burton
Brighton, Sussex

The ST300

I was sorry to see that so many old timers jumped on Robert's ST300 design, after all its only a very nice replica.

In the 1940s I used to charge about 36 accumulators a week. It was nothing new to find someone using a 3V cycle lamp battery if the accumulators had run out. It didn't seem to do the valves any harm. It's pointless using a resistor in series because the battery doesn't stay at 3V very long. One could use the LM317T voltage regulator, this adjusts from 1.2 to 37V at 1.5A.

John G4BYV
Dereham

Let me say how much I enjoyed reading the ST300, it brought back childhood memories of my father's ST500. This had reaction on both the r.f. amplifier and the detector stage, and additionally had Class B push-pull output, about which father was wildly enthusiastic - it was an advanced idea for its time.

I remember that in lieu of the usual h.t. battery, he used a "Milnes HT Supply Unit". This was a wooden crate which contained a multitude of Nickel Cadmium cells, made in short chemical test tubes. It had a switch which put all the cells either in series or parallel. The parallel position was used for charging the cells, which were then switched in series for use as an h.t. battery. Incredibly, the Milnes Company also produced an h.t. unit which ran from the domestic gas supply, being a form of thermocouple - though I never saw one.

Surprisingly as it may seem, despite the complex double reaction circuits, my mother operated the ST500 without apparent difficulty. It was our domestic radio receiver for many years, mother having a particular enthusiasm for Henry Hall, a bandleader of the time. Possibly we haven't progressed so very much at all - recently some amateurs have been building 0-V-1 receivers and have been pleasantly surprised by their performance when put alongside modern "blackboxes".

Ronald Marshall
Gourock

Since my article on the ST300 appeared in *PW* I have been surprised and pleased at the response both in direct letters and letters to the magazine. I had never imagined that it would provoke so much interest and I extend my thanks to all for their useful comments.

I would like to reply briefly to the main points raised.

Bright emitters: Yes, I was wrong about this. I should simply have said light up bright enough to be seen.

Filament Voltage: Again, I should have known that I would be picked up on this although I did state that the use of three volts was one too many. Also, I did say that I had been using three volts on such valves for some years with no ill effect. To be more precise, 38 years give or take a year. When I became interested in radio I was not allowed to "play" with mains sets for obvious reasons. My stock of 2V battery valves were all purchased in second-hand shops or jumble sales at a time when they were plentiful. The only new 2V valve I have purchased was the SG215 for the ST300. In those days I had no knowledge of Ohm's

Write on

Law or dropper resistors. Neither had I an accumulator. Instead I obtained my filament supplies from a 4.5V bell battery. The valves lit up brightly and worked.

When I went to radio college in 1959, I gained the requisite knowledge to tell me that I was giving them too much. I therefore reduced my volts down to three. In all these years I have only suffered from one filament failure. It was in the first radio I ever built. Having plugged in LT- and HT-, I then fumbled the LT+ and dropped it onto the h.t. battery where it landed in 120V socket! I have never forgotten the anguish I felt when I saw the filament spring in the top of the 210VPT valve jump as the filament failed!.

To sum it up I would agree that for peace of mind any potential constructors should use dropper resistors in the manner suggested by John Grice, i.e. each valve having its own resistor if the valves take different current which is the case with the valves used in my replica.

Intervalve Transformer: The discussion about this component is very interesting. When I built the set it was for fun and to relive old times. I did not want to go to great expense and decided to experiment with transformers. Various types were tried, output transformers, small mains transformers, etc. The LT44 was finally chosen for reasons of size and low cost. Since then I have experimented further and most transformers seem to work well even if they are connected the wrong way round!

In a later set using miniature valves the method of coupling suggested by Sir Douglas Hall was used with excellent results.

Valve Choice: V2 and V3 were used simply because I had them and hoped that they would be OK. SG215 was an educated guess taking into consideration availability, price and characteristics.

Summary: The set described was built four years ago and continues to work extremely well despite a few "grey" areas. This was often the way in the days when we had minds "unclouded by fact". I intend to write more on the subject of valve wireless sets and please be assured that all your comments are noted and indeed accepted in the spirit in which they are offered.

R.A. Wilson FI Diag E FRSA

PS: I wonder if any ex-students at Wray Castle in 1959 remember the day I lent someone my 6.3V mains transformer to supply the heaters of his R1155. He connected it the wrong way round, i.e. 250V mains into the 6.3V winding and goodness knows how much came out. The Castle blacked out, alarm bells rang, the transformer was completely wrecked and every valve except the poor old b.f.o. was physically blown to pieces!

Newsdesk...*Compiled by G4LFM*

Power Divider

A type-N precision power divider, the KDI Electronics D200NP, is manufactured from stainless steel and has improved Type-N connectors fabricated in the same material, for minimum corrosion.

The divider's wide d.c. to 18GHz frequency range is available with a maximum insertion loss of 7dB. The amplitude balance is maintained within ±0.25dB while phase balance is better than ±5% (port-to-port).

KDI have designed the D200NP to handle powers of 200W peak and 250mW average, from -55 to +85°C and has applications in laboratory environments.

Anglia Microwaves Ltd., Radford Business Centre, Radford Way, Billericay, Essex CM12 0BZ. Tel: (0277) 630000

In Memorium

The Appledore & District ARC in North Devon have told us that, as from 1 August 1989, the club callsign will be G2FKO.

Mr Tom Ward sadly passed away this year, he was a very well known local amateur and was very keen to help new clubs and amateurs in the area. He was well-known in RTTY and computer circles in the amateur world.

It was one of his last wishes that the local radio club take over his callsign (G2FKO). The Appledore club is very honoured to keep Tom's callsign on the air.

Catalogues

A multi-page brochure from Anville Instruments describes the Series 400 system - an intergrated hardware and software package for data acquisition and control using micro-computers. ***Anville Instruments, Watchmoor Trade Centre, Watchmoor Road, Camberley, Surrey GU15 3AJ. Tel: (0276) 25107.***

Global Specialties has produced a new 36-page catalogue covering its range of electronics testing, prototyping and training equipment.

Products include signal sources, power supplies, counters, wattmeters, multimeters, clamp meters to name only a few. ***Global Specialties, Rackery Lane, Llay, Wrexham, Clywd LL12 OPB.***

WAB Comes of Age

1990 will be WABs (The Worked All Britian Award Scheme) 21st Anniversary year. It has been decided to mark the occasion by making a special fund raising effort. The aim is to provide sufficient funds to train a guide dog for a blind person (licensed or s.w.l.) who is interested in amateur radio. The intention is to hand over the cheque at the 1990 AGM at Drayton Manor.

The organiser of this project is ***Adrian Keeble G4HPU, 4 Manor Cottages, Debden, Saffron Walden, Essex CB11 3JY.*** He would be pleased to hear from people prepared to donate prizes for the Grand Raffle or those who are willing to sell tickets.

Please send all ideas and donations to Adrian.

Newsdesk...*Compiled by G4LFM*

The Omni V

The Omni V h.f. transceiver from Ten-Tec combines the advantages of the crystal mixed oscillator with the convenience of digital features.

The coverage is all amateur bands from 1.8 to 28MHz with 24kHz overshoot at the low end and 32kHz at the high end. Modes available are u.s.b., l.s.b., c.w. and real f.s.k. - f.m. is an optional extra. The d.c. power input is 200 watts. A noise blanker and audio speech processor are standard equipment and the frequency display doubles as the 24-hour clock when the CLOCK button is pressed.

All four of the 6.3MHz i.f. filter positions are push-button selectable, independant of mode. A second filter socket is provided in the 9MHz i.f. for an optional 1.8kHz, 500 or 250Hz selectable filter.

HRS Electronics plc.
Garretts Green Lane,
Birmingham B33 0UE.
Tel: 021-789 7171.

Resistance & Capacitance Boxes

The hand-held resistance box can simulate resistance from 1Ω to 999MΩ in 1Ω steps very accurately. The resistance is set using push-buttons and the value is displayed in ohms.

An additional 1kΩ resistor is provided. If this is connected between one of the terminals of the internal resistance and a third terminal, the box can be used as a very accurate potenital divider. A fourth terminal "screen" enables the metal box to be connected to earth.

The capacitance box can simulate values from 100pF to 9.9999μF in 100pF steps.

Both units are housed in black metal boxes with non-slip feet. The resistance box costs £79.95 and the capacitance version costs £89.95 (both prices include VAT).

Maplin Electronics.
PO Box 3,
Rayleigh,
Essex SS6 8LR.

More Rallies For 1990

The Radio Society of Great Britain have announced the dates for their next Convention and Exhibition at the NEC, Birmingham - April 21-22.

The venue will be in one of the new halls at the NEC.

The VHF Convention at Sandown Park Racecourse will be held on 13 May 1990. More details on both these rallies when we start the 1990 "Rally Season".

Stereo Sound for TV

The Royal Television Society is running an update on Stereo Sound for Television from September 29-30. On the Friday evening there will be a dinner at Central with guest speaker Richard Coborne (Films of Bristol). On Saturday, the programmes will start with an overview by Francis Rumsey (lecturer in Acoutics and Sound Recording at Surrey University), and then there will be a series or presentations from the BBC, Central, Granada and ITN. The seminar will close with a panel discussion.

The fee, including accommodation at the Holiday Inn, costs £200 plus VAT, Saturday only will be £150 plus VAT.

Ceri Thomas. Royal Television Society,
Tavistock House East, Tavistock Square,
London WC1H 9HR. Tel: 01-387 1970.

Special Event Stations

GB8SMG & GB0SMG: These stations will be operational over JOTA weekend, October 21-22. They will be on all bands from the Saint Martins Scout Group HQ in Cathays Cardiff (YL45h/IO81JL).

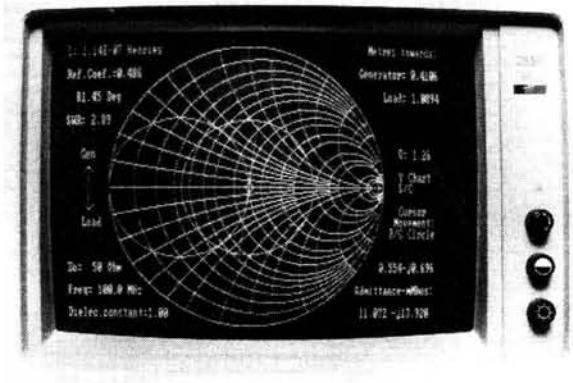
All contacts from both amateurs and s.w.l.s will be most welcome. For more information or skeds, contact:

GW1LOR, 35 Flora Street, Cathays, Cardiff CF2 4EQ.

Smith Charts

Number One Systems have brought out "Z-match". This software combines the advantages of graphical analysis with micro computer calculation accuracy and speed. The program covers the calculation and conversion of impedance and admittance, parallel and series network equivalents, wavelengths, distances, characteristic impedance, dielectric constants, reflection co-efficients, standing wave ratios and *Q* values.

Matching problems are only one example that Smith Charts solve easily.



A common method of matching is to add a short circuit coaxial stub shunted across a feed cable. The Smith chart makes it quick to evaluate the length of stub cable of a particular characteristic impedance (e.g. 50Ω), and at the required frequency, that will null out the reactive component of impedance presented at the point to be matched.

Solutions found in "Z-match" can be implemented directly in practice with transmission line transformer and stub matching methods using coaxial cables, microstrip, stripline and waveguides. "Z-match" will also match circuits containing active devices whose specifications can be given in impedance, admittance or scattering parameter forms.

"Z-match" goes further than is possible on the paper chart by allowing for line losses, providing a reference mode, working in actual rather than normalised units and offering conversions and calculations on single key presses.

Versions of "Z-match" are available for the BBC micros (price £65) and for IBM PC compatibles (price £130). The program is supplied with a comprehensive manual providing a helpful variety of working examples.

Number One Systems Ltd.,
Harding Way,
Somersham Road, St. Ives,
Huntingdon,
Cambs PE17 4WR. Tel: (0480) 61778.

Can You Help?

Mr Kinvig is trying to help a friend presently in India, he is looking for any information on the Davco DR30 receiver. If you can help, contact ***Mr Kinvig. 79 Clagh Vane, Ballasalla, Isle of Man.***

John Hanna is refurbishing an ex-military wireless set No.19, the p.s.u. No. 2 and the r.f. amplifier No. 2 Mk3. He has the circuit diagram for the No. 19 set but wants the technical details of the coils - the L21A/B and the L7A/B. ***John Hanna. 51 Cumberland Drive, Dundonald, Belfast BT16 0AT.***

Mr Dotchin is looking for a handbook, or copy, for a Johnson Viking Ranger II. This is a kit-built transmitter. ***Mr R.M. Dotchin G3WEP. 2 The Crescent, Shortstwon, Bedford MK42 0UJ.***

Does anyone have a list of spot frequencies on the h.f. bands. T.J. Taylor's main interests are in aviation, marine and unidentified stations. If you can help with pointing this newcomer to the right road, contact: ***IL44, PO Box 6, Heathfield, East Sussex TN21 8DG.***

Michael Oldfield recently had the misfortune to be burgled and as a result lost his Sony ICF-5900W. It's equipped with a b.f.o. and bandspread coverage from 3.75 to 28MHz. Not many of these receivers were sold in the UK, so if you should come across one check to see if there is a name and post code security marked in the battery compartment. If there is, please contact us at *Practical Wireless* and we'll pass on the details on the receiver's whereabouts.

Mr Dunn is a Class A licence holder and would like to be issued with the callsign G3DUN which has not appeared in any callbook for about 30 years.

The authorities at Waterloo Bridge House confirm that the callsign is no longer in use and are prepared to consider his application providing he can get it released from the original holder or their next of kin. Does anyone know who held this callsign and where Mr Dunn may contact them? If so, write to him at ***5 Eden Close, Beverley, HU17 7HE.***

Has anyone got a copy of *The History of Wireless Telegraphy* by J.J. Fahie, published in 1901 and reprinted by Arno Press in 1971. If so, would they like to contact ***John Taylor G0AKN on 01-891 2820.***

A Dragon 32 instruction book, disk drive card and software are being sought by ***J. Brown. 45 Marlborough Avenue, Falmouth, Cornwall TR11 4HS.***

Radio Electricks are engaged in the repair and overhaul of vintage radios and transistor-type radios. Several years ago, they were supplied from Messrs Osmors with a coil pack LMS which was miniature and built around a three-pole switch and a small plate capacitor. If anyone knows a firm who can supply these complete with i.f.s, contact: M***r S. Kelly. 3 New Road, Portlaoise, Ireland.***

Does any reader have any information on Cintel test equipment, e.g. their wide range capacitance bridge Type 1863 and their mutual and self inductance bridge type 1852? Ken Smith has been looking in at rallies to pick up Cintel equipment to renovate, etc., as he rather admires this firm's products. He thinks these bridges were based on the interesting transformer bridge principle, but has been unable to locate operating manuals/servics sheets on these pieces. ***Ken Smith. Staple Farmhouse, Staple, Canterbury, Kent CT3 1JX.***

Hot New Radios From Icom

We have heard on the grapevine that Icom are currently working on some interesting new radios. We have managed to sneak a look at some of them too.

The IC-R100: This is described as a super wide-range receiver and, if the specifications that we have seen are to be believed, it certainly is!

The frequency coverage is 100kHz to 1856MHz (with guaranteed performance between 500kHz and 1800MHz). There are 100 memory channels, plus a priority channel, plus 20 programmable search bands as well as six different scanning modes (not to mention three scan modes). One interesting feature of this set is that it has a built-in 15dB pre-amplifier that works between 50MHz and 905MHz along with the more usual 20dB attenuator.

The step sizes are 1/5/8/9/10/12.5/20/25kHz, there is a multi-function timer and a squelch that operates in all modes (that's a.m., f.m. and w.b.f.m.).

This radio is quite small, about the same size as the IC-2400/2500, and apparently it will not be expensive - but the price hasn't yet been finalised.

Keep your eyes open in future issues for more details.

The IC-R1. This radio is bound to be a sensation when it is released as it is a hand-held scanner that covers 150kHz to 1300MHz in a.m., f.m. or w.b.f.m. - all in a case that is about the size as the IC-2S! The step sizes are 0.5/1/5/9/10/12.5/15/20/25/3/0/50kHz and there are 100 memory channels which store both the frequency and the mode. There are lots of features including: six different scanning modes, a built-in clock timer, an adjustable five step power save function, a built-in S-meter and a tuning knob. We hope to bring you a review of this in one of our magazines in the near future.

The IC-R72: This is Icom's entry into the low-cost receiver field. It covers 30kHz to 30MHz (guaranteed between 100kHz-30MHz) and is about the same size as the IC-725.

It has 99 memories, a 10, 20 or 30dB attenuators and a 10dB pre-amplifier. The supplied modes are u.s.b., l.s.b., a.m. and c.w. - but an f.m. option is available. As the R72 has lots of features that you would expect to find on quite expensive sets - such as a two-postion noise blanker - it's hard to see how it can be sold for the price that I have heard mentioned.

Now on to the transmitting equipment.

The IC-24ET: This is an incredibly small (52 x 136.5 x 34.5mm) dual-band hand-held that weighs just 340g! Despite its size, the IC-24 is packed with features. There are 40 memories, but each one will store two frequencies, one for v.h.f. and the other for u.h.f. As there are also two call channels, this set effectively has 82 memories. There are also six scan modes, a clock/timer, keyboard or dial frequency entry and a built-in duplexer. It will also operate in full duplex for crossband working.

With five watts output from a 13.8 volt supply, this is a radio we are looking forward to getting our hands on.

I have been told that some of these radios may be on the Icom stand at the Leicester show, but do not be disappointed if they are not. Copy dates for this magazine mean that this was written while some of these sets are at the prototype stage and some may never reach production.

For further information, contact:

Icom (UK) Ltd.,
Sea Street,
Herne Bay,
Kent CT6 8LD.
Tel: (0227) 363859.

An Aladdin's Cave

Do you remember the suplus stores of Tottenham Court Road? If you have missed them this past year, then there is some good news for you. As from the begining of September, Proops Distributors Ltd of Heybridge Estate, Castle Road, Camden Town, London will be opening its warehouse to the public.

The 10,000sq.ft. warehouse, stocking a wide range of new and surplus items will be open six days a week. There will be things like solar panels to p.c.b.s and valves available.

Newsdesk...*Compiled by G4LFM*

Rally Calender

September 16**: The 1989 Scottish National Radio Amateurs Convention will be held at the Fife Institute of Physical & Recreational Education, Glenrothes, Fife. Doors open at 10am. Features include amateur traders, RSGB bookstall, special interest groups, lectures, Morse tests, refreshments & bar, talk-in station as well as Bring & Buy. Further details from: ***John Hardwick GM4ALA. Tel: (0592) 742763.

September 24: The 5th North Wakefield RC Rally will be held at Outwood Grange School, Potovens Lane, Outwood. Admission is 50p at 10.30am, disabled 10am. Free entry to OAPs, disabled and children. There will be a fully licensed bar with real ale, hot and cold food, raffle, Bring & Buy, usual radio, electronic and computer traders and repeater groups. Details from: ***Richard G4GCX. Tel: (0532) 622139.***

September 24: The 1989 Harlow Mobile Rally will be held in the Harlow Sports Centre. Doors open at 10am.

October 1**: The Great Lumley Radio Rally will be held at the Community Centre, Great Lumley, Chester-le-Street, Co. Durham. Doors open at 10.30am for the disabled and 11am for everyone else. The entrance fee is 50p. There is a Bring & Buy stand, RSGB Book stand, the usual traders, repeater groups as well as refreshments available. ***Barry G1JDP. Tel: 091-388 5936.

October 1: The Blackwood Amateur Radio Rally will be held at the Oakdale Community College. Doors open at 10.30am and admission is £1. There will be the usual dealers, Bring & Buy, raffle, free car parking as well as a lecture on ATV. ***B Matthew. Tel: (0495) 243858.***

October 8: The Armagh & Dungannon District ARC will be heolding their rally at Drumsill House Hotel. Morse tests will be held.

October 15: The Bishop Auckland Radio Rally will be held in the Sunnydale Leisure Centre, Shildon, Bishop Auckland. ***Ernie G4TYF, 64 Gurney Valley, Bishop Auckland, Co. Durham DL14 8RW. Trel: (0388) 607500.***

October 15: ELHOEX89 in The Floral Hall, Hornsea, North Humberside. Doors open 11am, 10.30am for the disabled. Talk-in S22, trade stands, club dispalys, cafe, bar, Bring & Buy, etc. ***G4IGY. Tel: (0964) 533331.***

***October 27/28**: The Leicester Amateur Radio Show will be held in the Granby Halls, Leicester. There will be a second hall in use this year to cater for the huge amount of interest in this rally.

November 4/5**: The 3rd North Wales Radio Rally will be held in the Aberconwy Conference Centre, Llandudno. The rally opens at 11am on both days. The entrance fee is £1 with OAPs and children under 14 free. Talk-in will be on S22 and 430MHz. There will be computer hardware and software, data transmissions, packet radio, satellite reception, TV and video, short wave listening, amateur radio, CB radio, marine radio, p.m.r. to mention but a few. More details from: ***Edward Shipton GW0DSJ. Tel: Rhyl 336939.

November 4: The 9th North Devon Radio Rally will be in the Bradworthy Memorial Hall, near Holsworthy. Doors are open from 10am to 5pm. All the usual attractions. Talk-in on S22. ***G8MXI, QTHR.***

*** *Practical Wireless* & *Short Wave Magazine* in attendance.**

If you are organising a rally and would like it mentioned in *Practical Wireless*, then drop us a line, preferably as soon as you have fixed the date but no later than six weeks in advance (marking your envelope Rally Calendar) and we'll do the rest. Please make sure that you include all the essential details such as the venue, starting time, special features and a contact for further information.

Cordless 'Phones

If your shack hasn't got a telephone installed then this can be a source of frustration to the rest of the family. An increasingly popular solution is a cordless 'phone.

The Commtel 830 can be used as an intercom, allowing two-way conversation between the handset (in your shack?) and the base unit. If an incoming call is received during an intercom conversation, the "in use" l.e.d. flashes on the base unit and the hand set "beeps" at you.

It has a memory for up to nine numbers and you can put a call on hold whilst talking without the caller hearing.

The telephone is equipped with battery back-up allowing about eight hours use during a mains failure. Also, for those with suitable hearing aids, this 'phone has hearing aid compatibility to give improved performance.

Commtel Consumer Electronics plc
Newark Road,
Peterborough PE1 5XB.
Tel: (0733) 313444.

Awards

The South Atlantic Award. This award is available to stations who have worked at least one station on each of the South Atlantic dependancies - Ascension, St. Helena and The Falklands - on any band and in any mode.

The Ascension Island Award. This award is available to stations who have worked at least three stations on Ascension Island on any band and in any mode.

The Air Bridge Award. This awards is available to stations who have worked one station in the British Isles, one station on Ascension Island and one station on The Falklands on any band and using any mode.

In order to qualify for these awards, applicants must list the relevant log entries and certify that the QSOs have taken place. There are no date limitations on any of the awards.

Applications for each award must be accompanied by 10 IRCs, US $5 or £2.50.

The Awards Manager.
PO Box 2,
Ascension Island,
South Atlantic.

The Golf Delta Award. This is issued by the Isle of Man ARS. Contacts since 1 January 1980 qualify with one point for each GD station worked/heard. The club callsigns GD4IOM and GD0IOM are worth two points each. European h.f. stations require five points, outside Europe it's 3 points. Outside the UK v.h.f. contacts need 3 points, within the UK it's 5.

The award costs £2.00, US$5 or 12 IRCs. To claim, send a certified log entry (no QSL cards) to:

Mrs Anthea Matthewman
GD4GWQ.
20 Terence Avenue,
Douglas,
Isle of Man.

RAE Courses

Barnsley: Barnsley College, Church Street. Lecturer is J. Longstaff G3VJR, 23 Harlington Road, Alwick on Dearne, Mexborough. Tel: Mexborough 585965.

Doncaster: Doncaster College, Waterdale. Lecturer is M. Fowler G8XTU, 6 Harcourt Close, Bessacar, Doncaster. Tel: Doncaster 531365.

Guildford: Guildford College of Technology, Stoke Park, Guildford, Surrey. Monday evenings commencing September 18. Enrolment is September 11 and 12 between 1400-1600 and 1800-2000.

Mexborough: Mexborough ARS, Harrop Hall, Dolcliff Road. Lecturer is E. Rogers G3MWN, 7 Buckleigh Road, Wath upon Dearne, Rotherham. Tel: Rotherham 873211.

Morley Green: The North Cheshire Radio Club, Mobberley Road, Morley Green, Nr Wilmslow. Sunday evenings with enrolment on September 17. Lecturer is G. Adams G3LEQ and P. Kirsop G4WCE. Gordon G3LEQ. Tel: (0565) 4040.

Orpington: Ramsden Girls School, Tintagel Road, Orpington, Kent. Tuesday evenings 7.30-9.30, commencing September 19. Enrolment by post to Bromley Adult Education, Aylesbury Road, Bromley BR2 0QR, or first night. Tutor is A.E. Betts, Tel: (0689) 31123.

Rotherham: Rotherham College, Howard Street. Lecturer is D. Rush G4CRE, 8 Sheaf Place, Worksop. Tel: Worksop 481310.

Shirehampton: Twyford House, Shirehampton. RAE classes on Wednesday evenings 7-9pm starting September 20. Morse classes on Monday evenings 7-9pm starting September 18. Tutor will be B.E. Carr G4UHQ. Further details from Mrs Davies, Tel: (0272) 683112.

Stockport: Reddish Vale Evening Centre, Reddish Vale Road, Stockport, Cheshire. Monday evenings between 7 and 9pm. Morse classes on Thursdays between 7 and 9pm. ***Dave Wood, Tel: 061-480 9157 (evenings).***

Stocksbridge: Stocksbridge College, Hole Ho Lane. Lecturer is P. Stables G4MRU, 54 Harvey Street, Deepcar, Sheffield. Tel: Sheffield 886083.

Stourbridge: Stourbridge College of Technology and Art, Hagely Road, Stourbridge. Tuesday evenings, 7-9pm commencing September 19. enrolment is on September 5 and 6 from 2-8pm.

Taunton: Somerset College of Arts and Technology, Wellington Road, Taunton. Tuesday eveings from 7to 9pm. Tutor is Peter Upton G7CCU. Enrolment details on (0823) 283403.

European CW Association

The European CW Association's annual Fraternising CW Party will be held on Saturday and Sunday, November 18-19. This is the EUCWs major event of the year, intended to bring members of EUCW-clubs and their friends "on-the-air" for a weekend of enjoyable c.w. activity, embracing all levels of operating ability.

Although mounted within a contest style framework, individual participants are free to treat the Fraternising Party how they wish. They can go "all-out" for contest type points, or can take it easy and just enjoy meeting Morse friends. It is hoped, however, that all taking part will send in logs afterwards to demonstrate their enthusiasm for the event.

Dates: November 18 & 19
Frequencies: 3.52-3.55, 7.01-7.03 & 14.02-14.05MHz
Schedule: Nov 18 1500-1700UTC, 7 & 14MHz.
1800-2000UTC 7 & 3.5MHz
Nov 19 0700-0900UTC 7 & 3.5MHz
1000-1200UTC 7 & 14MHz

Call: CQ EUCW. Please keep to the times and frequencies shown to allow others QRM-free QSOs.

Classes: A - licensed members of EUCW organisations, using more than 10W input or 5W output.

B - licensed memebers of EUCW organisiations, using QRP

C - Other licensed amateurs, using any power

D - short wave listeners

Exchanges: Class A - RST/QTH/Name/Club/Membership number

Class B - same as class A

Class C - RST/QTH/Name/NM (= non member)

Class D - To claim points, the exchanges of both stations in the QSo must be logged.

EUCW member organisations are: AGCW-DL, BQRP (Benelux QRP), BTC, FISTS, FOC, G-QRP, HCC, HSC, INORC, SCAG, SHSC, TOPS, UFT and VHSC.

Scoring: Class A, B & C - 1 point with own country, 3 points with other countries

Class D - 3 points for each complete logged QSO

Multipliers: 1 for each EUCW member organisation worked or logged per day and band, for all classes

Awards: Certificates will be issued to the first three stations of each class.

Logs: Log must show date, UTC, band, callsign, info sent, info received, points claimed for each contact. A summary sheet should show name, address, own call, score and details of rig used - including power used. Signature.

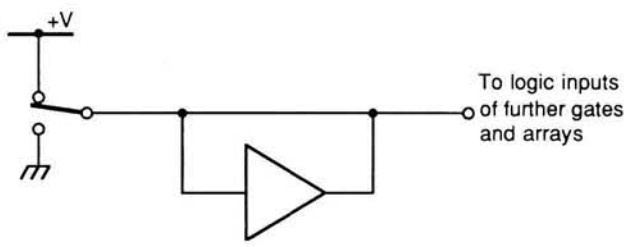
Logs should be sent, not later than December 20, to: ***The Contest Manager. Guenther Nierbauer DJ2XP, Illingerstr 74, D-6682 Ottweiler, FRG.***

SNIPPETS

At first sight the circuit in Fig. 1 may seem nonsense but it does perform a useful function, as the following explanation should prove.

There are many applications where it is necessary to ensure that a switch input to a digital circuit does not bounce or send multiple pulses for a single operation. This cheap and simple interface provides such a de-bounce function and can use c.m.o.s. devices which have a non-inverting gate or buffer (i.e. AND, OR and buffer).

When the switch armature (the moving bit) leaves one contact and travels towards the other one, the buffer output maintains a valid logic level at the buffer input for the time that the switch is open-circuit. As soon as the armature touches the other contact the output of the buffer is very briefly "shorted" to the other logic level. This does not last very long (a few tens of nanoseconds) since the input of the buffer is also connected to this level and quickly causes the output to follow suit. If the armature now bounces off the contact, as most switches do, and becomes open circuit, the buffer again maintains a valid logic level which will not change when the armature finally comes to rest on the contact.



A typical c.m.o.s. device like the 4050 will handle six switches but if the only spare gates available are inverting types, then two of them connected in series will provide a non-inverting function.

G.W.

F837

Feature

Indirect Conversion

In the January 1988 edition of PW, *a letter from Chris Charles was published in which he expressed support for a Novice Licence and went on to question the validity of the theory part of the RAE using the driving test as an analogy, i.e. that you could pass the driving test without knowing what went on under the bonnet. The editorial reply was to the effect that fireproof paper on which to print the answers had been ordered!*

In fact, publishing schedules being what they have to be, although the letter was published in the January edition I had written it in the early autumn and when it had not appeared by the end of the year I was quietly breathing a sigh of relief as I had begun to see that I was mistaken, at least in part. Having, as I put it "caught the bug" in the summer of 1987 I was feeling very frustrated by early autumn as, due to other commitments, I could see no prospect of taking the RAE until May 1988 and yet was very keen to do something a little more than CB. In this connection - and a number of subsequent letter writers have supported me here - I think that I have a very valid point. It is ridiculous on one hand to complain of lack of new blood and yet to expect people discovering the interest of amateur radio to maintain their enthusiasm for something like a year without actually getting any "hands on" experience.

Little Sacrifice

A correspondent says that "surely a few months of study is little enough sacrifice when it can lead to a rewarding and satisfying hobby lasting many years". I am sure that this is true but, human nature being what it is, I am sure that at least one person is lost to amateur radio for every one who stays the course and passes the exam. In this connection I wonder what the statistics are for drop outs in the courses laid on at the various colleges. If the aim is to attract young people and compete against the many other interests vying for their time there can be no argument against some form of novice or student licence. Other correspondents on the subject have suggested that this should be restricted to c.w. and for the very good reasons of using low power on simple sets, but in my view this just brings the argument full circle if beginners are to be expected to start by learning Morse, even if only to use it at slow speed. I gather that this is, in fact, the general direction of the proposed new licence but I think that it still "falls down" in that "no hands on" element is envisaged.

Heartened

Although my letter did produce some rather vitriolic replies I was heartened by a very friendly one published in March. In that, J.P. Olway G3RMA pointed out that the licensed amateur is in a privileged position in not having to use type approved apparatus and neatly bounced back my driving test analogy by pointing out that "All cars are type approved and after three years they need a check up on their type approval - it is called the MOT test"! He went on to hope that I would take the exam and join the fraternity. This is in contradiction to some correspondents whose attitudes, sadly, seemed to be that the system was perfect as it stood and implied that the bands are already overcrowded and could do without more.

I have already referred to my "conversion" above as I had come to realise, before my letter was published, that whilst, in theory, the idea of the examination concerning itself only with procedure and interference seemed a good idea, in practice such an arrangement would result in a syllabus of facts without reasoning behind them. One would presumably learn that a possible cure for TVI would be a low pass filter without knowing not only what the filter was, but why it worked. To creep back to my driving test analogy, I suppose that it is arguable that there is no need to know if the object is simply to transmit without annoying the neighbours but once you admit that such a filter contains, for example, a π network then where do you stop - do you merely explain what a π network consists of? No, in my opinion, you are then forced back to explaining capacitors and inducters, capacitance and inductance, and back to good old Ω. So here I am advocating, more or less, the RAE as it stands!

In My View

So, in my view, we need to keep the RAE but let the enthusiastic beginners have a go. The editorial summed up the debate beautifully in April by saying that "Any government department or representative body trying to put together a proposal for a change in the structure of amateur licencing has my sympathy - they're on a hiding to nothing"! That same editorial did, however, say that my letter had provoked one of the largest ever mail bags on a single topic. It is natural for those who have passed the examination - or indeed any examination - not to want to see it made easier for their successors. There are always those who start their conversation on the subject with "In my day" and the number of people who incorrectly believe that multiple choice exams - not just the RAE - can be answered by guessing in legion. A lot of people want to use their "Japansese black boxes" for talking to other owners of suchlike whilst others feel that "the hobby" is for radio constructors and experimenters.

Nothing Peculiar

This is nothing peculiar to amateur radio. Another interest of mine lies in Postal Board Gaming where, believe it or not, there is a GREAT SCHISM between those who claim to have invented the postal board gaming hobby and insist that it is limited to the game of Diplomacy only and those who say that, as it has developed to include postal gaming generally, it is no longer "The Diplomacy hobby" - I could show you pages of correspondence both for and against these propositions which would lead to spontaneous combustion of the Editor's special fireproof paper! Similarly, the Church of England currently threatens to split on the issue of whether or not women ought - or can - be ordained. There is always bound to be some tension but can there not be some reasonable compromises also?

Poignant

What I found particularly poignant about the corrrespondence I stirred up has been the letters and references to former professional Morse operators who would love to "have a go" and would be a real asset I am sure to amateur radio but who feel the RAE theory is beyond them. My younger son - aged 11 - is keen but cannot operate even under a licensed supervisor, without an RAE pass. Surely the answer has to be some sort of graded range of licences on the American pattern ranging from beginner to advanced? Given chance to operate under supervision my son's interest would probably be fired up sufficiently to take the exam but, if not, does it matter? What harm would have been done by someone having a few supervised QSOs?

My wife teaches Information Technology and expressed interest in the local club - or an operator - visiting the school to talk about and demonstrate amateur radio, possibly even leading to a GCSE "module" in it. She believes that such a "module" would not only stimulate interest in amateur radio but in radio communications generally, and would be helpful from a "careers option" point of view. She feels, however, that if the pupils were unable to "touch" - even under supervision - it would be hard to interest them. Again, what harm would there be in

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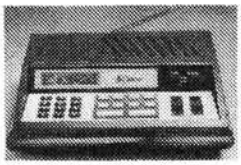

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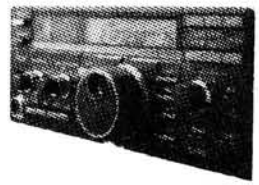

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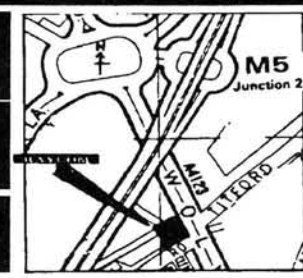

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this? It would surely be possible to arrange for someone to be monitoring, say the 144MHz band, to talk to them and if they ended up working some other - more distant - station so much the better!

It seems to me that only a little adjustment on both sides is needed to make the whole thing work smoothly and to avoid the damaging split which a Government keen on selling off frequencies to the highest bidders might well choose to exploit.

Finally

Finally - yes, I did take the exam in May and I did pass. I thought that the exam was difficult but fair. After all, one of the beauties of multiple choice from an examiners point of view is being able to cover the entire syllabus and thus preventing the "I won't bother with that chapter" syndrome. I was unable to go to classes but I am used to studying on my own as I have spent six years on an Open University degree and I took the R & TCS correspondence course. As against that my electrical and electronic knowledge was pretty minimal and what there was of it was very ancient as I am a "mature student" of 46. I found the RSGB Study Manual and specimen papers invaluable as was the *PW Passport to Amateur Radio* which accompanied me on many train journeys! The series running through the spring on "Understanding Circuit Diagrams" by R.F. Fautley G3ASG in *PW* was very helpful. It finally "got over" the different modes of transistor operation. My young son, Guy, also deserves a mention for time spent revising block diagrams with me - although he did chuckle horribly when I kept getting them wrong.

I started "on the bands" by the way with the homebrew coat-hanger antenna featured in August *PW* by F.C. Judd. For someone who has never successfully made a crystal set which worked, I was as pleased and satisfied as Marconi must have been with the first transatlantic transmission when a voice came back to me via this d.i.y. effort. In fact I began to see what G3RMA means about not having to use "type approved" apparatus. Perhaps I might even manage a crystal set that works ***PW***

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5. Only one project per letter, please.

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Advanced

A project likely to appeal to an experienced constructor, and often requiring access to workshop facilities and test equipment for construction, testing and alignment. Definitely not recommended for a beginner to tackle on his own.

Packet Radio Update

In Part 6, Roger J. Cooke G3LDI starts a look at packet in different parts of the world. South Africa is his first port of call.

As an h.f gateway sysops, I am often asked about activity in other countries. Rather than write to each person individually, I thought it might be a good idea to produce some information in this series to serve two purposes.

First, it gives the required information to anybody wishing to send mail to foreign parts and secondly it serves to publicise the activity in other countries and the routing of mail.

I received a request asking whether there was any packet at all in South Africa. This surprised me somewhat, as there are quite a few bulletins and private mail passing through the network all the time. However, it prompted me to obtain some information regarding activity from various parts of the world, starting with South Africa.

I was helped by several of the more active BBS sysops, to whom I am indebted. Pictures are, as the saying goes, "worth a thousand words" so I have included quite a few.

This is the basic set-up that exists in South Africa.

Pretoria: ZR6ADO 144.675MHz, ZS6CC 14.114MHz and forward 144.675MHz

Johannesburg: ZS6SAT 144.650MHz, ZS6KE 14.111, 21.107MHz switched forward 144.650 - 144.675MHz switched

Cape Town: ZS1RO 144.675 and 14.114MHz

Durban: ZR5GQ 144.675MHz

Pietermaritzburg: ZR5JX 144.675MHz

The Johannesburg area is linked to the Pretoria area via manual forward by ZS6KE (switching manually between 144.650 and 144.675MHz). The Pretoria area is linked to Cape Town via ZS6CC on h.f. (14.114MHz).

Cape Town is linked via ZS5OPM, ZS5QQ or ZS5BN to the Durban/ Pietermaritzburg area on h.f. 14.114MHz. The Durban/Pietermaritzburg area is linked to the Johannesburg area on a digipeater link with three digis (+/- 600km) on 144.650MHz. The Bloemfontein/Welkom area has access to the Johannesburg area via a three digi (Bloemfontein) or two digi (Welkom) link on 144.650MHz. The Kimberley area has access to the Johannesburg area via a four digi link on 144.650MHz.

The Johannesburg> Welkom> Bloemfontein and Kimberley link has been named, appropriately, South><Link. The Johannesburg> Harrismith> Pietermaritzburg> Durban link has been named East><Link.

Overseas communications are provided by:

1: ZS6IT; DCE Gateway in Johannesburg, who exchanges mail via ZS6SAT (144.650MHz).

2: ZS6CC; h.f. PPBBS (14.114MHz).

3: ZS6KE; h.f. PBBS (14.111MHz 0400 to 1000UTC, 21.107MHz 1100 to 1600UTC).

4: ZS1RO: h.f PBBS (14.114MHz), currently the most reliable link into AsiaNet via YB5QZ.

Plans exist for upgrades to backbone networks on the 430MHz band or the 1296MHz band but, as always, this is dependent on funds and equipment resources. There are also plans for many more level 3 upgrades to the digipeater network. It is currently estimated that there are approximately 250 amateurs using the network from all areas. The majority, about 180, reside in the Johannesburg-Pretoria area. A committee to head up the Packet Radio Working Group consists of the following members: ZS6CBM, ZR6AFA, ZR6AKT, ZS6GM and ZS4BU. SARL HQ liaison is via ZS1RO. In order to facilitate local co-ordination, the following "Local Area Co-ordinators" are available liaison:

ZS1RO Western Cape
ZS2BK Port Elizabeth
ZR4AAK Harrismith
ZR4CZ Kimberley
ZS4LS Bloemfontein
ZS5BN Pietermaritzburg

Other stations active from Africa include:

Z21FB h.f. only - Howard in Harare
Z25JS h.f. only - John
ZD7CW h.f. only - Julian on St. Helena
TU2AA - Ivory Coast

Other countries active from that part of the world include:

5Z4 - Kenya
9Q5 Zaire
EL - Liberia
TJ - Cameroon
SU1 - Egypt
TR8 - Gabon
6W - Senegal
CN8 - Morocco
ST2 - Sudan

The Pictures

First in the parade is Wolf Wager ZS6KE, Fig. 1. Wolf is sysop at both ZS6KE on h.f. and ZS6SAT the UoSAT gateway station. He works as Technical Support Manager for computer and data networking systems. Wolf uses an AT compatible with 2Mb RAM, 20Mb hard disk and two RS232 ports. The rigs are a TS-130S for h.f., the Henry 2kW linear is not used on packet, a TS-9500 for u.h.f. and an IC-211E for v.h.f. Antennas are a Butternut HF-6V vertical for h.f., a 4-el home-made collinear for v.h.f. and a 5/8 over 5/8 for u.h.f.

He runs MBL 5.12 BBS software. The TNC is the PK232 which has a small modification. This allows switching between the Radio-1 and Radio-2 ports automatically, making sending or receiving traffic that much simpler. Wolf tells me that ZS6SAT now has a OPEN port on 10.147MHz. Traffic can be passed to the network via this port between the hours of 0600 to 1800UTC. I think, judging by the activity on 14MHz, that more use will have to be made of the 10, 18 and 24MHz bands.

The next picture, Fig. 2, shows the antenna of Dick Stratford ZS1RO, he's the one installing the antenna at the top of the tower! Dick is the South African Radio League's Vice President and Secretary. He is in charge of the Data Processing and National Bandplanning portfolios, so is kept very busy. Being situated almost at

Fig. 6.1

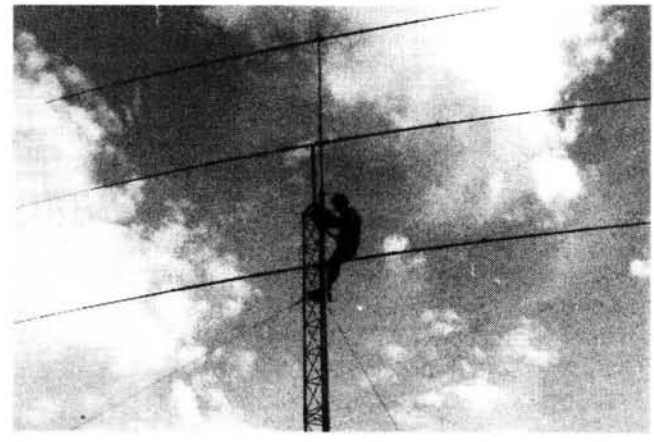

Fig. 6.2

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——ALLOCATIONS——
———CHART———

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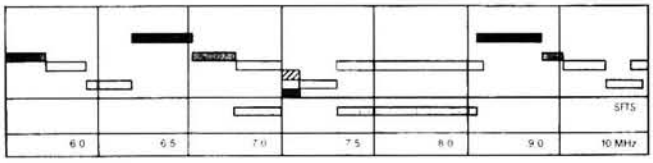

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the tip of Africa, Dick is the "go-between" between the Transvaal (ZS6) and Natal (ZS5) BBS on h.f. Forwarding on h.f. takes place with YB5QZ in Indonesia, so Dick is the link with AsiaNet. However, he is in the process of moving to Johannesburg and so hopes that someone else can be persuaded to fill the gap.

The station consists of two PK232s, one on 144.650MHz, the other on h.f. on 14.109MHz. The computer is an IBM clone, 20Mb hard drive and one floppy. The h.f. rig is the IC-740 with the IC-2KL linear running at 100 watts to keep the gear cool. The h.f. antenna is a four-element mono-bander, 12m high, facing Indonesia. The v.h.f. rig is the Pye Olympic running 10 watts into a collinear.

The ZR6ADO PBBS is a remotely operated system located at Kameeldrif (Magaliesberg) near Pretoria. It is operated by Attie Hattingh, from the comfort of his shack, 35km away from the mountain. You can see Attie in his shack in Fig. 6.3 with his two computer systems. One is to operate the packet PBBS and the other is to operate another remote station on another mountain, ZS6RYR, which is the RTTY RBBS.

The remote station is at an altitude on 1661m a.s.l. and runs an XT compatible, 20Mb hard disk, 640Kb RAM and one floppy. It has two RS232 ports, the second of which will be implemented shortly on u.h.f. for linking and forwarding. The TNC is the Pac-Comm 220, the receiver a Philips CMT, the transmitter an STC MTR running 10 watts.

The antenna is a 4-element J-pole at 12 metres. The frequency is 144.675MHz and the software MBL 5.12.

Attie has the means of re-setting or switching off the system by using d.t.m.f. encoding from his QTH.

Fig. 6.5

The Johannesburg clubhouse, callsign ZS6TJ, can be seen in Fig. 6.4. There are various antennas, a 3-element beam for h.f., v.h.f. Slim Jims, satellite beams for v.h.f. and u.h.f. and a dish for weather satellite reception.

They run an XT PC compatible, the two TNCs are the PK-87 and Pac-Comm 220. They also run a u.p.s. This is a necessary piece of equipment due to the fact that during the local summer months (our winter) it is common to have violent electrical storms every evening from November to March. Both ZS6KE and ZS6SAT have been disabled a number of times due to lightning, although so far a direct strike has been avoided.

Finally, Fig. 6.5 shows a beautiful view of the skyline of Johannesburg.

Mail to stations in RSA all goes via the DCE link at the University of Surrey GB3UP, although just recently Pat 5H3ZO has re-appeared on the scene on 21MHz. I an trying to ascertain if this will be permanent, as Pat and myself had an excellent link between us. This would provide an alternative route for RSA and AsiaNet traffic.

More in Part 7, keep the news coming to G3LDI @ GB7LDI or QTHR, s.a.s.e. if a reply is wanted.

73 and happy packeting. ***PW***

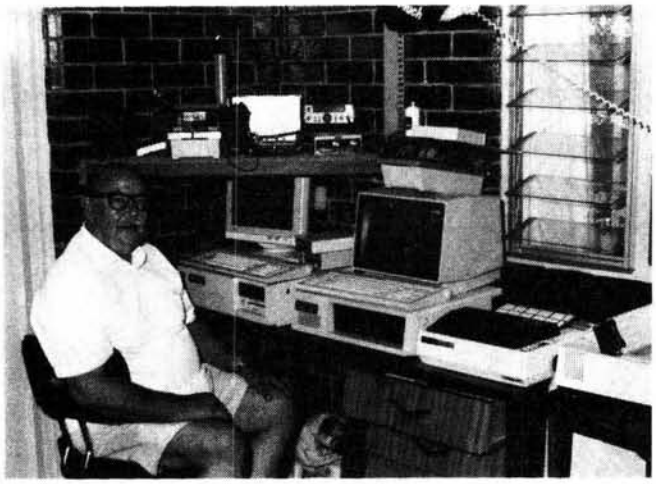

Fig. 6.3

Fig. 6.4

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A FEW SIMPLE RULES: Your ad. should follow the format of those appearing below, it must be typed or written in block letters; it must be not more than 40 words long including name and address/telephone number. Swaps only-no items for sale-and one of the items MUST be radio related. Adverts for ILLEGAL CB equipment will not be accepted.

The appropriate licence must be held by anyone installing or operating a radio transmitter.

Have Uniden v.h.f./u.h.f. hand-held scanner new and boxed, covers 29-510MHz. Would exchange for PCR-3 valved receiver, or single-band h.f. set such as Command compact receiver. Fred. Tel: Cambridge (0223) 241088. *G746*

Have Rotel RX202 tuner amplifier 25W per channel and Awia tape deck, plus a pair of Wharfdale 3XP speakers in good working condition. Would exchange for scanning receiver or v.h.f. transceiver. Tel: (0384) 892971. *G752*

Have FRG-7 with information and kits for *PW* modifications, plus valve voltmeter, Weston analyser and large quantity of components, magazines and books. Would exchange for medium format SLR or Olympus camera. Tel: (07456) 2930. *G753*

Have Kamtronics all-mode communications terminal and BBC-2 computer with FAX EPROM, v.h.f./h.f. leads and manual, plus games and tape recorder. Would exchange for Amiga 500 computer. Tel: Rhyl (0745) 334668 *G782*

Reading & Understanding Circuit Diagrams

(with a bit of theory thrown in)

In Part 18, R.F. Fautley G3ASG starts to look at filters. What is a filter, how do you recognise them and what do they do?

This section is not intended to show you how to design filters as many text books cover this subject very thoroughly, but to help you **recognise** the more common varieties and describe simply what functions they perform.

To start with, what are filters for?

Filters are used to separate signals having different frequencies so that those in a specific part of the frequency spectrum can be accepted whilst others are rejected. That is, signals of some frequencies can be attenuated much more than others. In the simple filter types we will be examining, only **passive** components are used so no **power amplification** can occur at any frequency. "Passive" components meaning components that do not need power from a d.c. supply, whereas "active" components like transistor and valves provide amplification but also need such d.c. supplies.

Filter types fall into the following four main categories:

(a) low pass filters
(b) high pass filters
(c) band pass filters
(d) band stop filters

A couple of things to bear in mind when trying to understand filter operation:

(i) **Inductors** have reactance which **rises** with increasing frequency

(ii) **Capacitors** have reactance which **falls** with increasing frequency.

To assist in unravelling the mysteries of filter operation we'll make a couple of approximations:

(iii) Low frequencies, let's call them d.c. (or 0Hz) as you can't get any **lower** than that!

(iv) High frequencies, let's call them infinite frequency (or ∞Hz) as you can't get any **higher** than that.

Putting notes (i) to (iv) together we get: an inductor at d.c. is a short circuit and at ∞Hz is an open circuit; a capacitor at d.c. is an open circuit and at ∞Hz is a short circuit.

Just a quick reminder about short and open circuits. A short circuit between two points is the same as a piece of wire joining the two points together. An open circuit between two points is the same as the absence of a piece of wire, i.e. no connection at all.

Finally, putting all this together we have the following approximations:

Component	Reactance at: 0Hz	∞Hz
Inductor	0Ω	∞Ω
Capacitor	∞Ω	0Ω

Table 1

Inductors: Short circuit at d.c. Open circuit at infinite frequency.

Capacitors: Open circuit at d.c. Short circuit at infinite frequency.

The Low Pass Filter

Look at the circuit of Fig. 18.1 and apply the approximations assumed previously. Both the capacitors (C) are open circuit at d.c. and the inductor (L) is short circuit at d.c.

At d.c. (and all very low frequencies) then, we can replace the components (often referred to as "elements" of the filter) in Fig. 18.1 by those in Fig. 18.2. Thus, at d.c., with input directly connected to output, and nothing shunting (connected across) either of the two input terminals or the two output terminals; the filter will have no effect at all on d.c. and low frequency signals.

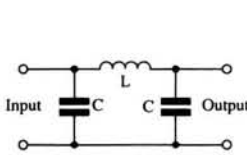


Fig. 18.1

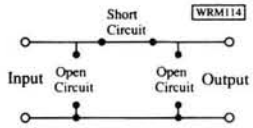


Fig. 18.2

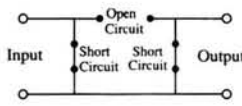


Fig. 18.3

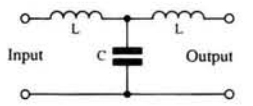


Fig. 18.4

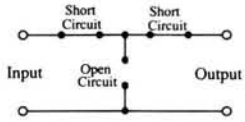


Fig. 18.5

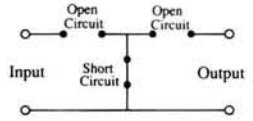
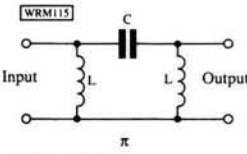


Fig. 18.6



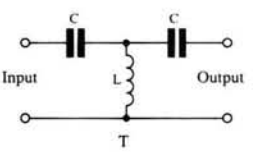
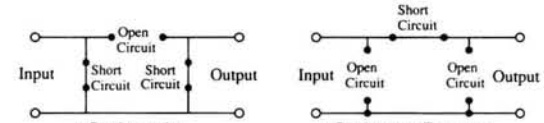


Fig. 18.7



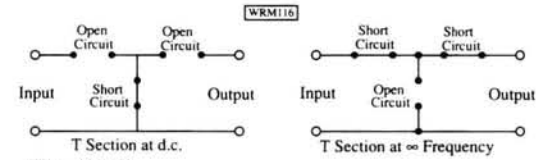
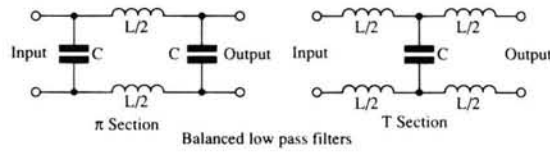


Fig. 18.8



Balanced low pass filters

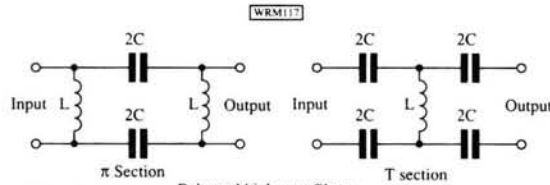


Fig. 18.9 Balanced high pass filters

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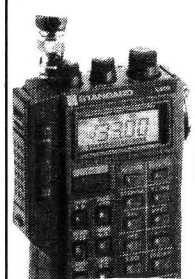

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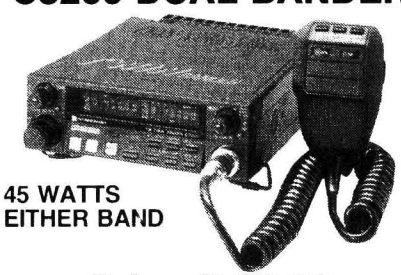

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Continuing in the same way for signals of infinite (or very high) frequencies:

Both the capacitors (C) are short circuit at infinite frequency and the inductor (L) is open circuit at infinite frequency, Fig. 18.3.

This time we can replace the components in Fig. 18.1 by those in Fig. 18.3 at very high frequencies. At these frequencies, the filter behaves as if it has a short circuit connected across both its input and output terminals and an open circuit between them. Putting the results of Figs. 18.3 and 3 together we can see that the essential performance of a low pass filter is:

(a) It will pass low frequencies

(b) It will reject high frequencies

That's why it's called a low (frequency) pass filter!

The filter in Fig. 18.1 we have been studying is referred to as a π section low pass filter. It is so-called because the shape of the elements in the circuit configuration is similar to the Greek letter π.

Another form of low pass filter is shown in Fig. 18.4, this one is called a T section filter. It gets its name from its circuit's similarity to a capital letter "T".

Applying notes (i) to (iv) again:

At d.c. the capacitor is open circuit and the inductors are short circuits.

The circuit in Fig. 18.5 shows that at d.c., the filter has no effect. This is similar to the π section low pass filter at d.c. shown in Fig. 18.2. Likewise, Fig. 18.6 shows the T section low pass filter at infinite frequency behaving in the same way as the π filter.

Putting the results of Figs. 18.5 and 6 together we can see that the performance of the T section filter is identical to the performance of the π section filter.

For any filter type there is, theoretically, always both a π and a T configuration which will give identical performance. The values of the components are not the same, but that's a design problem!

The High Pass Filter

Simple π and T forms of this type of filter are shown in Fig. 18.7. Following the same principles as for the low pass filter, and re-drawing the filter circuits at d.c. and infinite frequency, we get Fig. 18.8.

The conclusions we reach (we do, don't we?) for a high pass filter are:

It will pass high frequencies

It will reject low frequencies

That is why it's called a high (frequency) pass filter

The two filters we've looked at are very simple filters, comprising only one "section". Multi-section filters, i.e. several sections combined in cascade, are often used to provide greater rejection (or attenuation) at unwanted frequencies. Also, our simple single-section filters have a common input-to-output connection between the input and output "earthy" terminals indicating that they are "single-ended" or "unbalanced" filters. "Balanced" filters (having **no** common input-to-output connection) are shown in Fig. 18.9. These are useful for inserting into balanced lines, for example a microphone pair, where neither line is "earthy".

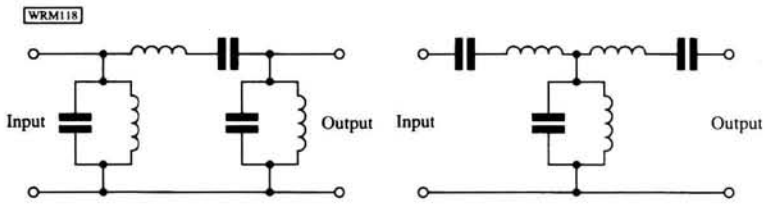

Fig. 18.10

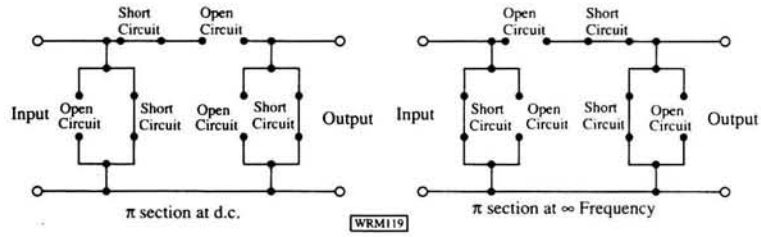

Fig. 18.11

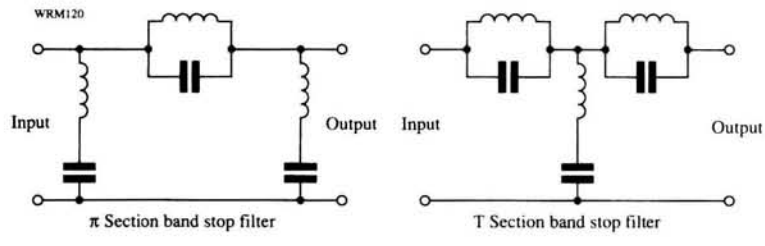

Fig. 18.12

Applying notes (i) to (iv) to the filter circuits in Fig. 18.9 shows that their pass and reject effects are unchanged. Some of the element values have been halved or doubled to allow for the extra components.

The Band-pass Filter

Band-pass filters, shown in Fig. 18.10, are more complicated than the simple low and high pass filters we have just dealt with. Series and parallel tuned circuits are a feature of these filters and we must look closely at why and how they are used.

(v) A parallel tuned circuit provides a **very high impedance** to resonance. Let's call this high impedance at resonance an open circuit ($\infty\Omega$).

(vi) A series tuned circuit provides a **very low impedance** at resonance, so let's call this low impedance at resonance a short circuit (0Ω).

By using notes (v) and (vi) and drawing equivalent circuits for three different conditions we can predict, in a simple way, the characteristics of the π section band-pass filter.

The three conditions are:

At d.c.

At infinite frequency

At resonance (where all tuned circuits resonate at the same frequency)

Equivalent circuits representing these conditions for the π type are shown in Fig. 18.11.

If we put all our information together into a table we find that the filter will **pass** only a small **band** of frequencies around the resonance of the tuned circuits.

That's why it's called a band-pass filter.

The Band-stop filter

As by now you may have guessed by its name, the band-stop filter passes **all** frequencies except for a small band around the resonant frequency of its tuned circuits. The π and T section band-stop filters are shown in Fig. 18.12.

Using the same approximations used for band-pass filters it should be easy to see that:

Frequency	Across Input Terminals	Across Output Terminals	Between Input & Output Terminals
d.c.	short	short	open
∞	short	short	open
f_{res}	open	open	short

At d.c. it is a short circuit between input and output. At infinite frequency it is a short circuit between input and output. At resonance of the tuned circuits it is open circuit between input and output. At d.c. it is an open circuit between the input terminals. At infinite frequency it is open circuit between the output terminals. At resonance of the tuned circuits it is a short circuit between the input terminals. At resonance of the tuned circuits it is a short circuit between the output terminals.

Thus it will **pass** all frequencies except those in the stop band. Had you already worked it out for yourself? (I hope so!).

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Practical Wireless 144MHz QRP Contest Results 1989

Neill Taylor G4HLX

The results of the seventh *PW* QRP Contest on 11 June 1989 returns to the number one position the group who were the winners for four years running, 1984-8, then known as the "Bug Bashers" contest group. Their fifth victory, by a substantial margin, was under the name "The Stay-at-home Square Bashers". Behind this curious title lies a story: last year the group were prevented from taking part because they were on their well-publicised DXpedition to Gibraltar at the time (under their alias of "The Square Bashers"). This year the team was again off on an expedition, to the Canaries. But staying at home were Dave Robinson G4FRE, Chris Easton G8TFI and Roger Ward GW5NF. Dave says "we could not be kept away from the contest this year, we even passed up the trip to CT3 to take part"!

To gain the 1989 Winner's Cup, the group used four 9-element Yagis, vertically stacked, and returned to the site they had used in 1986, on a 425m mountain about 13km NW of Monmouth in Gwent. According to Dave, "this is the site to use of the five tried by the group, as it has good take off in all directions". The 47 squares worked confirms this, and it is remarkable that the total score, an impressive 17249, is just nine more than they achieved from the same site in 1986.

In second place, and leading the G entries, is the Mansfield ARS Contest Group G3GQC/P, operating from Hambro Rocks in Derbyshire. "We put a lot more effort into trying to produce a competitive station after last year's surprising fourth place", say the group, and this certainly paid off, producing a score with a very significant margin over other G stations.

Leading the Scottish entries, and re-gaining the Tennamast Trophy, is the Civil Aviation Authority Radio Society (Prestwick) GM4CAA/P, who last achieved this in 1987. Again operating from Lowther Hill in Dumphries and Galloway, and using a single 17-element Yagi, they lead the GM entries by a very clear margin, despite s.w.r. problems which were eventually tracked down to a faulty PL259 plug.

Certificate Winners

Overall Winners	Stay-at-home Square Bashers	GW4FRE/P
Runners-up and Leading English station	Mansfield ARS Contest Group	G3GQC/P
3rd Place	Wulfrun Contest Group B	GW1WPF/P
Leading single operator	Chris Partington	G0CLP/P
Runner-up single op.	Peter Thompson	G8DDY/P
3rd placed single op.	Tony Crake	G1GVA/P
Leading Scottish Station	Civil Aviation Authority RS	GM4CAA/P
Leading Irish Station	Wexford VHF Group	EI9GJ/P
Leading fixed station	Ela B. Martyr	G6HKM
Leading single-antenna station	Guildford & District RS	GW5RS/P

After three years in third place amongst the single operators, Chris Partington G0CLP/P, at last makes it to the leading position, from Black Combe in Cumbria. The highest placed fixed station was that of Ela Martyr G6HKM, at Great Waltham in Essex. The leading station using a single antenna was the Guildford and District Radio Society, GW5RS/P, who put their 17-element Yagi at 550m a.s.l. near Abergavenny. Lists of the other certificate winners will be found in the tables, including the leading stations in each of the 26 locator squares from which entries have been received. The number of single operator entries, 29, was lower than usual this year, bringing the total down to 87. A number of factors probably influenced this, one being the exceptional conditions on 144MHz on the day before the contest, when a sequence of Sporadic-E, aurora and auroral E brought DX from all over Europe from early afternoon until way past midnight. As G1GVA/P remarks, "the opening the previous day had worn everybody out, or used up their radio ration with the XYL!".

The summary table printed here shows all entrants' positions; a full detailed results list will be sent to all who submitted a stamped addressed envelope with their entries, and to anyone who now sends an s.a.e. to the Poole offices. This list will also be sent out as a bulletin over the packet radio network - look out on your local BBS for messages from G4HLX titled "QRP Contest Results".

Conditions

The exceptional conditions on the Saturday evening were enjoyed by a few contest stations who had set up early, for example by GM4TMS/P: "we worked five Italian stations" at around midnight. However, the Sunday of the contest itself was an anti-climax in terms of propogation. There was a little Sporadic-E at about 1230UTC, but no entrants seem to have managed to complete any DX QSOs at this time. At GM0FUW/P, for example, "a sudden burst of Sporadic-E around 1230 brought in EA at S9+20dB, but disappeared before a full QSO could be finished". G6IEK/P noticed "a few minutes of Sporadic-E, but only Spanish-speaking stations were heard". The Es was recognised by G0JLF/P, too, who heard DX stations, but "didn't manage to work them".

Apart from the Es, conditions were reasonable, but many operators found, like GM4TMS/P that "conditions were quite good at the start, but deteriorated at about 1200 to get worse and worse until hardly any contacts were achieved in the last hour and a half". As usual, perception of this varied, for a variety of reasons - at G0BNC/P "afternoon conditions seemed very poor", but on returning home it was found that the pre-amp had stopped working!

Weather

To a portable station, weather conditions can be as important as propagation, and although most parts of Britain enjoyed the traditional *PW* Contest weather - "very very hot indeed" (G3RCW/P), those in the west were less fortunate. Whilst many groups, like G0AEX/P (Leeds), had "lots of sunshine and red faces as always on this event", others such as G0JKD/P (Devon) ask "what did you do to the weather - the only time it's been cold and damp for the last month".

Ireland was the worst hit: "weather conditions were horrendous with gale force winds and driving rain" (EI6BA/P). At GI0EJN/P, there were "strong winds all day and driving rain, especially at antenna erection and dismantling times", which forced this station to use only one Yagi instead of two as planned, but the power splitter was still left in circuit which led to a 2.5:1 s.w.r. which was only noticed after the event. GW4ARI/P (Dyfed) was a little

Leading Stations using a single antenna

Pos	Name	Callsign
5	Guildford & District Radio Soc.	GW5RS/P
6	Martyn Wright & Neil Underwood	G4RLF/P
7	Roger Stansfield & others	G3UAX/P
10	R. Thornley & A. Erwood	G1NUS/P
11	The Truckers Contest Group	GW1HGV/P
12	Chris Partington	G0CLP/P
13	Civil Aviation Authority RS	GM4CAA/P
14	Denby Dale Amateur Radio Soc.	G4CDD/P
16	St. Helen's & District ARC	G4LCK/P
17	Sid's Appreciation Soc.	G1SAS/P

Leading multi-operator stations

Pos	Name	Call	score	QSO	Squ	Loc	Ant	asl,m	TX/RX
1	Stay-at-home Square Bashers	GW4FRE/P	17249	367	47	IO81NV	4x9Y	425	FT-225RD
2	Mansfield ARS Contest Group	G3GQC/P	14706	342	43	IO93EC	4x14Y	380	IC-251E +2x17Y
3	Wulfrun Contest Group B	GW1WPF/P	9520	280	34	IO82JG	2x14Y	180	FT-225RD
4	Victory Contest Group	G8LNC/P	8854	233	38	IO90JO	4x19Y	235	FT-221R
5	Guildford & District RS	GW5RS/P	7905	255	31	IO81LW	17Y	550	IC-271
6	Martyn Wright & Neil Underwood	G4RLF/P	7820	230	34	IO80WX	6Ω	275	IC-211E
7	Roger Stansfield & others	G3UAX/P	7524	209	36	IO91GI	17Y	295	TR-9000
8	Oldham Radio Club CG	G1ORC/P	6048	216	28	IO83XN	2x9Y	425	IC-251E
9	Cousin Jack Contest Group	G4VRL/P	5950	175	34	IO70PP	4x10Y	305	FT-221R
10	R. Thornley & A. Erwood	G1NUS/P	5852	209	28	IO93CF	9Y	400	FT-290R

more fortunate, despite "one of the wettest *PW* contests..... with magical timing the rain started after I had set up and stopped about 15 minutes before the end".

Lost on a Mountain

In the West Country, the weather caused some fun and games for two stations. G6IEK/P (Devon) "decided to back-pack to the actual summit of a tor on Dartmoor". After more than two hours of repeated journeys transferring tent and equipment from the car to the peak, "a classic Dartmoor fog closed in and I actually lost the tent for a short while", resulting in a late start.

At G1IJQ/P (Cornwall), "as if the wind was not bad enough (and it was!), the mist and rain came down completely blocking the view.... by about 1430 I had to make the decision to terminate our effort and vacate the mountain. What followed would be worthy of a comedy sketch - we lost our way! I know the way better than anyone but with the seriously reduced visibility, every bit of granite looked the same".

Activity and Operating

Returning to the radio operations, several stations observed a reduction in the level of activity, e.g. G1JDP/P - "there did not seem to be as many stations on the air, although we did no worse than the last two years". "It was a bit slow towards the end" at G8DDY/P, who feels the contest should be two hours shorter. GW1WPF/P, on the other hand, still thinks "a 24-hour QRP contest would be a good idea".

G0JKD/P noted "a great improvement in operating standards and a welcome lack of splatter", and G0ABB says "operating manners were fantastic". However, PE1MHO puts in "a plea for the use of standard phonetics. The fantasy spelling used by some people makes things very difficult under marginal conditions". An interesting observation from PE1MHO is that they worked some German stations, "it would appear that they have a field day that coincides with the QRP contest every year".

Newcomers

A number of entrants were experiencing contest operation for the first time, and like G0ABB "we have really enjoyed our first contest". Jon Page G1POS/P is a good example: "this is my first contest", he says, and seems pleased to find "lots of stations active. I got my set up only two minutes before the start of the contest, so it was plug in the antenna and fire away." Jon had gone, as a single operator, to Fish Hill at Broadway in Hereford and Worcester, not too far from his home, with his homebrew antenna which "worked exceptionally well, being made from 4.3m of bamboo pole, six 3mm stainless steel rods and a quad section made from mains earth wire" (see photo). Jon found he was "very busy except a few times when trying to make a cup of tea. I hope I do well and a get good results from all of my efforts". This he did, being placed 5th amongst the single operator entries, a very commendable first attempt.

Another first time contest operator was GW7ASN, operating from the station of GW4VVX at Blackwood, where "in the few hours available he worked more stations and more squares than in all the time he has held a licence".

Strategy

Hunting out the locator squares to boost the multiplier is certainly important, as PE1MHO remarks: "we had more success this year because of revised tactics - we chased squares instead of only going for QSOs..... Working GW3FRE/P was a great thrill, the first GW any of us had heard on 2m".

Gaining new squares became a serious matter at G3GQC/P, too, there being "loud cheering in the background as we worked another new square." The station had many visitors, walkers on the popular Peak Trail which passed close by, who were "more than a little amused at our celebrations after working a new square".

Finding a good site is, of course, of paramount importance, and GW4ARI/P was one who spent a long time searching for a suitable spot, not too far from his holiday location near Tenby. Finding all the hills either inaccessible or overshadowed, he "took heed of GW4VEQ's outstanding score last year (from a site only 35m a.s.l.) and plumped for a lower site with a good take-off. It was hard going but convinced me that sea paths at v.h.f. yield the best signal strengths, as I was receiving Cornish and Eire stations at quite staggering strengths".

Mishaps

The usual catalogue of disasters seems a bit thin this year, with things going quite smoothly for most stations (apart from the aggravation of the weather for some). "The antenna went up first time with no hitches; this has not happened before!", say G1GVA/P. "Nothing serious went wrong" at GW1WPF/P, "but for reversing my car into a ditch at 4am and having to get a tow out". G0BNC/P ended the contest with a flat car battery, "it was hard pushing the car off the grass and down the road to bump start it all on my own". GW4ARI/P took a few photos as usual, but "would have achieved better results had I had a film in the camera".

Challenging

GW4ARI/P summarises the views of many when he says "a great contest - big score or little score, it never fails to provide me with an enjoyable and challenging weekend. For me, this contest epitomises what portable contests are all about, i.e. operating skill and site selection". Another common remark is that of GM4UYZ: "it never ceases to

Leading single operator stations

Pos	Name	Call	Score	QSO	Squ	Loc	Ant	a.s.l. m	TX/RX
12	Chris Partington	G0CLP/P	5046	174	29	IO84IG	8Y	610	TR-7010
15	Peter Thompson	G8DDY/P	4482	166	27	IO90HR	2x19Y	125	TS-780
19	Tony Crake	G1GVA/P	3224	124	26	IO91GI	13Y	280	TR-751E
20	Dave Hewitt	GW8ZRE/M	3128	136	23	IO83JA	HB9CV	560	FT-290R
26	Jon Page	G1POS/P	2560	128	20	IO92CA	8Ω	300	FT-480R
29	David White	G6IEK/P	2150	86	25	IO80CN	5/5Y	395	SB-2X
30	Ela B. Martyr	G6HKM	2121	101	21	JO01FT	15Y	60	IC-275E
33	Tim Raven	GW4ARI/P	2028	78	26	IO71RU	14Y	140	IC-202S
35	Ron Flemming	G0BNC/P	2000	100	20	IO91EU	2/2Ω	200	FT-480R

Practical Wireless 144MHz QRP Contest 1989								
Pos.	Callsign	Points	Pos.	Callsign	Points	Pos.	Callsign	Points
1	GW4FRE/P	17249	30	G6HKM	2121	59	G1JDP/P	1083
2	G3GQC/P	14706	31	G4RSE/P	2121	60	PE1MHO	1036
3	GW1WPF/P	9520	32	G7AAB/P	2068	61	GM4ZZW/P	1020
4	G8LNC/P	8854	33	GW4ARI/P	2028	62	G3BPK/P	1008
5	GW5RS/P	7905	34	G4SND/P	2006	63	G6ESJ/P	990
6	G4RLF/P	7820	35	G0BNC/P	2000	64	EI6ARB/M	884
7	G3UAX/P	7524	36	EI9GJ/P	1746	65	G0GBI	810
8	G1ORC/P	6048	37	G8LVQ/P	1734	66	G0JLF/P	770
9	G4VRL/P	5950	38	EI6CCB/P	1701	67	G6GAU	768
10	G1NUS/P	5852	39	G6JMN/P	1700	68	G1TAI	720
11	GW1HGV/P	5400	40	G4SSD	1577	69	G1WAC/P	720
12	G0CLP/P	5046	41	G4JBR/P	1564	70	GI7BOP/P	660
13	GM4CAA/P	4860	42	G4BZP/P	1548	71	GM0IXN/P	598
14	G4CDD/P	4680	43	G7AMH/P	1520	72	GW0LIS	585
15	G8DDY/P	4482	44	G8ZHF/P	1518	73	PE1EWR	576
16	G4LCK/P	3600	45	G1IJQ/P	1512	74	G0JQA/P	556
17	G1SAS/P	3425	46	GI0EJN/P	1512	75	G1WPD	533
18	G4TSW/P	3422	47	G0AEX/P	1488	76	G3SVC/P	484
19	G1GVA/P	3224	48	GW1ORA/P/P	1377	77	G4CRC/P	476
20	GW8ZRE/M	3128	49	EI6BA/P	1334	78	EI2CRG/P	465
21	GW7AIN/P	2952	50	G6OI/P	1245	79	GW1EZS/P	416
22	G0JKD/P	2910	51	G7AHW/P	1241	80	G0HEU/P	408
23	G1DWI/P	2829	52	G2HR	1155	81	GM0FUW/P	372
24	GW0IIW/P	2667	53	G4ZUN	1140	82	G0AEA	348
25	G0KPH/P	2640	54	G4FOX/P	1116	83	G1JGE/P	280
26	G1POS/P	2560	55	G0ABB	1105	84	G0KYB	232
27	G6ARC/P	2442	56	GW7ASN	1104	85	G4DRV/P	198
28	GM4TMS/P	2323	57	G3RCW/P	1095	86	GM4UYZ	112
29	G6IEK/P	2150	58	GW0CVY/P	1094	87	G0DRP	36

Leading stations in each locator square			
Square	Name	Call	No. entrants in square
IN69	Colin Oakley	G0AEA	1
IO52	Thomas J. Foley	EI6BA/P	1
IO62	Wexford VHF Group	EI9GJ/P	2
IO63	Robert McGrogan	EI6CCB/P	2
IO70	Cousin Jack Contest Group	G4VRL/P	5
IO71	Tim Raven	GW4ARI/P	2
IO72	Ian B. Eldred	GW1EZS/P	1
IO73	Dragon Radio Club	GW0LIS	1
IO74	Fred Sweeney & Paul Knocker	GI0EJN/P	2
IO75	Ron Watts Group	GM4ZZW/P	2
IO80	Martyn Wright & Neil Underwood	G4RLF/P	6
IO81	Stay-at-home Square Bashers	GW4FRE/P	6
IO82	Wulfrun Contest Group B	GW1WPF/P	4
IO83	Oldham Radio Club Contest Group	G1ORC/P	8
IO84	Chris Partington	G0CLP/P	3
IO85	Civil Aviation Authority RS	GM4CAA/P	2
IO86	Stirling & District ARS VHF CG	GM4TMS/P	2
IO90	Victory Contest Group	G8LNC/P	4
IO91	Roger Stansfield & others	G3UAX/P	4
IO92	Paul J. Keighley & others	G0KPH/P	7
IO93	Mansfield ARS Contest Group	G3GQC/P	10
IO94	Barry, Dave, Bill, Nigel & John	G1JDP/P	3
JO01	South Essex Amateur Radio Soc.	G4RSE/P	5
JO02	Sid's Appreciation Society	G1SAS/P	2
JO11	Frank L. Laanen	PE1EWR	1
JO32	Dragonslayers QRP Group	PE1MHO	1

amaze me what is worked on QRP and the fun of working that mode".

"Thanks for a great contest" says G0JLF/P, "here's looking forward to next year". "We did enjoy it very much" say EI2CRG/P, who "just took part for the enjoyment and fun of it, so we look forward to next year's QRP contest".

In fact it's never too early to start preparing for the next contest. The leading G station, G3GQC/P, "started planning this contest soon after we had recovered from the last one and have spent most of the year 'scrounging' the extra bits that we need. Several members of the group said that preparing for the contest was a good deal of the fun".

Next Year

So on that note, with thanks to all those who submitted logs, and congratulations to those who won trophies or certificates, we start thinking about the eighth 144MHz QRP Contest, which is provisionally planned for Sunday 17 June 1990, although this date will be confirmed later in the year. ***PW***

SNIPPETS

If you're a constant c.w. user then you may suffer with tired ears. A symptom of this complaint is tone deafness at the frequency of your transmitter's side-tone. This is easily cured by placing a plastics vending machine cup containing half-a-dozen small nuts, bolts and washers over the top of the transceiver's loudspeaker. As they rattle in sympathy with the side-tone they produce a nice T3 note. Another idea to cure this syndrome is to place a domestic transistor radio in a convenient position next to your transmitter; with the key down, tune the radio until a suitable harmonic is found. This should produce a varied and interesting sounding side-tone. **J.W.** *F621a*

Few of us can afford custom number plates, but how about this for an idea. Use the number plate manufacturing service offered by some garages and auto factor centres to have your own callsign plaque made. Only trouble, you'll have to be content with black letters on a white or yellow background, but then nothing's perfect. You could even have another showing your locator. **E.F.W.** *G734*

Go Anywhere Slim Jim Antenna For 430MHz

Here's a nice variant of a well tried and tested antenna from Tony Martin G4XBY. With the addition of an old CB magmount he has come up with a very versatile design.

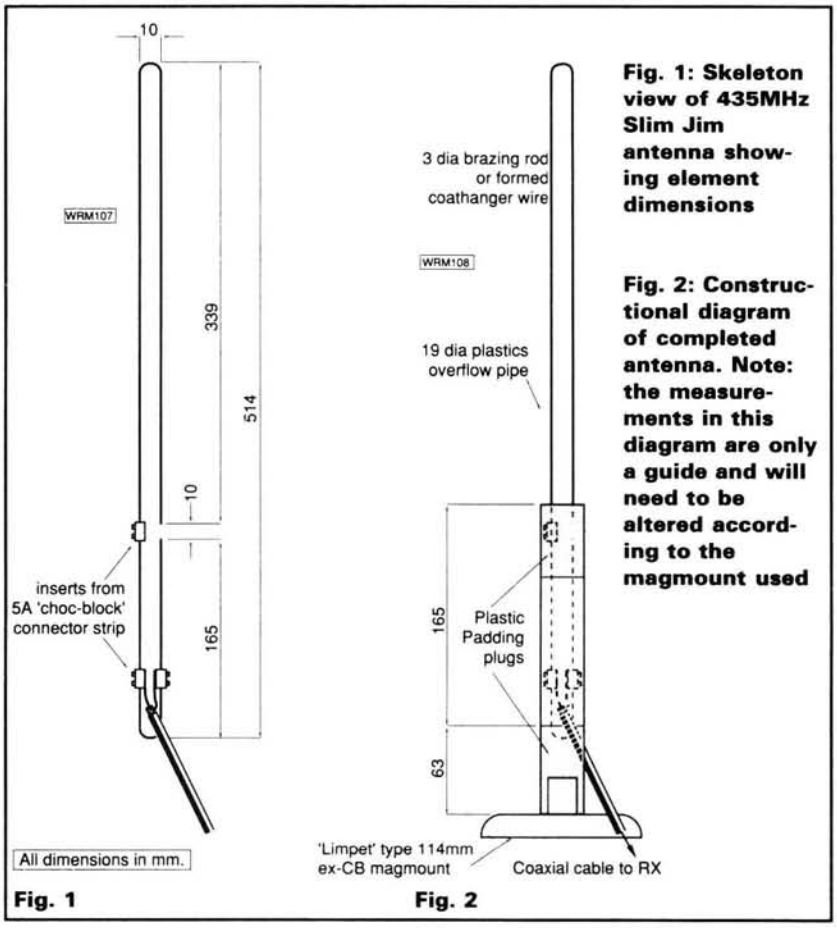


Fig. 1: Skeleton view of 435MHz Slim Jim antenna showing element dimensions

Fig. 2: Constructional diagram of completed antenna. Note: the measurements in this diagram are only a guide and will need to be altered according to the magmount used

Fig. 1 **Fig. 2**

This well loved antenna has been widely used for years, particularly among newcomers to the hobby. The antenna's popularity is mainly due to its ease of construction and setting-up. So far the Slim Jim has been scaled for use on almost every amateur band from 28MHz right up to, and beyond, 430MHz. It needs no ground plane and has good, low angle, radiation characteristics, with addition of a magmount it makes a nice mobile antenna with around 3dBd gain. The dimensions of the 430MHz version of the Slim Jim are given in Fig. 1.

Materials

The author's original antenna made use of several thin stainless steel whips purchased cheaply at a rally. However, this material is generally not that easy to work with, particularly when trying to bend it around tight radii. So, as a substitute, a suitable length of 3mm diameter brazing rod is recommended. This material is stocked by most large motorist centres or d.i.y. superstores that sell home welding equipment.

If brazing rod is not easy to obtain in your area, then you could try using straightened out lengths of coat-hanger wire. The only drawback with this material is that it easily corrodes in an external environment and is rather difficult to soft solder. Even so, both these problems can be easily overcome by treating the finished antenna with several coats of polyurethane varnish and by thoroughly cleaning the wire with sandpaper before soldering.

Magmount

The magmount is an old CB "Limpet" type fitted with the obligatory SO239 socket. In this case the socket is used for no other purpose than to graft a length of 19mm plastics overflow pipe on, with the aid of a liberal helping of Plastic Padding.

The padding is also used to hold the bottom loop of the Slim Jim and to provide a watertight lead-out for the coaxial feed. The feeder enters the side of the tube as shown in Fig. 2. Plastic Padding is also used to hold and seal the elements of the finished antenna in the top of the tube. The brass inserts from 5 amp "choc-block" connect strip are used to join both halves of the antenna together. These inserts can also be used to connect the coaxial feeder to the elements, particularly if you're having trouble soldering to the material used for the antenna.

Construction

First, take a 686mm length of brazing rod and bend it approximately in half with one side 13mm longer than the other. The distance between either side of the folded section should be 10mm.

Next, cut another length of brazing rod to 343mm and fold this in half, again making the gap between either side of the folded section 10mm. Remove the plastics from one section of the 5 amp connector strip, leaving just the brass connector block with its two screws. Insert one side of the lower half of the antenna into the connector block and then the longer side of the top half of the antenna. Tighten both screws in the block (not over tight), now we have the basics of our Slim Jim. Following on, warm up the connector either with a gas blow torch or with a 100W soldering iron, then apply solder to the joint and allow it to run well into the connector.

Note the earlier comments with reference to soldering, this applies to both types of wire to some extent.

Matching

Attach a piece of string to the top end of the antenna and suspend in free space at least 2 metres from the walls (or anything metal) and at least 300mm below the ceiling.

Next, attach the coaxial cable from the rig (via miniature crocodile clips) and v.s.w.r. meter to the $\lambda/4$ wave stub (bottom section) of the antenna. Move the crocodile clips up and down the stub until 1.1:1 v.s.w.r. is achieved. Note this will be approximately 60mm from the bottom of the antenna. Mark this point and, using a hot soldering iron, put a blob of solder on each point.

The length of coaxial cable needed for the finished antenna will depend largely on what size of vehicle you own. However, it should be noted that the overall length of the coaxial cable should be cut to an odd multiple of $\lambda/2$.

The following formula should help.

$$\frac{150 \times \text{Velocity Factor}}{\text{Frequency (MHz)}} = \lambda/2 \text{(metres)}$$

e.g. URM76 coaxial cable has a velocity factor of 0.674

$$\frac{150 \times 0.674}{435} = 0.23$$

e.g. $13 \times \lambda/2 = 13 \times 0.23 = 3$m

or $17 \times \lambda/2 = 3.9$m

Strip back the coaxial cable enough to make two suitable length "pig tails". Then solder the braid tail to the stub side of the antenna and the inner tale to the long side (see Fig. 1). Using pvc electrical tape, tape the coaxial lead to the stub side of the antenna, running the cable in the gap.

Tube

Take a 228mm length of 19mm plastics overflow pipe (obtainable from d.i.y centres) and drill a 6mm hole approximately 63mm from the bottom of the tube. Note drill up at an angle. Pass the coaxial cable down the tube and bring it out through the hole in the side wall of the tube (see Fig. 2).

Pull the coaxial cable through the lead-out until the joint between both halves of the antenna is approximately 140mm from the top of the tube. This should leave, ultimately, the bottom of the antenna 30mm from the bottom of the tube. Next mix some elastic Plastic Padding and press this into the top of tube using a thin spatula. Make sure the gap between the top and bottom halves of the antenna is fully immersed in the padding and that the element wires are parallel.

Joining

Once the upper plug of Plastic Padding has set, the tube can be joined to the magmount. First, take the "Limpet" magmount and stand it on flat surface, preferably one to which it is attracted. Fill the bottom of the tube with Plastic Padding and push the assembly firmly on to the magmount socket. Hold the antenna assembly in position for approximately five minutes whilst the Plastic Padding sets (full hardening time 12 hours). Enough Plastic Padding should be used to come up past the cable lead-out and to immerse the bottom loop of the antenna. You should also note that if the antenna has been assembled correctly then the bottom should not come into contact with the socket on the magmount.

Finally, trim off any surplus padding from the bottom of tube and magmount using a Stanley knife. Also, trim off any surplus Plastic Padding from where the antenna element enters the top of the tube.

Attach a suitable plug to the coaxial cable and away you go with an antenna which can be used on a car roof or table top. Remember, if coat-hanger wire is used for the antenna, then a couple of coats of polyurethane varnish will help to keep the wire free from corrosion. ***PW***

Feature

Practically Yours

Glen Ross G8MWR

Many people are keen to get going on 50MHz but are rather frightened when they contemplate their neighbours' reaction to a relatively large Yagi swinging about over the roof. Compared with a 14MHz beam the 50MHz antenna is nothing, but if you live in a select area then an array roughly three metres square can be a bit too noticeable.

Alternative

The simple answer is to fall back on the friendly wire dipole. The only problem with this arrangement is that you have two good, but fixed, lobes and those rather nasty nulls off the ends of the wire. Paths of major interest at the moment are to South Africa and the USA and these directions are at roughly ninety degrees to each other. This means you are going to have to get involved in using some method of antenna rotation and the whole thing becomes a little bit messy.

A Better Way?

There is a more elegant approach to the problem and that is to use a dipole which is more than a single half-wave long. Every time we add another half-wave of wire we generate an extra set of lobes. A single half-wave ($\lambda/2$) provides the classic figure-of-eight radiation pattern, adding a second half-wave, so making a full-wave dipole, gives us four lobes. These are placed at about fifty degrees with respect to the wire and by suitable alignment of the wire we can cover four useful directions, all reasonably well.

We do, however, have the problem that this type of antenna exhibits a high feed point impedance which is a bit of a problem to match in to low-impedance coaxial cable and, ultimately the transmitter's p.a. stage.

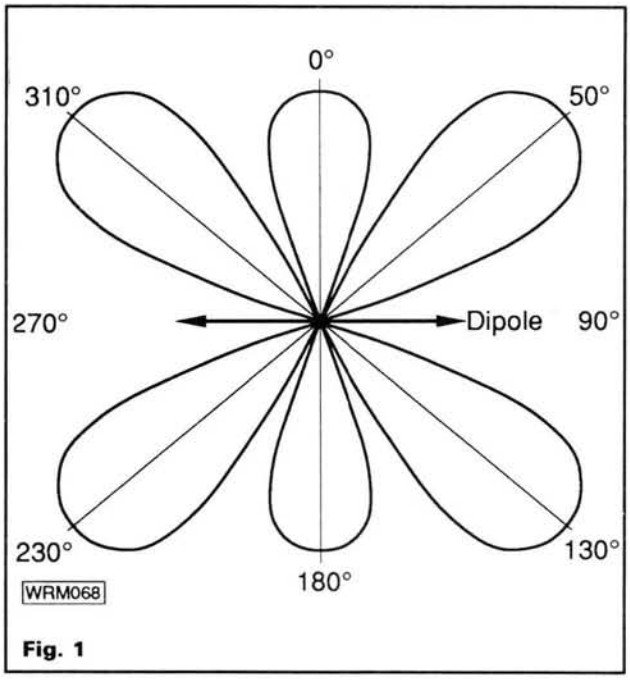


Fig. 1

Final Answer

Adding a third half-wave length of wire to the antenna gives us a $3\lambda/2$ long centre-fed dipole which has two distinct advantages over the full-wave antenna. The first advantage is that we are now back to a normal dipole feed impedance, so matching into the coaxial cable is no longer a problem. The second advantage is that the main lobes now lie at about forty degrees with respect to the wire and that two more lobes have appeared in the usual dipole position (Fig. 1).

We now have an antenna with good coverage in most directions, no feed problems and to top it all the antenna has some gain, a decibel or two, with reference to a $\lambda/2$ dipole.

You can go on adding more odd half-waves and you will slowly bring the main lobes more into line with the wire and generate additional central lobes, plus a little more gain. The system is applicable to any frequency and this arrangement is commonly used on 21MHz where a 7MHz dipole is often used as a $3\lambda/2$ unit.

Construction

It is difficult to be precise about the length of wire to use for a 50MHz $3\lambda/2$ dipole because the allowance normally made for end effect no longer applies to the inner dipole section. The total length also depends on the method of mounting and the proximity of nearby buildings, etc. The best bet is to start with about 8.6m of wire, connect an v.s.w.r. bridge in line and apply enough power to get a reading on the meter. Now cut small equal lengths from both ends of the wire until a satisfactory s.w.r. is obtained. It now only remains to align the antenna so that the lobes, which are fairly broad, look in the required directions and the job is complete. ***PW***

The G2BX

Antenna Clinic

Session 9

This month F.C. Judd G2BCX, our antenna specialist, deals with a query concerning the working ranges to and from mobiles operating in conjunction with a v.h.f. business radio network. The frequency used is not far removed from the radio amateur bands 145 and 430MHz, so what follows can apply to mobile operation on those bands.

Q "Although the 'base station' antenna is high, the working range to mobiles is limited, with reception being either nil or subject to rapid fading or high noise level. The base station antenna, originally a ground plane, was changed for a collinear and there was some improvement. Is it possible that the antennas used on the vehicles (magnetic-mounted quarter-waves) might be the cause of the problem?"

A The last comment just about hits the nail on the head! However, it was unwise to employ a ground plane antenna for the base station to begin with because of the high angle of maximum vertical radiation (in the region of 30 degrees) common to this type of antenna owing to the unusually limited size of the ground plane radials. Tests have shown that even with more than four radials, each one wavelength long, or a flat metal sheet one wavelength square, the angle of maximum vertical radiation will not be much less than about 15 degrees. In theory, the area of the "plane" must be infinite to obtain the idealistic vertical radiation maximum at 0 degrees.

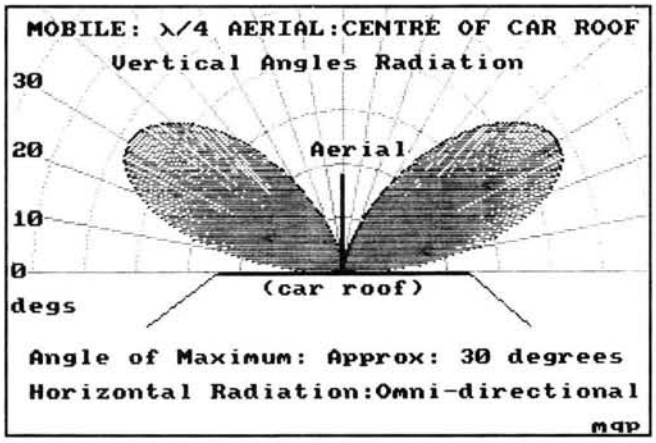


Fig. 1: The computer simulated vertical angle radiation pattern for a quarter-wave roof mounted v.h.f. mobile antenna

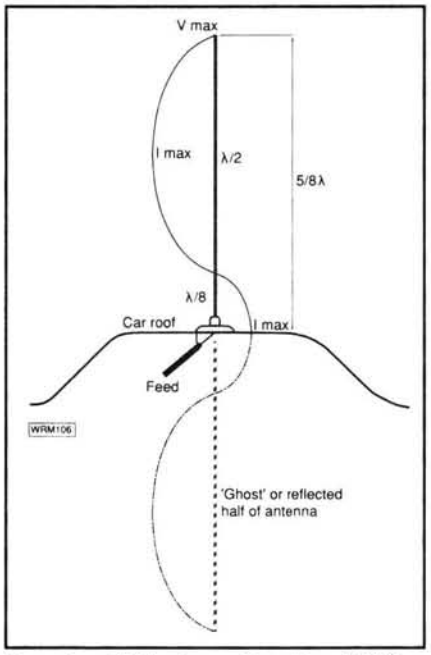


Fig. 2: Evolution of the 5λ/8 v.h.f. mobile antenna

The mobile quarter-wave antenna: High vertical angle radiation is also common with quarter-wave v.h.f. antennas mounted at the centre of a car roof and for the same reason, the area of the plane (the roof) is small. This is illustrated in the computer simulated vertical radiation pattern, Fig. 1, which would be more or less the same for a quarter wave ground plane antenna high above ground on a mast. A study of the pattern reveals that radiation at zero angle (parallel to ground) is virtually non-existent. Even in the region of 15 degrees, only about 50 per cent of power to the antenna is radiated. This performance is of course "reciprocal", i.e. the "signal pick-up" when receiving is impaired pro-rata. This applies in all horizontal directions of course as this and similar vertical antennas are omni-directional. Even at relatively short ranges this type of antenna would cause more "fade-outs", particularly in built-up or heavily wooded areas.

There are two alternatives. One is the so-called 5/8 wavelength antenna which, mounted at car roof centre, offers some improvement. It does not provide a gain of 3dBd, in fact it provides almost no gain at all. The theory of its operation is that it becomes on half of a collinear array of two spaced dipoles, the second "dipole" being a "ghost" reflected by the metal car roof, see Fig. 2. A collinear array of two dipoles, spaced 0.4 wavelength, driven in phase and operating in "free-space", do provide a gain of 3dBd. However, some improvement in performance with a 5λ/8 antenna stems from the fact that all the radiation is from the upper "half-wave" portion. The λ/8 section below this does little more than serve as a "matching system" for a 50Ω feed. The vertical angle radiation from the half-wave section is not affected so much by the presence of a metal car roof beneath it. Maximum is at a lower angle as illustrated by the computer simulated pattern in Fig. 3. Reflected radiation from the car roof and around the body has the effect of cancelling most of the radiation below zero degrees.

The ring-base vertical: Details of this antenna may be found in *Wires and Waves* (PW Publishing Ltd) but please note, when the original article was published in October 1982 there was a kit of ready-made to assemble parts for a mobile version of this antenna. This is no longer available. The article does, however, contain full details and dimensions for home construction.

The ring-base antenna is basically a "near free-space" half-wave with an integral small inductance and an adjustable quarter-wave ring at the base which allows for a direct match with a 50Ω cable and adjustment for minimum v.s.w.r. For optimum performance it must be "gutter mounted" in which case the angle of maximum vertical radiation closely approaches zero, as in the

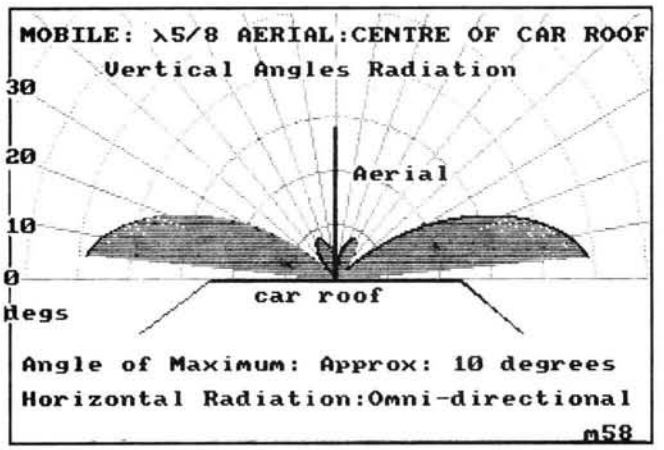


Fig. 3: Computer simulated vertical angle radiation pattern for a 5λ/8 roof mounted, v.h.f. mobile antenna.

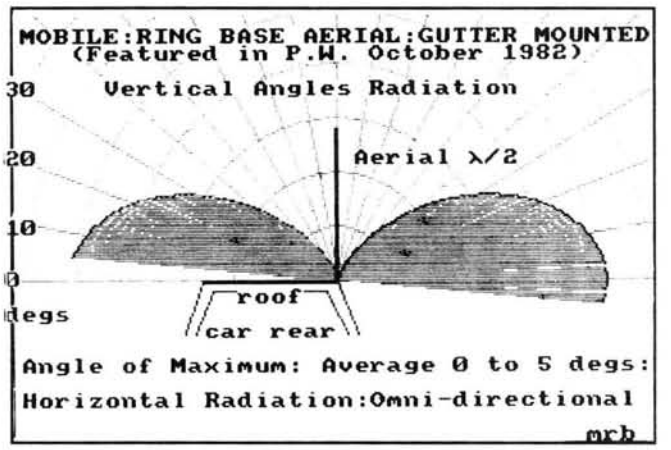


Fig. 4: Computer simulated vertical angle radiation pattern for a gutter mounted ring base (half-wave) v.h.f. mobile antenna

computer simulated pattern, Fig. 4. It can, of course, be constructed for use as a base stations antenna.

The mobile collinear: This is not particularly suitable for 145MHz owing to its size, and not very efficient at 430MHz - or other frequencies in this region. Gain factors quoted are virtually fictitious and the pattern of radiation at vertical angles is often distorted by incorrect phasing of the half-wave elements be they two or more. Oh yes, they function but not as well as one might think, but this is a subject for another time.

Please note: The radiation patterns shown are simulated and serve only to illustrate the combined effect produced by the type of antenna and its position on the vehicle. Actual radiation from any mobile antenna, in both the vertical and horizontal planes, will depend on other factors which cannot be taken into account. The immediate environment, at any given moment whilst travelling, can greatly and often rapidly change the overall field of radiation and cause large variations in signals received by a fixed station, e.g. the familiar "mobile flutter effect".

PW REVIEW

Kanga "Cheriton" 80/20m Receiver Kit

Like many other h.f. operators with an interest in both QRO and QRP operation, Colin Turner G3VTT has used a commercial transceiver or receiver as the basis of his station for a considerable number of years. After seeing some of the super home-brew equipment from behind the Iron Curtain during a trip to Czechoslovakia early in 1988, he wanted to make a good-quality receiver as a basis of a complete home-brew station of good performance, with receiver selectivity a prime criterion. Here he tells of his experiences.

For the receiver I did not consider the direct conversion technique to be suitable due to its susceptibility to overloading, poor selectivity, and a lack of a.g.c. circuitry. I recognised that the direct conversion technique offered ease of construction but the QRM figure 3dB below a superhet's performance was not acceptable. I decided that a simple superhet with good i.f. filtering would be the only acceptable circuit to consider.

I was delighted to see the Kanga Gang were offering a superhet of good performance called the "Cheriton" which was a dual-band 3.5MHz and 14MHz design using an i.f. of 9MHz coupled with a v.f.o. running between 5MHz and 5.5MHz. There was also the facility for adding an extra filter and even another band. I decided to use this receiver, along with a home-designed 1.8MHz converter and 100kHz calibrator, as the heart of my home-brew station.

After completing the receiver, I found its performance better than many current commercial transceivers, especially if the intercept point of 17dBm is considered. The r.f. amplifier noise figure is also low at 4dB and the selectivity is as narrow as you care to make it by fitting the correct filter for your needs. Make no mistake, this is a receiver capable of receiving s.s.b. and c.w., even a.m., with excellent results. It is not a toy!

The "Cheriton" Circuit

First, let us take a look at the receiver's block diagram as shown in Fig. 1. The r.f. signals from whichever band is being received are fed by their respective top-coupled band-pass filter to the r.f. stage. Switching between 3.5MHz and 14MHz is accomplished by d.c. switching two small relays, v.f.o. switching is not needed due to the choice of i.f. and v.f.o. frequencies. The r.f. transistor is a type 2N3866 which is well known as a v.h.f. power amplifier device and is therefore most suitable to give around 10dB amplification and at the same time handle strong signals. The device is biased to around 30mA collector current which gives the stage its intercept point of 22dBm. Noiseless feedback is used to ensure stability with gain across both bands.

The mixer device is a fairly new i.c. from Plessey Semiconductors, the SL6440. It has a high intercept figure and therefore is not prone to cross-modulation, again due to high levels of bias current. The bias figure is not given but Kanga have suggested that a heatsink formed from a small piece of aluminium is glued to the top of the i.c.s case. The i.f. signal at 9MHz is fed to either one or two crystal filters depending on the constructor's choice of selectivity and depth of pocket. Included with the instructions and diagrams for the kit is an order form that can be used to obtain filters from IQD of Crewkerne, Somerset. The basic option is for the kit to be fitted with a type 90F2.4 filter, which has a bandwidth of 2.7kHz, or a type 90F2.5B or 90H2.4B which give slightly better audio quality. Improved c.w. reception can be had by fitting the

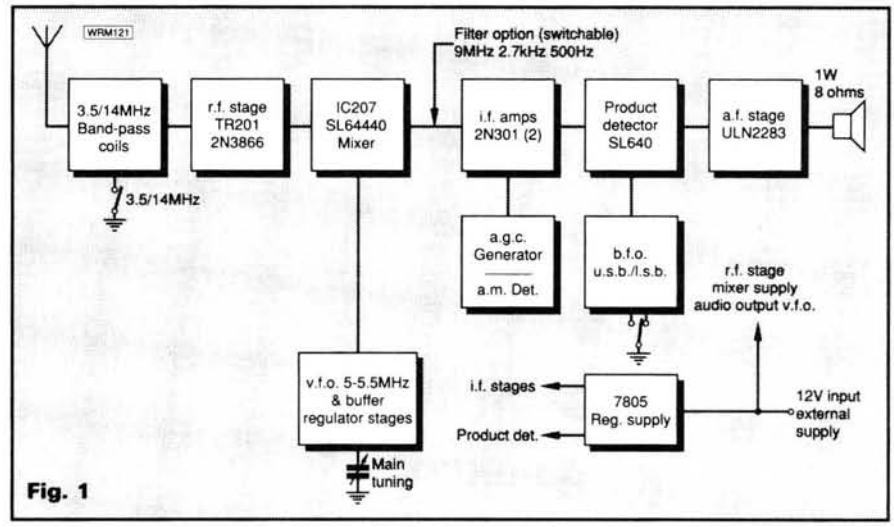


Fig. 1

91H250 or 90E0.5 filters which give 250 and 500Hz selectivity respectively. The extra filter can be fitted onto the board in the space provided using two extra small and very cheap relays to switch it in and out of circuit.

Filters for a 9MHz i.f. can be obtained from other sources, of course, and being a Member of the G-QRP Club has distinct advantages. From time to time the Club has offers of hard-to-find components; one of these offers was for 9MHz crystal filters and I was able to obtain a 500Hz filter for £15. Anybody still doubt the value of joining G-QRP? The 2.7kHz filter I used was obtained complete with carrier crystals from a fellow club member for a song. Kanga intend that the constructor obtains his or her own filters from whichever sources are available. By so doing the overall kit cost is kept down. Scan the advertisements, attend club junk sales, ask your friends, hunt the filters out.

Returning to our trip through the receiver signal stages, the i.f. signal is amplified in two stages using two dual-gate m.o.s.f.e.t.s type 3N201 and a third stage of amplification is used to drive an a.g.c. amplifier. The a.m. signals are derived from the a.g.c. detector, demodulated s.s.b. or c.w. signals are obtained from a Plessey Semiconductors SL640 i.c. This device must also be obtained by the constructor but as it is a fairly common device it is cheaply available. The audio is then fed to an a.f. amplifier i.c., a type ULN2283, to give the required level of audio to supply the headphones or loudspeaker socket. In my receiver I used an in-built loudspeaker making one less external connection. Various sundry f.e.t.s and bipolar transistors are used for v.f.o., buffer, c.i.o. and a.g.c. duties. A 78L06 regulator is used to stabilise the v.f.o. supply rail.

Kit Components & Construction

As previously mentioned, the kit does not supply all of the components. Whilst this may seem to be a drawback at first it must be remembered that this is a kit aimed at the medium to experienced contructor and it is assumed he or she will have access to components possibly from a well filled junk box. This is an approach I like as there are considerable savings to be had with my own filter supply as a good example. Difficult components such as the SL6440 are supplied but it will be necessary to purchase or scrounge a 2N3866 r.f. transistor, a main tuning capacitor, and a box to fit the receiver into. All resistors, capacitors, f.e.t.s and transistors are supplied.

There are no step-by-step notes for this kit's construction such as you would perhaps find in a larger manufacturer's product. Like one or two other smaller kit suppliers here in the UK, the constructor is given a comprehensive circuit, components list and parts layout guide, which in fact were quite adequate to complete the project. My own technique was to fit four or five components into the board at a time and when they had been soldered in place I coloured the relevant component positions shown on the p.c.b. layout sheet. When all components are coloured in, the kit is complete. Transistors, f.e.t.s and i.c.s were fitted last of all to prevent damage and adequate time was allotted to ensure they were fitted correctly.

The most difficult parts of this kit to prepare are the toroidal inductors. There are three of these to complete and they form the two balancing input and output transformers for the SL6440 mixer i.c. and the collector transformer for the r.f. stage. Kanga supply a separate instruction sheet for winding these, however I suggest the propective builder sits down in a quiet room, sends the family out for a few hours, reads the sheet thoroughly and then, taking a deep breath, tackles the simplest transformer first. It can be done. I did it, though my fingers are not that nimble these days, but it is a delicate job. An ohmmeter is the best tool for checking which coil is which and luckily self-tinning wire is provided which only requires the heat of a soldering iron. Be not of faint heart, you will be a true constructor yet.

Finally in the sphere of constructional comments, I would add that it will be necessary to mount the 2N3866 r.f. transistor on a spacer to ensure the collector, which should be fitted with a heatsink, does not foul other components.

Operation

Tuning rate is largely determined by the type of slow motion capacitor you use, (I used an ex-RAF Muirhead drive), and whether the v.f.o. coverage is beyond 5MHz to 5.5MHz. With the aid of a freqency counter, I trimmed the v.f.o. both by adjusting the v.f.o. coil tuning slug and by removing vanes to give the correct coverage. The instructions detail how this coverage can be obtained and the receiver aligned by using a general coverage receiver.

Small wafer switches were used for mode switching, selectivity switching, and sideband switching. Miniature toggle switches were used for a.g.c. on/off switching, band switching and calibrator switching. Both the calibrator and the 1.8MHz converter were G3VTT home-produced additions to the basic "Cheriton", which gives some idea of the design's flexibility and ease of modification and improvement.

The "Cheriton" can be recommended as a kit suitable for the medium to highly experienced group of home constructors. If care and patience is applied to its construction a receiver of excellent performance capable of out-performing most commercial designs can be built for around £100 using all new components, with the basic "Cheriton" kit costing less than £39.50. Further details can be had from ***Kanga Kits of 3 Limes Road, Folkestone, Kent CT19 4AU.*** **PW**

Errors & Updates

A Small Yagi For 50MHz
July 1989

Unfortunately, during the preparation of this article a small error crept into the drawings. The body SO239 socket (Fig. 2) should be connected to the boom of the antenna via a stout piece of braid and suitably sized solder tag.

Write On... ST300
Letter from, Sir Douglas Hall
September 1989

The section of his letter referring to the use of the large section of the LT44 as an anode load should have read, as follows:

> .. the large winding of the LT44 could be used as the anode load, the small winding being left disconnected and a 0.01μF capacitor connected between the anode of V2 and the grid of V3, with a 1MΩ resistor between the grid of V3 and the appropriate GB tapping.

Phase Locked Loop for the Measurement of Adjacent Channel Noise

Martin Popple explains the theory behind the design of a low-noise v.c.o.

When a transmitter is in operation, its adjacent channel noise must be low so that it does not swamp weak signals close to its own carrier. A transmitter operating over a wide frequency range will use a voltage controlled oscillator (v.c.o.) as its frequency source in a control loop. The v.c.o. is the main source of adjacent channel noise.

It is important to be able to measure the noise of the v.c.o. alone, but a v.c.o. in open loop will drift uncontrollably so any measurements are difficult. However, this is not the case in a closed loop, so a loop is therefore required to lock the v.c.o. which will not add significant noise or attenuate it.

The loop should be able to lock v.c.o.s of gain 105 to 107HzV^{-1} from 100 to 400MHz with a tuning voltage ranging from 2 to 16V.

The Basic Loop

A block diagram of the loop is shown in Fig. 1. To use the loop, the v.c.o. is swept towards the local oscillator (l.o.) using the filter offset voltage in the active filter until the two frequencies are equal. The v.c.o. should then acquire lock, if all constraints are met.

When in lock, any drift by the v.c.o. will produce an output voltage from the phase detector (mixer) proportional to the phase difference between the v.c.o. and l.o. frequencies. This is inverted and amplified by the active filter and applied to the v.c.o. tune line, forcing the phase difference back to zero. The v.c.o. and l.o. frequencies will then stay equal.

An active filter will amplify the control signal while a passive filter will not, and is preferred because the phase error is inversely proportional to the gain of the filter.

There are two reasons why a second-order loop is preferred over a first-order loop: (a) the filter gain of a first order is unity but that of a second order is very high. This means that the second-order loop will react to an error voltage much more quickly, so loop errors will be less.

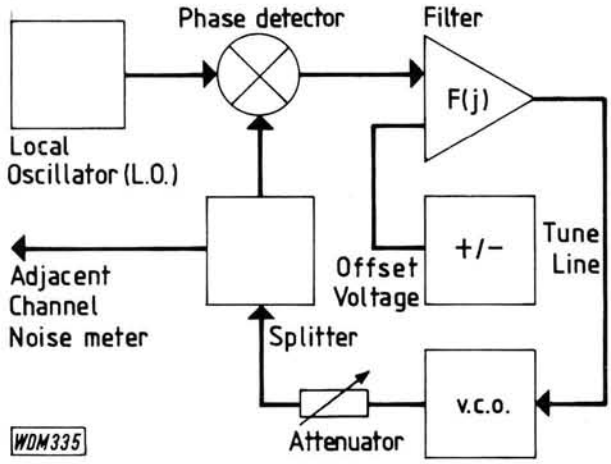


Fig. 1

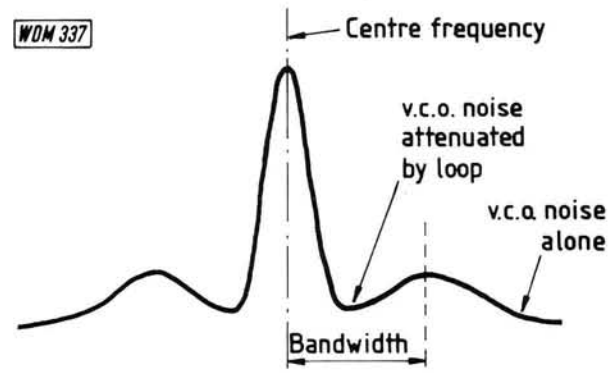


Fig. 3

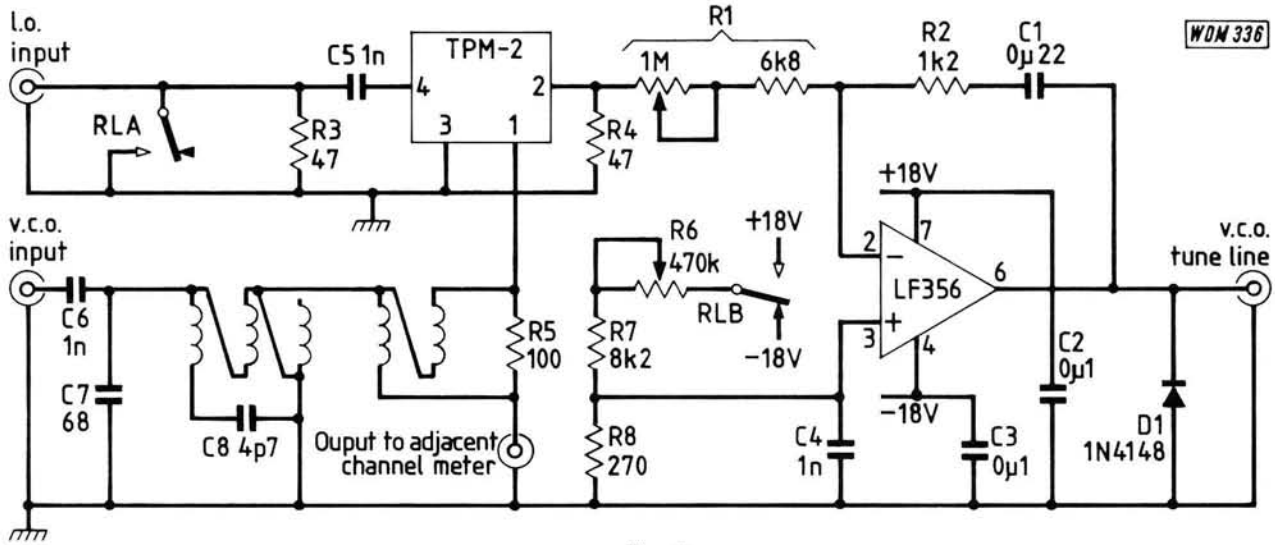


Fig. 2

(b) The hold-in range of a second-order loop is effectively the supply voltage (due to the extra integrator in the loop) but a first-order loop's hold-in range is limited, set by the phase detector and filter gain.

The loop filter chosen can be seen in Fig. 3. This controls the loop characteristics which are given by:

$$f = \frac{1}{2\pi}\left\{\frac{K_{vco}\,K_d}{R1.\,C1}\right\} \qquad [1]$$

$$\alpha = \pi\,.\,R2.C1.f \qquad [2]$$

(see Appendix 1)

K_d is the phase detector gain obtained from data sheets (units volts per radian (Vr^{-1})), a is the damping factor equal to 0.707 for correct damping, and f is the bandwidth (units Hz), set with R1, R2 and C1. When using equations, any quantities in Hz are changed to radians to be dimensionally correct.

By rearranging, Equation 3 is obtained:

$$\frac{K_{vco}}{R\,1} = \frac{4\pi^2 f}{K_d} \qquad [3]$$

As K_d and f are constants, K_{vco}/R1 must also be a constant, so as K_{vco} varies R1 must also vary.

Constraints

A mixer is used as a phase detector as it adds the least noise compared to other phase detectors and their loops. To act as a phase detector the mixer input signals must be of equal frequency and power, the power being sufficiently high to produce a usable output voltage.

There is a limit to the maximum sweep rate when acquiring lock which is set by the loop characteristics. If this rate is exceeded then the loop will not lock as it can only react so fast (see Appendix 2). By decreasing the filter offset voltage or increasing the bandwidth, the sweep-rate problem is lessened. However, the filter offset voltage magnitude must not become equivalent to the op-amp offset voltage.

When the v.c.o. and l.o. frequencies are far apart then a high sweep rate is needed or it could take many minutes to get the frequencies close. A large filter offset voltage is needed in this case. A potential divider, as seen in Fig. 2, is used so that the filter offset can be varied.

The l.o. must have very little phase jitter as it is used as a reference and will modulate the loop. Its broadband noise 25kHz away however should not affect the noise measurement.

The frequency spectrum when the v.c.o. is locked is shown in Fig. 3. The loop reduces noise close to the carrier but does not attenuate noise outside the bandwidth. Adjacent channels are 25kHz away and the noise must not be attenuated so the bandwidth must be less than this, but much greater than 50Hz or mains hum will modulate the v.c.o. The value of R2 must be high enough to stop slew-rate limiting of the op-amp as large values of capacitance (C1) are used. Values greater than 1kΩ are satisfactory.

The Circuit

The circuit of Fig. 2 is a compromise of the constraints outlined. A bandwidth of 850Hz was finally chosen.

Relay RLB makes it possible to integrate in either direction, with relay RLA used to unlock the loop if required. The diode D1 on the output of the op-amp stops the output going negative, as no v.c.o.s can be controlled by a negative d.c. input.

Operation

An external frequency generator is used for the l.o. The v.c.o. is locked either side of the frequency for which a noise measurement is wanted. For each of these frequencies the d.c. tuning voltage of the v.c.o. is noted down, so the gain of the v.c.o. can be calculated:

$$K_{vco} = 2\pi\left\{\frac{f_2 - f_1}{V_2 - V_1}\right\} rV^{-1}$$

Resistor R1 is set corresponding to this value and the loop relocked. The adjacent channel noise-meter can now be connected to make a measurement. **PW**

Appendix 1

From Fig. 1, assuming in lock, output of phase detector:

$$V_d = K_d(\theta_{LO} - \theta_{VCO})$$

where K_d = phase detector gain θ_{LO} = local oscillator phase and θ_{VCO} = v.c.o. phase.

Output of loop filter :

$$V_f = F(S).K_d(\theta_{LO} - \theta_{VCO})$$

where S is a complex notation of frequency, with $S = j\omega$.

Equation for a v.c.o. as an integrator:

$$\frac{d\theta_{VCO}}{dt} = K_{VCO}.V_f$$

Output of the v.c.o.:

$$\frac{d\theta_{VCO}}{dt} = K_{VCO}.F(S).K_d(\theta_{LO} - \theta_{VCO})$$

The loop gain $\theta_o \div \theta_i$ is needed to compare with a second loop equation. Using Laplace, the filter function

$$F(S) = \frac{1 + S.R2.C1}{S.R1.C1} \quad \text{Then}$$

$$\frac{\theta_o}{\theta_i} = \frac{\frac{K_{VCO}.K_d}{R1.C1}(1 + S.R2.C1)}{S^2 + S.R2\frac{K_{VCO}.K_d}{R1} + \frac{K_{VCO}.K_d}{R1.C1}}$$

Compare to the high gain second order equation:

$$\frac{\theta_o}{\theta_i} = \frac{2\alpha.\omega_n.S + \omega_n^2}{S^2 + 2\alpha.\omega_n.S + \omega_n^2}$$

This gives:

$$\omega_n^2 = \frac{K_{VCO}.K_d}{R1.C1} \qquad \alpha = \frac{R2.C1.\omega_n}{2}$$

As $\omega_n = 2\pi f$, ω_n is the natural frequency of the loop, where f is the bandwidth.

$$\therefore\ f = \frac{1}{2\pi}\left(\frac{K_{VCO}.K_d}{R1.C1}\right)^{\frac{1}{2}} \qquad \alpha = \pi..R2.C1.f$$

Appendix 2

Assume acquisition time $\approx 1 \div f$

$\therefore$ maximum change in frequency with time:

$$\frac{df}{dt} \approx \frac{2B}{1 \div B} = 2B^2 \qquad [1]$$

Using the op-amp integration equation:

$$V_o = \frac{-1}{(R1 + R2)C1}\int V_{os}.dt$$

$$\therefore \frac{dV_o}{dt} = \frac{-V_{os}}{(R1 + R2)C1} \qquad [2]$$

For a v.c.o.:

$$f = K_{VCO}.V_o$$

$$\frac{df}{dt} = K_{VCO}\frac{dV_o}{dt} \qquad [3]$$

By substituting [1] and [2] into [3]:

$$2B^2 = \frac{K_{VCO}.V_{os}}{(R1 + R2)C1}$$

As R1 >> R2 :

$$V_{os} \approx 2B^2.C\left(\frac{R1}{K_{VCO}}\right)$$

The minimum filter offset voltage can now be worked out.

SWAP SPOT

Got a camera, want a receiver? Got a v.h.f. rig, want some h.f. gear to go with your new G-zero? In fact, have you got anything to trade radio-wise?

If so, why not advertise it FREE here. Send details, including what equipment you're looking for, to "SWAP SPOT", *Practical Wireless*, Enefco House, The Quay, Poole, Dorset BH15 1PP, for inclusion in the first available issue of the magazine.

A FEW SIMPLE RULES: Your ad. should follow the format of those appearing below, it must be typed or written in block letters; it must be not more than 40 words long including name and address/telephone number. Swaps only-no items for sale-and one of the items MUST be radio related. Adverts for ILLEGAL CB equipment will not be accepted.

The appropriate licence must be held by anyone installing or operating a radio transmitter.

Have Plessey PR155, several Eddystone 985/3, also Collins 32V2 receivers, plus Leitz trinocular microscope and more. Would exchange for Leica "screwmount" camera and wireless equipment prior to 1930. All replies answered. W.J. Ford, Box 606, Smith Falls, Ont K7A4T6, Canada. *G848*

Have Telequipment oscilloscope Type 43 fitted with TD-42 time base and two Type A amplifiers. In very good working order. Would exchange for digital voltmeter in similar condition. Bob. Tel: Chichester (0243) 789705. *G850*

Have 144MHz to 50MHz *PW* "Meon" transverter also Sony ICF-7600 7-band receiver. Would exchange for 144MHz f.m. transceiver or packet set-up or FRA converter for FRG-7700. Patrick O'Brien GW1SX, QTHR. Tel: (0286) 5468. *G856*

Have Amstrad CPC-464 computer with colour monitor, Speedking joysticks plus lots of quality software, including c.w. and RTTY, Elite and Starglider. Would exchange for 144MHz transceiver, base station or portable. Dave. Tel: 061-303 0409. *G866*

Have Realistic PRO-38 scanner hardly used and still under guarantee. Would exchange for base station type scanner or ERA Microreader Mk1. T. Galt. Tel: 041-620 2178 after 6pm. *G873*

All-band all-valve table top h.f transmitter, max. power c.w., also two p.s.u.s and quality key plus frequency checking unit. Suitable for radio club. Would exchange for w.h.y? Swapper collects. John. Tel: 021-743 5068 Birmingham. *G899*

Have Lowe HF-125 receiver and Leader v.s.w.r./power meter, both in mint condition. Would exchange for w.h.y? N. Cameron EI4DZ, 16 St Marys Crescent, Westport, County Mayo, Eire. *G900*

Have various radio and electronic items. Would exchange for, or purchase, Collins 51J4 or R390A receiver in near perfect condition, preferably with all filters and handbook. Tel: (0904) 794680 (York). *G906*

Have four new QQV06-40A valves in original Mullard cartons, also Weston V light meter, little used and in original packing. Would exchange for 144MHz transceiver or w.h.y? Barry. Tel: (0902) 782404. *G919*

Adaption of Plug Top PSU

Here's a smart idea from Michael Stott for all you safety conscious people.

As you may will have noticed, a lot of the smaller transportable equipment coming from the Far East uses small external mains power packs. The market for this equipment must be equally as great in both Europe and the British Isles. Yet, for some inexplicable reason most of these power packs are fitted with an integral slim 10 amp continental-type plug.

So what's the problem? Two pin to three pin 13 amp shaving adaptors can be used to accommodate most of these Far East oddities. However, more commonly people will try and push these power packs straight into a standard UK type three pin 13 amp mains socket. To do this it means depressing the earth pin shutter bar (who would do a thing like that?), well I think we all have at one time or another.

This practice is not only dangerous due to lack of proper fusing, but can also mechanically damage the socket. This damage causes arcing, due to the socket prongs being forced apart by the non-standard pins of the power pack. The mass of the power pack also forces the top fittings in the socket upwards, so when a normal 13 amp plug is inserted very poor side contact is made.

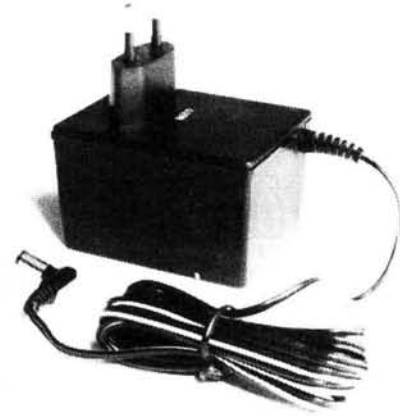
I found the solution to this problem was to fit a normal 13 amp square pin plug directly onto the body of the power pack. This adaption not only makes for a good mechanical fit in to the socket but also allows the fitting of a correctly rated fuse.

Transformation

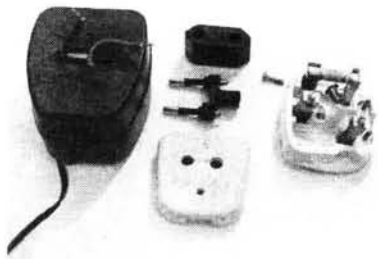
First remove the two round pins from the power pack, these can sometimes be taken off by removing a self-tapping screw in the bottom of the power packs case. However, this arrangement is somewhat of a rarity, most units need to have this part removed with a hack-saw blade. In the course of this operation don't worry about damaging the face of the power pack, as you will have to roughen up this surface to afix the plug on. If you cut around the base of the pin chamber not penetrating by more than 5mm you shouldn't damage the mains power wires therein.

After cutting around the chamber, carefully lift it off and unsolder the two wires. This should leave a slot as in the photograph. Next, select a 13 amp mains plug with a flat top and drill two holes in the top of the plug to take the wires from the p.s.u. Fix the top half of the mains plug to the adaptor with either epoxy resin or contact adhesive. Whilst carrying out this operation, be sure to pass the wires through from the power pack into the plug top. Then fit the wires into the plug base in the normal manner, fit a correctly rated fuse and finally screw the two halves of the plug together.

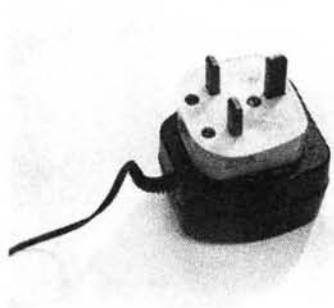
In the photograph you may notice that I have made a third hole in the plug top, this is to take a self-taping screw to give the modified unit extra mechanical strength. However, after modifying several of these units I found this was not necessary. ***PW***



View of unmodified power pack



Power pack with original pin assembly removed



Modified power pack

SWAP SPOT

Have Eimac 4CX250B valve and base, both new. Would exchange for an Air band receiver or h.f. to v.l.f. converter. Dave. Tel: 051-639 5922 Wirrel. *G665*

Have Toshiba XR40 CD player, boxed, instructions, as new but faulty, also Praktica B100 camera with f1.8 lens, case, perfect. Would exchange for legal CB, 144MHz or communication receiver or w.h.y? G.L. Newnham, 22 Warren Place, Calmore, Southampton SO4 2SD. Tel: (0703) 865086. *G699*

Have Commodore 128 computer with datassette unit. Would exchange for hand-held scanner covering from 108-950MHz. Clive. Tel: 021-788 8447 (Chelmsley Wood). *G700*

Have Eddystone 740 general coverage receiver (collectors item). Would exchange for Eddystone EA12 amateur bands only receiver. G3NSW. Tel: Manchester 795 7084. *G718*

Have CR100 Marconi receiver complete with manual, g.w.o. but cracked glass, no base plate. Would exchange for BC221 in g.w.o. with charts. Sharp. Tel: Swindon (0793) 826325 after 7pm. *G719*

Have Heath HW101 v.g.c. with manual, never used on TX, little used on RX. Unused since £77 overhaul by Cedar (1986). Would exchange for 144MHz transceiver, FT-221 or similar, plus cash adjustment if necessary. Sharp. Tel: Swindon (0793) 826325 after 7pm. *G719a*

Have Tono communications terminal 550 and manual. Would exchange for hand-held scanner, preferably to receive air and marine bands or w.h.y? V. Wainwright, 19A Harcort Drive, Herne Bay, Kent CT6 8DJ. Tel: Herne Bay 740093. *G732*

Have lots of linear ICs (e.g. MC3359, MC1469P, MC3357P), plus micro prossesors, t.t.l. and displays. Send for lists. Would exchange for back issues of Practical Wireless magazine 1978, 1983, 1984, 1985 and 1986. Nik, Fakulti Kejuruteraan, Jabatan Letrik, University Malaya, Kuala Lumpur, Malaysia. Tel: 03-7553 466 Ext 321 *G739*

Have Hallicrafter R-274/FRR covers 540kHz to 54MHz complete with instruction book. Would exchange for polyphonic music synthesiser or slimline Betamax video recorder. Hebbes. Tel: Bradford (0234 51651). *G740*

Have Uniden 55XLT v.h.f./u.h.f. hand-held scanner new and box. Would exchange for valved h.f. receiver or single-band 3.5MHz set similar to Command receiver. Fred. Tel: Cambridge (0223) 241088. *G745*

Surface Mount Devices and the Amateur

In Part 3, W. Mooney G3VZU deals with the construction of his 10MHz band receiver

The circuit is fabricated on three separate p.c.b.s, each measuring 25 x 32mm. This modular approach was adopted because each unit can function as a stand-alone device, a useful technique for the experimenter. Normal precautions for working with high-gain audio and r.f. should be followed. The device was housed in a pre-made aluminium box measuring 70 x 38 x 100mm, a type which is widely available. The layout is not critical, but it is essential to use a screened container. The overall placement of the main components is shown in Fig. 3.1, the loudspeaker being in the lid of the device.

All p.c.b.s and L1 are held in place with 8BA nuts and bolts. The audio module is mounted on a small angle aluminium bracket which was cut down from standard d.i.y. 12mm angle. The on/off and volume control is a miniature 5kΩ "Japanese" type and the tuning potentiometer is likewise a miniature device both available from many suppliers. The miniature loudspeaker is a 0.1 watt device of about 35mm diameter and 8Ω impedance. A 3.5mm jack socket provides headphone reception if required, this is a stereo type with both channels wired together. Any convenient terminal may be used for the ground connection and high impedance antenna input and an SO239 socket was used for the low impedance input.

The Hardest Part

Fabrication of the p.c.b. modules is, of course, the hardest part of the project. There are several options here:

1: See the *PW* "PCB Service" for details of the boards.

2: Make your own board with Dalo pen. This is a very workable method and quite fast once the component positions on the board are found.

3: Use a photographic method to reproduce the layouts suggested here (Fig.3.2).

Making Your Own Boards

The second method may not produce the straightest lines and the neatest job but it is low cost and quite fast. There are several fine drawing pens which may be used also, for example the permanent markers used with overhead projectors. A test for solubility in ferric chloride solution will easily screen out suitable types. A 0.5mm tip is the largest size which can be used if neat results are required. A Dalo pen will therefore need to be "sharpened" with a sharp blade. The photographic method is also fast but unless it is already in use it is a little costly. However, it is worth while setting up with a uv light source and suitable chemicals if you plan to make several boards.

Essentially the photographic method consists of producing a master positive of the p.c.b. on clear or translucent film. The copper laminate may be purchased pre-coated. The master is placed between the uv sensitive p.c.b. and the light source and exposed for about six minutes. A weak solution of caustic soda now removes the exposed areas leaving them open to attack by the ferric chloride etchant.

Rapid Production

For rapid production of prototypes using s.m.d.s the photographic approach is highly recommended, especially if advantage is to be taken of the miniaturisation potential of these devices. Using the photographic method a small circuit like the local oscillator module can be implemented from the schematic diagram to a working unit quite easily in an evening. Of course, the job should not be rushed as errors such as misplaced tracks on a p.c.b. can make the final circuit very messy by the time corrections are made. Unfortunately, there are no words which will help with the task of p.c.b. design and etching.

So let's assume that the board is etched. A good water wash is essential after etching and it should be cleaned with a mild abrasive to reduce the likelyhood of copper whisker bridges. Dry the board well after washing and a light spray with a solder-through laquer will help preserve the clean easily solderable copper surface. Any lead-through holes should be drilled at this stage. In the designs described here, the only reason for drilling holes is to connect to the earth plane on the rear side of the p.c.b. and for 8BA clearance holes on all modules. Some earth links would be needed if single side board were to be used. Double sided p.c.b. is particularly recommended for the local oscillator

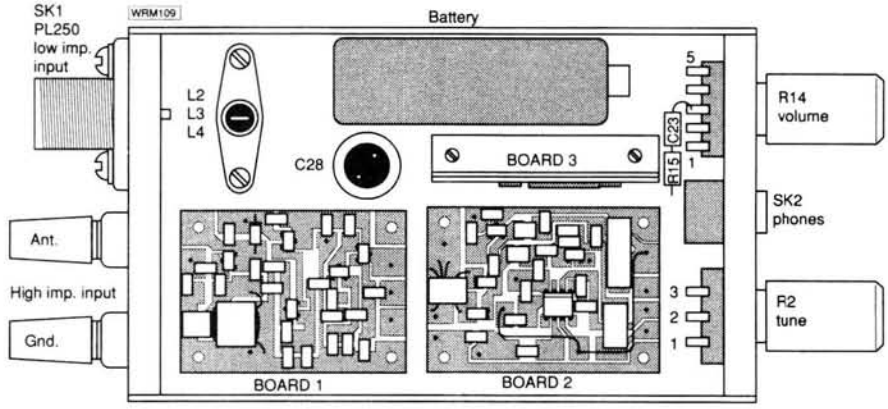


Fig. 3.1

Interwiring Connections

1a - R14 (1)
1b - 2g
1c - 2f
1d - R2 (2)
1e - R2 (1)
2a - C28 & R14 (1)
2b - braid of coaxial cable to R14 (4)
2c - coaxial cable inner to R14 (2)
2d - coaxial cable inner to R15
2e - coaxial cable inner to 3b
2f - 1c
2g - 1b
2h - post through to underside ground plane
2i - L4
3a - post through to underside ground plain - R14 case
3b - braid of coaxial cable - 2f
3c - coaxial cable inner - 2e
3d - R14 (1)
3e - post through to underside ground plane and braid of coaxial cable to LS-
3f - coaxial cable inner to LS +
3f - SK2
C28 - negative terminal - 3a
Ground socket - L2, L3 & L4 and chassis solder tage on SK1
SK1 inner - L2
Antenna socket - L3
SK2 outer jack connection - R14 case
R2 (3) - R14 case
R14 case to R14 (4)
B1 -ve to R14 (4)
B1 +ve to R14 (5)
Antenna socket - C1 - chassis

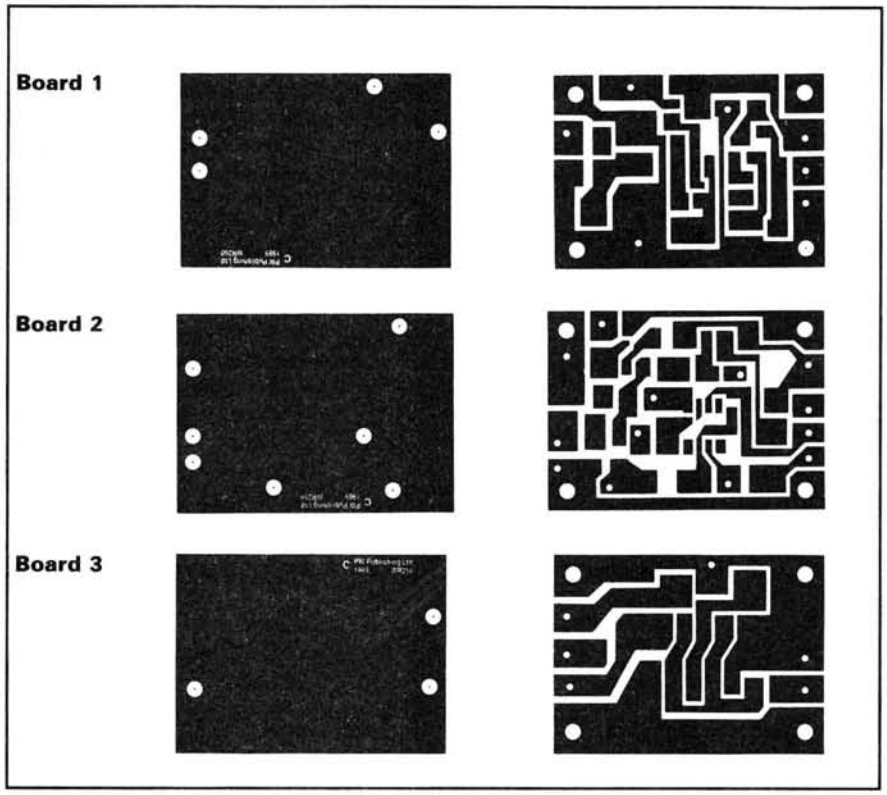


Fig. 3.2

board. Some of the drillings are for live connections - inputs, output and supply rails. The rear side of the p.c.b. should be counter sunk to prevent shorting out. Vero pins are used as binding ports or feed-through connections when they are soldered on both sides. Excess pin lengths are cut off close with side cutters. It is probably better to add the pins and solder in after the s.m.d.s are soldered in place.

Construction Techniques

A brief resume of s.m.d. practice may be useful here. When you order devices they will probably arrive in small individual plastics bags with a device type label. You will note that capacitors are not marked and that widely different capacitors can have very similar physical size and appearance. They are easily mixed up so leave them under wraps until needed. Don't handle them too much as the solder coating easily tarnishes to give poor solderability. Get some 1mm or 0.5mm resin cored solder and use a 15 watt iron (or less) with a 1/16th iron or nickel bit. Place resistors or capacitors on the board with the component ends on the s.m.d. footprint.

Hold the component in place by pressing very gently onto the board and solder one end. To hold the s.m.d., use a wooden toothpick or a s.m.d. holding jig which gives you a much needed extra hand. A good quality pair of tweezers are really indispensible for s.m.d. work. Make sure all copper is very clean to start with and a light coating of solder-through lacquer can be used before populating the board. This has the advantage of making the tiny s.m.d.s more managable as they tend to adhere to the dry film.

Again when all wiring is complete, a good spraying with solder-through lacquer will tend to seal the s.m.d.s themselves. If a lot of changes to your circuits are envisaged, some re-working bits for passive components and i.c.s should be aquired. However, if it's just the odd capacitor that needs replacing it could be deliberately fractured with a side cutters and each end desoldered individually. Don't use solder suckers for s.m.d.s, desolder braid is much safer. Passive components may also be removed using two soldering irons and a friend. To solder i.c.s in place solder two diagonally opposed pins first to fix in posiiton.

Although the modules shown here have a mounting screw in each corner, it is essential that the populated board does not experience excessive flexural stress as there are no leads to bend and absorb the strain. Therefore don't tighten the boards down with excessive zeal or bolt them to a part of the cabinet which is going to flex. Make sure there is good hole clearance on the p.c.b. and lock the threads with a little lacquer. There is no substitute for a little practice with the devices and basic skill comes fast.

The component positions on the various p.c.b.s is given in Fig. 3.3. There may be some slight variation depending on availability and the source you buy from. COG dielectric s.m.d. chip capacitors should be used for the oscillator tuned circuit, these are C3, 4, 6, 7, and 9. Variable resistors R2 and R14 are not essentially miniature types. The winding details for L6 is shown in Fig. 3.4.

The placement of panel controls and sockets is not critical and a matter of personal preference. The use of an internal power supply is vital as it is difficult to keep mains-born interference out of the signal path.

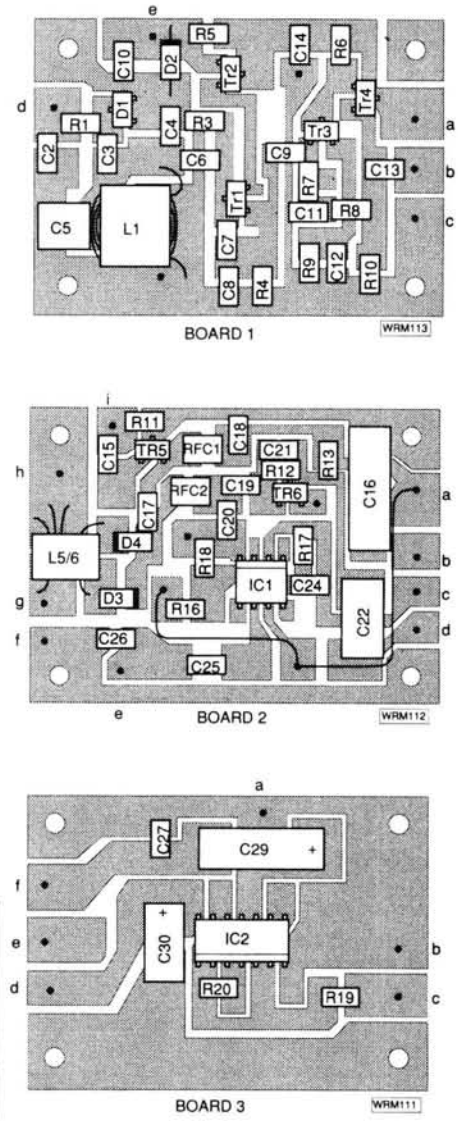


Fig. 3.3

Setting Up & Operation

Close visual examination of all p.c.b.s is essential before power is applied. Make sure the 741 and 4011 are wired in the right way around, see Fig. 3.3 to find pin 1. Apply power to each board individually using a current limited supply, either electronic or with a series resistor of, say, 300Ω which will drop the supply voltage to safe limits if a fault is present. So, starting with the local oscillator v.f.o. circuit, the supply current should be about 15mA. Measure the voltage on the emitter of TR4, it should be about mid rail - 3V is fine. The emitter of TR4 will be a bit less - about a volt or so. If TR4 emitter voltage is correct, chances are the Zener voltage and the voltage on TR2 emitter (which will be about 0.6V or less) are correct also.

The source voltage of the f.e.t. should be about 4V, but a wide spread can be found due to transistor characteristics. A good value would be half the Zener voltage. Now check that the Varicap is the right way round (lined end to positive supply) and check that the tune control actually gives a varying Varicap voltage. Now for the moment of truth, connect a frequency counter to the output of the

v.f.o. - cold side of C13. A good steady count should be observed. The frequency may be trimmed with C5 or by decreasing the number of turns, or increasing, on L1 if a ferrite ring is used. A small 1/8in coil former was used in one test circuit and cut to a height of 5mm with a v.h.f. type core and wound with 12 turns of 36s.w.g. enamel wire. This gave much better temperature stability than ferrite ring types.

Some ceramic s.m.d.s are more temperature sensitive than others and can be checked out with a blast of freezer spray. Cooling to about 0°C should give a frequency shift of not more than 50kHz. Again this depends on what specification you need. Replacing the s.m.d. capacitors around the tuned circuit with polystyrene types can also improve matters.

Mixer & Audio Pre-amp

The mixer and audio pre-amp may be checked out next. Again monitor the current. Measure the d.c. voltage on pin 6 of the 741, this should be mid rail. If this is so, then the 741 circuitry will probably be OK. Now check the d.c. voltage on the collector of TR6. A couple of volts drop across R13 will give adequate signal swing but it could be less than mid rail. A small ear piece connected to the audio output from the board will give sufficient volume to monitor the signal at this point. Touching the base of TR6 should give a good healthy hum if all is well. The source voltage on TR5 should be about 3V. Now connect up the local oscillator. A few feet of wire on the high impedance input should produce some loud commercial teleprinters on tuning across the band. Peaking the core of L3 will give a good improvement in signal strength. Unfortunately, the input tuned circuit also picks up the oscillator signal so just tune L3 for best results. The audio power module again should have about 4-5V on the hot side of C29 and a total current drain of less than 10mA.

The 10MHz band is busy with commercial traffic and the amateur stuff is somewhere in amongst this lot and rarely stronger. There will be times when the band is dead and when a simple receiver like this one will not be able to sort the wanted signals. However, over a period of weeks there will be tones on excellent amateur communication.

Hopefully, this series will have given you the inclination to "have a go" at surface mount construction. ***PW***

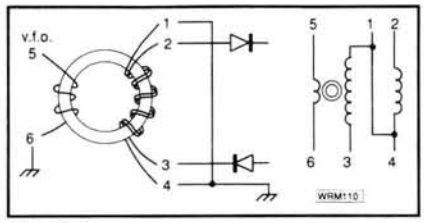


Fig. 3.4

Inductor L1
3 turns of 24 s.w.g. in two-hole ferrite balun OR 12 turns on 1/8in cored former

Inductors L2-4
3/8in former with core, where L2 is 2 turns, L3 is 16 turns and L4 is 4 turns. All 24s.w.g. enamelled copper wire.

Inductors L5 & 6
Small ferrite core 4mm thick, 6mm od, 3mm id. L5 is 3 turns and L6 is 2 x 5 turns bifilar wound, both 34 s.w.g.

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470Ω	4	R5, 9, 10, 19
1kΩ	2	R4, 11
4.7kΩ	4	R6, 13, 16, 18
10kΩ	1	R8
22kΩ	1	R15
100kΩ	5	R1, 3, 7, 12, 20
470kΩ	1	R17

Potentiometers Linear

5kΩ	1	R14(1)
10kΩ	1	R2(1)

Capacitors

1206 package s.m.d.

10pF	1	C9
100pF	2	C17, 24
180pF	2	C4, 6
220pF	4	C3, 7, 8, 18
1nF	4	C13, 15, 21, 27
10nF	4	C2, 10, 11, 12
22nF	2	C20, 26
100nF	1	C19
220nF	3	C14, 18, 23

Trimming capacitor s.m.d.

6.5-30pF	1	C5

Plate Ceramic

33nF	1	C1

Aluminium s.m.d. electrolytic 16V wkg

1µF	2	C22, 25
22µF	3	C16, 29, 30

Electrolytic 16V wkg

2200µF	1	C28

Semiconductors

Diodes s.m.d. types

BB212	1	D1
1N4148	2	D3, 4
6V8 Zener	1	D2

Transistors SOT23 s.m.d. package

BC848C	4	TR2-4, 6
2N4858	2	TR1, 5

Integrated Circuits.SO14 s.m.d. package

CD4011	1	IC2
741	1	IC1

Inductors

s.m.d. type

220µH	2	RFC1, 2

Miscellaneous

Miniature 3.5mm jack sockets (2), miniature loudspeaker 8Ω 0.1W(2), aluminium box with lid (2), PL259 50Ω socket, 4mm terminals, 3/8in former with core (see winding details), small ferrite core (see winding details).

(2) Maplin Electronics plc
PO Box 3
Rayleigh
Essex SS6 8LR
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(1) Progressive Radio
93 Dale Street,
Liverpool
L2 2JD
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Events

The Republic of the Marshall Islands will in due course change its prefix from KC6 to V6, amateurs signing V63AA-ZZ; likewise the Republic of the Marshall Islands will sign V7, amateurs there being in the V73AA-ZZ block, but at the time of writing I do not know just when the changeover will take place.

Rotuma may soon be more active on the air, as I gather that Pita Aisake has passed his exam and may soon be sporting the call 3D2AP.

Later in the year, I gather that Eric SM0AGD will be on from Banaba Is, T33AG being the callsign; more details are awaited on this one.

An interesting one to look out for is RB5FH/MM; Bob Sherbinin will be sailing a replica of an ancient vessel around various archaeological sites; QSLs for this to his home address: Box 2, Arciz, Odesskoj Oblast, 272500 USSR. Incidentally, Bob's previous calls include UA0AAK, U0Y,and UK0AAM.

For those who are athirst for an ET contact, I hear that PA3CXC will be in Ethiopia and will be negotiating in the hope of a callsign.

Svalbard activity is promised until the end of September from SP8UFO/JW, with the QSL route to the home call.

Starting in October, SM7PKK is doing a second session around the Pacific, with hopes of 3D2KK, T30, 5W1HK, ZK3 (Atafu Atoll), KS6 and ZK1; and if the money hasn't run out by then he will visit more islands until it does. QSLs to the home call, but don't mix up cards for various stops in one envelope as different people will handle the cards for each stop.

Top Band

G3SBI (Warrington) says his s.s.b. is for socialising, serious activity being all c.w.; a late-night session around midnight on July 14/15 netted, on Top Band, UA3VSF, UQ2GSF, RB5IIM, AA1K and W2GD, the last two around 0300Z.

G2HKU (Sheppey) has been doing some improvements to the earthing system, and recovering from the party to celebrate his fiftieth year on the air, this last having been set up by friends and staff of KW without his knowledge. I gather the highlight of the occasion was G8KW being prevailed upon to make a recording on a wax cylinder phonograph, for which the blank waxed cylinders are still obtainable, and indeed they look remarkably like KW 7MHz traps! Anyway, to revert to Top Band, s.s.b. yielded ON7BW, while c.w. gave GW4IOI, DJ3XD, GM3PFQ, OY3QN, HB9DFF, OK1DR and OK1DWJ.

The 3.5MHz Band

G3SBI during his one session late at night on the l.f. bands managed c.w. with KG4W and AI1N.

QRP exponent Angie **G0HGA** (Stevenage) has put two watts of c.w. to work on this band and managed DL0HSC, F6GUO, FD1ONJ, G0DMN, G0GZN, G3KKZ, QRP/G3JXV and G3LD.

The 7MHz Band

Most people this time seem to have had a play on the band. G3SBI mentions K4LTA, OA4IU and N2NU in his one session of c.w. Incidentally Colin uses a thirty-watt top-loaded vertical on all bands.

Now to **GM4XQJ** who notes that he has not a had a lot of time for radio, but on c.w., Brian found GM4BKV and PI5KOM, leaving GB0DJS on s.s.b.

G0ISW reports from Ruislip and reports that he has a G5RV at six metres high and the Yaesu 767 at 100 watts s.s.b. On 7MHz, this combo talked to GI4GNT and G3XFQ.

G3BDQ (Guestling) makes his bow at this point after a period of silence, and John offers JX7DFA as his catch of the month on this band.

Now to **G0LJB** (Whitehaven) who writes for the first time - welcome aboard Paul - and notes DL2ECQ, DJ2OD, DK7AR, F6INZ, F/G3RNQ, ON4AEW (QRP both ways), PA3BFK, PA0VLA, PA3FHT, PA3CWN, OK1DLF, SP9ADY, UP2OJ, Y23RM/P, Y52NL, YU3ADR, UB4UEE and ZA1PI - the latter asking for QSLs to Box 90 Turon, Poland. Tirana Slim again, no doubt, but what can one do.

Two-way c.w. was the preferred mode for **GM3JDR** (Aukengill) when he managed 4J1FS, RB8M, RQ7W, 9H3IE, FR5FO and SV0MD/8.

WARC Bands

Not surprisingly in view of the recent change to licence conditions on these bands, we have quite a few references this time - keep up the good work!

G0HCZ is a new reporter from Newport, IOW - welcome, Derek - who has an Icom 720A plus a home-brew VK2ABQ to which has been added the 18 and 24MHz bands mounted some 10 metres above ground which in turn is about 20 metres above sea level; but there is high ground both to east and west of the QTH. Most of the time Derek has been using 18MHz s.s.b., starting from 0002Z on July 1, when he found himself on the end of a pile-up lasting for 2-1/2 hours. QRM levels have been low, luckily, as fading to the tune of up to six S-points has been noted. Summing up, G0HCZ offers 18MHz contacts with CE2HC, EA5GCB, HB0LL, HK6BER, J37AJ, KP2BH, LU1KKQ, PY2CDS, VE2MNL, VE3YSL, VE7AHI, VK2AVA, VK3CKL, XE3AAF, YV4BVB, ZL3ARK, 9M2RI, W1ZLG, W2NS, K3LGC, K4JRB, W5SAL, W6TKV, KX7F, W8MMC, N9DEO, N0CAO and AL7I.

Next we have **G4ZMI** (Headless Cross), who had a cross-mode contact with CN8MC on 18MHz, the latter on 'phone to Neil's c.w., plus c.w. to TA2BK, K1GOW, W2FJ, ZS6FS, VE3FGG, HB9LO, CO2VG, VP2M/WC0W, K8TV, SV5QR (Dodecanese), K2OZ, PY6WT, PY2ZAA, K2KE, KE0DR, OY3QN, OH2BYG/8, OA4ZV and JG6MQI. In addition, DL6GBU was raised on 24MHz.

On 18MHz c.w., Don at GM3JDR took a peek at the band, and came out with two-way c.w. QSOs with W8ZCQ, K7DZ, JK6JYZ, JA8GMZ, JW9DAA, KL7U, W4IF and OX/OZ1LQH.

Our only 10MHz reporter this time is G2HKU who keyed with VK3NC, and noted the PY beacon a number of times at good strength on 24MHz - but no activity. As for 18MHz, c.w. accounted for WB0FQC, W4HET, VE1IC, N4EJK and N5VV.

On 18MHz, G3NOF has put up a trapped sloper, and with this he has heard VE2, W1, W2, 6Z2E, 9K2EC and worked Europeans and ZB2IK.

I nearly missed out G0ISW thanks to a misplaced paperclip, but Philip notes his s.s.b. contacts on 18MHz with G3SFZ, 9K2EC, KU1G and CT5BLV, while 24MHz, turned up G0EIQ, G3SFZ and IK3CYV.

The 28MHz Band

As expected, largely a prisoner of the summer conditions. Often, at least at times when my ear has been turned to the band, all I have is the string of timebase harmonics, whichever way I try to beam. At other times, the band has been open with v.h.f.-type propagation; true long-distance propagation seems in the main to be in the north-south direction, with only the rarer opening reaching the USA.

G3NOF (Yeovil) found a few long path VKs around 0800, and also by the same route between 2000 and 2300Z. A few weak Ws have been noted at the same times. South America appeared between 1700-2100Z, and there were a few Africans in the mornings. Contacts on s.s.b. were completed with CE3BFZ, J79T, TR8SA, VP8BWT, WP4IGN, ZD8BOB, ZD8PJ, ZD9BV, ZL4LZ, ZP5AA, ZP0Y and 5H3TW.

G0ISW used s.s.b. to raise N8AUM while the latter was making a first QSO at three watts from a converted CB rig, plus VE3ACA, UA0WW and K1SVC.

GM4XQJ is a chap who likes his bit of QRP and doesn't mind what mode, so we find, on c.w., CX5BBI and OK2BMH, while on s.s.b. 3B8DB, 5H3ZW, 4X1DA (raised with one watt), 4X6YR, J79T and W5GFM.

Just a couple get a mention by G3BDQ, who offers 5H3ZW and K9BO/Z2.

Another mixed modes merchant is GM3JDR, who raised 4J1FS on Sideband, plus CW to LU5DSL, CE6NOT, DK9FE/SV9, AP2ZA, 5H0T and PY1GCW/PP8.

At G2HKU just two c.w. contacts are noted, namely PY2GQT and PY7DH.

The 21MHz Band

This is undoubtedly the star turn at the moment as far as the reporters are concerned. G3NOF for instance says, "The band never seemed to close" with JAs for example on long path 0700-0800, short path 0800-2300Z; and in the mornings, while the streets are being aired 0700-1000Z, the Pacific has come in over the North Pole together with the odd KL7. Asians 1000-1700, and S. Americans in

THE NEXT THREE DEADLINES ARE SEPTEMBER 27, OCTOBER 31 & NOVEMBER 28

the mornings and again in the evenings. Don made s.s.b. contacts with A41KB, AH6CS, BY1SQ, BY4AOM, BY4RSA, C40A, CO2QQ, DU6BOB, FG5CL, FO5IW, FO5LQ, FO5MA, FW/KA0OMX, GU/PA0EQT, FD1JYD/VE8 (Zone 2 - King Christian Land), HC5EA, HK3IHP, HK3JJH, HK6IKV, HK6ISX, HL4GAV, HL5FNV, HL9TF, HL9TG, HL0Y/4, HV1CN, HZ1AB, ID9/IK4CFV, IG9ONU, J79T, J88AQ, JAs, JH1FNS/CE3, JT1KAA, KG4UN, KH6SB, KL7QK/P, KL7TC, KL7XD, NP4CC, OY/DL1SCQ, OY/DL2SCQ, OX/OZ1LLC, RA0AW, RZ6AWL/UF60, SU1EP, T30BC, T32AF, TA4A, TA3/G4JVG, UA6HZ/JW, UA9FBH/UA9G, UA0BDU/UA1O, UA0KBU, UA0QBB, UA0QBR, UA0QWA, UA0WZ, UA0ZCL, UW0LAP, V85GA, VP2EY, VP2V/G4LYM, VS6UZ, VU2RX, VU2TTC, XE1GAM, Y&B/YCs, ZC4BS, ZK1DD, ZP5AA, 3B9FR, 3D2XV (Rotuma), 5W1HM, 5Z4BO, 6Z2DK, 6Z2WK, 7J6CAW, 9M2ZZ and 9X5NH.

Turning to G0HCZ in the Isle of Wight, we find Derek made his s.s.b. go out to CM6VP, J28DN, K3AQH, OX/OZ1LLC and YV2BYT

G4ZMI notes his c.w. contact with YL operator JF7TYA.

Now we turn to G0ISW who offers YB5QZ, TR8CA, VE3OCP and 4X4IV.

GM4XQJ had c.w. sessions with RD8D/UZ3QWX, and W2LZX, while s.s.b. made it to FP/KY2L, HC2RG, KA9I, NO9F and 4M5T.

At this moment in comes G3BDQ who has divided his 21MHz takings with 80 watts p.e.p. to a Corsair up in a different way: from Africa he mentions ZS6UN, CQ9AF, J28DN, TJ1PD, 6W1HF, 6W1AAD, 5H3GB, 5Z4BI, TR8SA, ZD8RP, FH5EF, 9X5AA, 9X5KP, IG9ONU (Lampedusa Is), CN16MC, CN60AQ, 5Z4FO, ZS3UN/OH7NRW, ZD7VC, J52US, EL2GM and S79MX; turning to Asia, John notes many JAs, JY9SR, HS1BV, RJ7R, VS6UW, UZ0DWD, many YB/YC, TA2AP, TA3/G4JVG, VU2RX, VU2WAP, 4S7EA, YI1BGD, 9M2RJ, 9V0WO, HL0U, HL3IID, HL4SF three times, HL4VP and HL5WN. On to S and C America, where many PYs, CX5DY, HK3RQ, HK5JPS, CO3JA/4 (Pinos Is), VP5W4NPX, L1Y from the Argentine, LU2ZC on South Shetland, VP8BZR at Mt. Pleasant and J79T. That leaves the N. Americas and here the tally was West coast VE and Ws, KL7HF, KL7XD, NL7DU, CI7GRN for a "special" and 4U1UN. The only Australasian raised was P29KDY and some rarer Europeans completed the set.

G0LJB included contacts with CO2VG (QSL via I0WDX), EC8ASY, KA0SXL (Oklahoma), KB8HBC, N3FED, N4GSJ, UV6LJV, VE1ALZ, WA4RYB and WC7Q.

GM3JDR stuck to c.w. on this band, and his haul inluded YB6ZAP, VK2DZD, 7J7AAM, 7L8NS, LU6UO, 4J1FS, ZD7SE, SM0OIG/YN, VP5/WV5M, ZF2NE/ZF8, KM9P/KP2, LQ5A, 4M7A, FS5T, ZV4OD, V27T, N7DF/WH2, P3AA, 5H0T, VP2MU, HC2G, VS6BL, VO4MP, LU1HNL, HL1EX, BY4RSA, BY8AC, UA0ZDN, UA0FZ, KH6IJ, YB2CTW, ZX7PO, FP8DX, HC5AI, TT8CW, ZV7AA, ZD8BOB, 3D2AK, HL1AJF and YY4LB.

Another c.w. addict is G2HKU, who raised JA1NUT, K4LTA, W9OA, AP2MC, UL7RER, JA7YAB, YK1AO, JA4FMS, N3JT, JA5JTE, CM8LY, J79T, W7QK, ZX7PO, VK3XB, VK3KS and LU9DCF.

Finally The 14MHz Band

Surely most of the DX traffic usually is transacted on this band, but equally surely for once it has been eclipsed this month by 21MHz. G3NOF says he didn't have a lot of time for it with 21MHz doing so well, but the long path to VK/ZL was open most days 0600/1000Z, and Asia 1600-1800Z. Don completed s.s.b. contacts with D68CY, FH5EG, NY6M/KH2, OY/DL2SCQ, P29VU, UA0BEZ/UA1O, UA0FF, VKs, 6Z2DK and 6Z2WK.

Another s.s.b. addict was G0HCZ who notes his QSOs with K1RH/FP, OA4OS, VK3AVH, WD9HAW, 4U1UN and 6Y5DA.

G4ZMI says he had a fast rubber-stamp job with TV6TLE who was gathered to be some sort of expedition and Neil wonders what and where this one was all about; I vaguely - sign of old age! - recall something about it, but also note that TV signals have been from mainland France, such as the TV6UIT from Nice during the ITU session there. Any offers?

G0ISW stuck to s.s.b., which yielded UA9QA, UR1RWQ, VK2QK, 9K2DR, 4L1NV, VK7QH and smaller fry.

The GM4XQJ c.w. made it two way to DK8XB, HB4FF, UZ3ZWD, with an s.s.b. QSO with UA1OIL as an after thought.

After his big haul on 21MHz, G3BDQ must have been a little tired, as he only worked ZF1BD and 4U1UN on this band.

G2HKU usually has a few bites at this cherry, and the c.w. in fact bit off PA0GAM/9L, JX7DFA, 9H3KL, YV5JSS, and SV5/DJ4JBO.

Now I have the long list; this one is all-c.w., from G0LJB, and includes CM2RS (QSL to Box 1 Havana), CH3AT, EA7EEQ, KB8ARI, K2DXE, KA1MKJ, KI4TI, K1AG, KA2ZOR, N4DVE, N4KER, OH0/OZ1JVN, PP5AS, RA1CT, RA9FDW, RA3DUU/UQ (Kipsalals. QSL to Box 269, Moscow 121354), UZ9AWH, U5WF/UB9P, VO1TK, VP2MQ (QSL to W4ZFE), VE3IR, VE3FXR, VE1AUU, WB8E, WB9GCU, W2HDW, W8SSI, W9GXR, YV4DOK, 4N7N, 4L1NV in Antarctica and all the usual shoals of smaller fry.

Two-way s.s.b. from GM3JDR accounted for JW5E and 4J1FS, while the c.w. was responded to by ZL4DU, UA0CIM, VK5MD, UZ0KWT, UA0FM, TV6ACO, VP2EXX, HC2OG, PY1GCW/PQ2, VK5QJ, FS5R, FS5T, 4J1FS, P3AA, FV4ITU, VK5QJ again, YN3CC, VP5/WV5M, AL7H, LQ5A, ZX2A, RH8AA/RH0, RD8/UZ3QWX, XM1ASJ, UA0LH, VK2BDS, VO4AW, VO5AC, KH6IJ, HX6JUN and KL7KJ.

Comments

G0LJB is a new contributor and wonders how I want the information presented. I'm not too fussy in fact, just so long as I can read the writing and in particular the callsigns. Some people set everything out in tabular form, others just send in Xerox copies of log pages, although the latter method is vastly improved if you mark-up the contacts with coloured pencils so I can read and transfer the information quickly. The sort of thing I mean is to use a red tick by each 14MHz QSO, orange for 21MHz, blue for 28MHz, and so on. After all, if one leaves out the real rarities such as a genuine ZA (!) what comes into the semi-rare and worth reporting depends on your own views. For example you may not normally consider east coast Ws worth a mention with the Big Rig, but if you get a reply from there with your one milliwatt QRP rig it will make your day and seem well worth reporting. Don't forget that every Old-Timer with 300-plus countries scored was once a novice having his first QSO, and that his concept of rarity has changed continuously as the years have gone on.

GM4XQJ (Falkirk) makes a valid point when he asks that people who call CQ QRP do make sure they are inside the accepted QRP limits of five watts c.w. or ten watts s.s.b. Brian often goes back to a CQ QRP call only to find when the QSL card comes home that the guy has twenty watts or so which hardly comes into the QRP classification. As he says, most QRPers are looking for two-way QRP contacts.

If I might add one of my own, on s.s.b. the people who totally fail to give their callsigns clearly and completely. In a pile-up a shortened call is a good way of getting your QSL back marked "not in log" and outside the pile-ups the tendency to gabble a call is increasing yet.

VHF Up

David Butler G4ASR
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The 50MHz Band

For dedicated operators that had the patience to sit by their rigs for a considerable number of hours each day, the month of July produced some quite interesting DX. However, to the casual listener, the band appeared to lack the number of Sporadic-E openings that have been enjoyed in previous years. In reality the band was open from the UK to CX, JA, KP2, LU, VE, W, ZD8, ZS and Z23. Five out of the six continents required for the WAC award were actually worked by a number of stations.

In previous months I may have given the impression that the best location for 50MHz DX working is on the south coast. This may be true to some extent, but it is pleasing to start this month with a report of DX worked by **Calum MacPherson GM0EWX** located on the Isle of Skye (IO67). On July 22, between 1226 to 1315UTC, contact was made with 21 x Ws and 5 x VEs in locators EL87, EL96, EL98, FN41, FN43, FN53, FN56, FN74, FN84, FN86 and GN37. At 1339UTC, a solitary KA1PE was worked. In the early evening, commencing at 1712UTC, Calum caught an opening to Southern Africa. Contacts on s.s.b. were made with ZR6A, ZS6LN, ZS6WB and ZS6XJ, the final African signals fading out at 1725UTC. Thirty minutes later, the band opened up to South America. This incidentally was a trend particularly noticed in recent months. The band would first open up to Africa, signals would eventually disappear and then approximately 30-45 minutes later the band would become open to South America. Calum, having recognised this feature, stayed on the band and worked CX4HS, CX8BE, LU2DEK, LU3DCA, LU4DMX, LU6DLB and LU9AEA, all between 1755 to 1915UTC.

Because of the geographical selectivity that often occurs on 50MHz, Calum had the band to himself and consequently was able to have rag-chews with most of these stations. On July 27, history repeated itself and Calum was able to enjoy yet another opening to both continents. Jack, ZS3KC (JG77) was worked at 1759UTC, followed by a contact with ZS3E (JG89). From 1835UTC, QSOs

were made with CX4HS (GF17), LU2EIO, LU7DZ and LU9AEA, all in locator GF05.

Tim Anderson G0GTF (SXE) writes that he has been on the band for 9 months with an FT-757GX driving an RN Electronics transverter to a 5-element Yagi. Tim makes mention of those moaning that they can't compete or work DX with legal power. He admits it all takes time and patience but in a very limited period he has worked 29 countries and 76 squares.

Another station echoing these sentiments is **Bill Biltcliffe G6NB** (OFE). He has had quite a lot of fun by just using the 1W driver stage of a new transverter. Many G and GW stations have been worked, the best contacts in July being 599 from T77C, 59 from TK/HB9CXZ and 569 from 9H1CG. Bill's country score now stands at 30.

Ela Martyr G6HKM (ESX) managed to work 10 new squares and 2 new countries in July. Two Greek stations, SV1EN (KM18) and SV1DH (KM27), were worked on July 6. A contact with 9H4W produced a surprise for Ela, assuming incorrectly that the locator would be JM75. 9H4W turned out to be situated on the Island of Gozo, in JM76. Further sporadic-E contacts in the month included FC1AOB (JN16), FC1BYM (IN94), F6CQK (JN13), TK/HB9CXZ (JN41), TK/PA0ERA (JN42), PA3DYY/MM (JN11), OH1VR (KP11), OH6ARJ (KP33) and OH8MT (KP24). My list from the French Radio Society, REF, indicates that two of the stations worked did not have permits for 50MHz, and neither for that matter, did one of the stations on Corsica. It is all becoming very confusing and giving the RSGB VHF Awards Manager, G4OUT, a major headache!

Paul Feldham G7CFK (MCH) has recently constructed a *PW* Speech Processor and reports that it is working fine. It was his first attempt at electronic construction. Well done, Paul. Presumably, it helped him to make the following crossband contacts with DL0MT (JN48), EA3ALV (JN11), EA3MD (JN11), EA5KF (IM99), F/G4JCC, I2CVC and OE6JDG/6 (JN76). The force wasn't quite with Paul on July 17, when the band opened up to North America. Signals were quite weak and all exhibited rapid deep fading which stopped any serious attempts at contact. Stations heard around 1830UTC included K1GPJ, KA1MFA, KA1KVB, W2CAT/1, K4ZKU, N4MM and VE1YX.

July was a pretty unexceptional month at the QTH of **G4ASR** (HWR). Even so, a number of new countries were worked. At 1730UTC on July 7, many Finnish stations were heard working into Uruguay. It was approximately 90 minutes later that CX4HS (GF17) was heard. Signals were initially weak but built up to 59+ to stay at this level for about half an hour. Alberto was copied for just under one hour before signals faded at 1957UTC. It was a surprise to hear TK/HB9CXZ (JN41) during the evening of July 12 booming in at 59 on s.s.b. The good news with this one is that it looks likely that the station did have a permit for 50MHz. I had to resort to meteor scatter to work GB4XT (IO79) on July 14. Reflections weren't brilliant but the s.s.b. contact was completed within 10 minutes.

Having missed the opening to the USA on July 17, I made a determined effort to be available during the next evening. Sure enough the band opened up, but this time it was to Uruguay, South America. From 1810UTC, for just under 2 hours, CX4HS was heard on s.s.b. peaking 59. SV1DH (KM27) was worked on July 22, at 1315UTC and at 2110UTC. In both instances he was heard calling CQ and getting no replies. Conditions on July 27 were most rewarding. The band opened up at 1715UTC with ZS3VHF becoming audible, growing quickly in strength to 579 and remaining in for 45 minutes. Mal, Z23JO (KH52) was heard between 1725 to 1738UTC, being worked at 1733UTC, 59 both-ways. As Z23JO faded, so ZS3KC (JG77) appeared out of the noise. He finally disappeared at 1800UTC. Fifteen minutes later the first of the South American's were heard. Between 1815 to 1950UTC, LU9AEA, LU7DZ and CX4HS were copied on s.s.b. peaking S9. As CX4HS faded into the noise, so the beacon LU1MA (FF57) on 50.0865MHz was heard. It peaked 569, pretty remarkable for a 11 370 km path length. In another opening on July 31, Mal Z23JO was heard again, this time on c.w. around 1730UTC.

Invalid contacts were made with F/PA0ERA (JN09) on July 2 and with the same station signing as TK/PA0ERA (JN42) on July 21. In both instances no permits for 50MHz operation had been issued and therefore these contacts cannot count for award purposes. In a similar vein, a number of stations were duped into thinking that they had worked Cyprus, by contacting 5B4LP, around 2100UTC on July 5. This station was obviously a pirate. The real 5B4LP does not operate on 50MHz. Some potentially good news was received with the QSL card from G3GJQ/5N0. Roy is hoping to obtain documentation to authenticate his 50MHz operation from Nigeria. Until such documentation is received, contacts with this country cannot be claimed for awards.

Bob Nixon G1KDF (LNH) managed to winkle out some of the real DX on the band. On June 28, at 1910UTC, ZB2BL was heard putting a good signal into the UK. Jimmy was very active a few years ago on both 50MHz and 70MHz and it is pleasing to hear that he is back on the bands. Other contacts made during the month included ZB0D on July 16, HB9CXZ/TK, FD1NLQ/7X and T77C. The good South American opening on July 23, between 1755 to 1945UTC, gave G1KDF contacts with CX4HS (GF17), CX8BE (GF15), LU1DMA (GF05), LU2EIO (GF05), LU8YYO (FF50) and LU9AEA (GF05).

Station	50MHz Counties	50MHz Countries	70MHz Counties	70MHz Countries	144MHz Counties	144MHz Countries	430MHz Counties	430MHz Countries	1296MHz Counties	1296MHz Countries	Total Points
G1SWH	57	26	60	6	87	19	56	6	—	—	317
G6HKM	56	27	—	—	75	27	38	14	23	7	267
G8LHT	47	14	20	4	67	26	32	11	3	1	225
G0IMG	65	23	38	5	50	10	25	5	—	—	221
G6NB	54	30	—	—	55	15	22	3	—	—	179
G1DOX	27	3	39	6	57	13	24	3	4	1	177
G4XEN	21	-9	13	2	63	21	33	9	—	—	171
GW6VZW	57	20	—	—	71	18	—	—	—	—	166
G8PYP	27	16	—	—	48	25	19	9	—	—	161
G4ZTR	10	12	35	6	54	23	14	5	—	—	159
G4LDR	43	10	—	—	31	11	28	8	—	—	131
GM4CXP	28	11	4	1	61	19	4	2	—	—	130
GM1SZF	33	11	—	—	57	16	5	6	—	—	128
G0EHV	—	—	44	5	62	16	—	—	—	—	127
GD4XTT	34	8	—	—	49	10	11	4	—	—	116
G0EVT	23	19	—	—	33	26	6	6	—	—	113
G8XTJ	36	13	—	—	49	11	—	—	—	—	109
G1VJP	15	4	—	—	74	12	—	—	—	—	105
G0FYD	—	—	—	—	82	22	—	—	—	—	104
GW1MVL	—	—	—	—	62	20	3	4	—	—	89
G1TCH	17	14	—	—	34	12	—	—	—	—	77
G7CLY	—	—	—	—	57	14	4	1	—	—	76
G3EKP	25	11	12	2	12	7	1	1	—	—	71
G3FPK	—	—	—	—	51	19	—	—	—	—	70
G4VOZ	—	—	41	6	—	—	17	4	—	—	68
G7CFK	40	24	—	—	—	—	—	—	—	—	64
GW4HBK	—	—	44	6	—	—	6	2	—	—	58
G1GEY	4	2	—	—	—	—	34	8	2	2	52
G0HGA	—	—	—	—	32	11	—	—	—	—	43
GM1ZVJ	4	3	—	—	22	11	—	—	—	—	40
G4AGQ	—	—	12	2	7	7	6	3	—	—	36
G6MXL	2	1	4	1	7	4	8	5	—	—	33
G0HOZ	—	—	—	—	25	4	—	—	—	—	29
G1CEI	—	—	—	—	14	4	—	—	—	—	18

Annual v.h.f./u.h.f. table. January to December 1989

The 70MHz Band

VHF NFD provided a number of operators with the opportunity to catch up on their country and county scores. Among the contest stations active were EI2WW/P, GD0IOM/P (IOM), GI4ONL/P (LDR), GI8RQI/P (DWN), GJ7AOG/P (JER), GM4RZW/P (SCD), GM3WOJ/P (DGL) and GM0FRT (GRN).

Mervyn Rodgers GM0GDL (CTR) reports on a one day portable excursion into Central Region to activate this rare area. The team members included GM0GDL, GM0GMD and GM0LWD. The group gave contacts to 28 x G, 3 x GW, GM and EI. All stations worked should thank G4SEU and G4WND for the loan of equipment and the guile to talk the group into going out for the day.

Gerry Schoof G1SWH (LNH) used the increase in activity during VHF NFD to boost his county scores tremendously. 15 new counties were worked during the contest and 2 others were picked up after the event, bringing his total at the end of July to 60 counties and 6 countries.

Ron EA7IC/4 (IN70) has frequently been heard working into the UK via 28/70MHz crossband. Your scribe worked him at 1540UTC on July 13, when the conditions on 50MHz could best be described as intense.

The 144MHz Band

Tropospheric conditions were good during the first week or so of July. The period between 4th - 7th was particularly good with many operators working into Scandinavia and Germany. Although the 144MHz Sporadic-E season has generally been poor this year, there were a number of openings during the latter part of the month, which enabled the more alert operators to pick up a few new squares and countries.

Bill Stockley GM6RGN (SLD), reports on a brief Sporadic-E opening on July 15, working EA2LY (IN80), EA2AGZ (IN91) and EA2LU (IN92), between 1439 to 1506UTC.

Way up on the north coast of Scotland in IO78, **John Lincoln GM0JOL** (HLD), normally encounters days when no signals can be heard at all. The recent lifts in propagation have allowed John to work into Germany and Holland. John reports that the GB4XT expedition worked all 3 stations resident in IO78 square; GM0JOL, GM4NGY and GM7ASN.

Mervyn GM0GDL (CTR) has discovered a hill to the south-west that enables him to work stations to the north of his location. Contacts via this natural reflector have included GM0EWX and GB4XT. On the true beam heading, tropo contacts have been made with 5 x OZ in JO46, 3 x SM in JO66/J067, 2 x DL in JO53/54, EI7M (IO52) and LA8AK (JO37).

Stephen O'Malley G7ANV, (NLD), had the thrill of hearing his first Russian station during the Sporadic-E opening on June 17. UB4EWP in KN88 was copied at good strength, but the UB was working the stronger stations in Germany and Denmark at the time. Other contacts via Es in June included I, IS0, YU and LZ. On the tropo front, wet square contacts were made with GW0KZG/MM in JO05, 14, 15, and with LA0DT/MM in JO04 and JO06. Stephen, who runs 10W from a Trio TR9000 into a 9-element Yagi, also worked LA1T, EI9GJ/P (IO54), GB4XT (IO79), LA1YCA (JO38), LA1BM (JO29) and SM4IPX (JO79).

A little further to the south, we come to **Ian McCabe G0FYD**, located in Blackpool. Ian uses an Icom 290H, Microwave Modules 50W amplifier and 15-element Yagi at 10m, the QTH being 3m a.s.l. Many new counties and squares were worked by utilising both VHF NFD at the beginning of July and the good tropo in the following weeks. Contacts during the weekend of VHF NFD included EI4GRC/P (Galway), GJ1TJP/P (JER), G3SFG/P (HPH), GM1JLP/P (BDS), G8LNC/P (IOW) and G4VCJ (CVE). Between July 8-9, the lift in conditions allowed contacts to be made with LA1T, LA6HL (JO28), LA1BM (JO29), OZ1JWE (JO46) and GW0KZG/MM (JO04). On July 16, after many hours of trying, GB4XT was worked on c.w. for a new square. Ian remarks that the signals from GB4XT were very weak for the first few days of the expedition, but improved during the last two days. The path to the south-west from Blackpool is quite torturous and Ian was therefore very pleased to have worked G/PA3BAS in IN79, on July 22, for a new square. The Sporadic-E opening on the same day didn't favour Ian's QTH but he did hear EA6FB popping out of the noise.

John Hoban G0EVT (YSW) certainly put his station to good use recently. Running a Trio TS780, driving a pair of 4CX250Bs into a 14-element Yagi, he made the most of the available propagation modes. Sporadic-E accounted for many new squares. In the event on June 10, between 2052 to 2357UTC, QSO's were made with 10 x YU and 3 x I stations. One week later on June 17, John worked HG, 3 x I, 2 x IS0, 4 x LZ, 2 x YO and 5 x YU, all between 1709 to 2029UTC. Another Es opening on July 12, between 1800 to 1809UTC, gave s.s.b. QSO's with IW8BZN and IC8BNK. John picked up two wet squares, JO14/15, on July 3, by working Andy Adams GW0KZG, aboard the Royal Research Ship *Challenger*. The enhancement in propagation to the north-east of Europe, allowed tropo contacts to be made with LA1BM, LA1T, OZ1BUR, OZ1KLU, OZ7JR, SM6KKX, SM6EHY and SM7FWZ.

Dave Glover G1VJP (MSY), was pleased to work GM1SMI (OKE) before the pile-up began on aurora. Dave would like to take this opportunity to thank Bob and the numerous others who activate these rare locations, sometimes risking life and limb, not to mention the "flack" they must get from their XYLs. Recent DX worked by Dave has included IC and YO via Es, whilst tropo accounted for contacts with EI4GRC (IO53), GJ7AOG, GW0KZG/MM and G6EBH/MM (JO04).

Station	Band (MHz) 1296	430	144	Total
G3IMV	48	124	412	584
G4KUX	—	120	372	492
G3UVR	82	135	246	463
G4RGK	50	124	284	458
GJ4ICD	59	119	262	440
G0DAZ	27	128	277	432
G3XDY	89	147	196	432
G3JXN	87	134	179	400
G1EZF	—	93	263	388
G4XEN	—	111	274	385
G6DER	78	110	183	371
G6HKM	45	107	210	362
G4RRA	—	80	255	335
G3COJ	44	103	186	333
G4DEZ	48	37	248	333
G4SSO	—	93	229	322
G4FRE	72	146	102	320
G1KDF	37	102	180	319
G4TIF	—	110	200	310
G4DHF	—	—	307	307
G1EGC	23	80	198	302
G8HHI	38	110	148	296
G1LSB	—	139	150	289
G6MGL	59	89	141	289
G8PNN	63	98	128	289
G4NBS	63	105	119	287
DL8FBD	—	—	280	280
G8ATK	45	91	143	279
G4MUT	31	93	153	277
G4PCS	—	3	258	261
G1GEY	11	77	168	256
G3NAQ	—	80	175	255
G8LHT	6	85	164	255
G0EVT	—	57	197	254
G6DZH	—	87	154	241
G4IGO	—	—	238	238
ON1CAK	—	33	204	237
G3FPK	—	—	236	236
G0EHV	—	75	160	235
GM4CXP	—	31	198	229
EI5FK	—	56	172	228
G6STI	24	69	130	223
ON1CDQ	—	32	182	214
G4MEJ	—	—	213	213
G8LFB	—	—	209	209
GW4FRX	—	—	204	204
G8MKD	—	49	150	199
GJ6TMM	—	48	151	199
G4YCD	—	—	197	197
G4DOL	—	—	186	186
GI1JUS	—	—	181	181
G4ZTR	30	45	89	174
G1SWH	—	49	118	167
G7ANV	—	—	153	153
G6MXL	16	45	91	152
G4AGQ	1	42	104	147
GW6VZW	—	6	138	144
G1WPF	—	29	97	126
G0FEH	—	24	101	125
G0FYD	—	—	121	121
G8XTJ	—	—	116	116
G1IMM	—	17	98	115
GW1MVL	—	20	95	115
G8PYP	—	19	95	114
GM0HBK	—	—	107	107
GI4OWA	—	—	103	103
GM0GDL	—	22	81	103
G1TCH	—	6	88	94
G1SMD	—	—	93	93
G6MEN	4	26	63	93
G4WHZ	7	—	76	83
G1DOX	4	11	61	76
G0HEE	—	—	73	73
GU4HUY	—	—	73	73
G1CEI	—	—	68	68
G0HDZ	—	—	64	64
G0ISW	—	12	52	64
G1NVB	—	—	58	58
GM0JOL	—	—	47	47
G2DHV	2	7	33	42
G7CLY	—	—	38	38

QTH Locator Squares Table.

At the QTH of G4ASR (HWR), tropospheric conditions were good, particularly between July 4 - 8. Medium haul contacts were made into SM, LA and OZ, both on 144MHz and 432MHz. An interesting contact, on July 16, was made with F6BQX/P, working in the CQ WW VHF WPX contest. The group were located in IN86, a pretty rare locator, consisting mainly of water. Thanks to an effective telephone warning chain, I caught the early morning Sporadic-E opening on July 22. In 5 minutes, commencing at 0730UTC, s.s.b. contacts were made with I0PSK, I0XKD, IW0AKA, IW0BZJ, I1KTC, I2SRR, I5EUS, IK5EHR, IW5BBH and IW5BHY. After a lull of 7 minutes, YU2CCB (JN85) appeared briefly, being worked at 57 both-ways. At 0753UTC, UO5OX (KN46), at a distance of 2380km was copied at 55, but the pile-up was too intense to make a contact. Signals from the Five Bells Group, GB4XT, were very weak for the whole duration of their expedition. Unfortunately, the 850km path was in the no-man's-land of too far for a reliable tropo contact under the prevailing conditions, and too near for a meteor scatter contact. Before I receive letters on this latter point, I will point out that my 18-element Cushcraft Boomer is 25m a.g.l. and consequentally performs far better on m.s. at 2000km than 850km. A smaller antenna, at a lower height, possibly with some elevation, will give far superior meteor scatter results for contacts under 1000km. Some years ago I made some very short range m.s. contacts, under 600km, by placing the rear end of a 9-element Yagi on the ground and propping it up, at an angle of 45 degrees, with a piece of wood. Reflections were quite spectacular. Try it. It really works!

Located in Worcester, Co**llin Mister G0DAZ**, is usually never far away from the DX. On July 13, he worked, via Sporadic-E, EA5GZ, EA5MR, EA5OE, EA5YB, EA6VQ, OK1MC and 9H1GB. Between 0723 to 0745UTC, on July 22, Collin made s.s.b. QSO's with YT3ET and 18 Italian stations in JN45/52/53/54/61.

Those of you that caught the early morning Es opening on July 22 may well have thought that it started around 0720UTC. In fact, things were bubbling away nearly one hour before this, as the report from Craig Cameron G1EHX, will testify. Between 0635 to 0645UTC, s.s.b. contacts were made with HG8ET (KN06), OE3OKS (JN86), OE5OLL (JN68), YU7EW (KNO5) and YU2CCB (JN85). The next phase started at 0720UTC and lasted 25 minutes. Further QSOs were made with I4MKN, IK5EHR, IW5BBH and IW5BHY. Most certainly the case of the early bird catching the worm.

G6HKM (ESX), worked two wet squares by contacting GW0KZG/MM in JO05 and GD8EXI/MM in the Irish Sea. On the Sporadic-E front, QSO's were made with YT5G (KN11) on July 6, and EA5DIT (JM98), EA7CVD (IM86) on July 13. Ela reckons the best day of all was July 28 when GB4XT was worked at 1829UTC. The specified frequency had been monitored for many hours before contact was made. Dedication pays off in the end.

Another YL operator, **Angie Sitton G0HGA** (HFD), writes about the changes to the system which she is intending to carry out soon. Plans are afoot to buy an amplifier to give an increase in power output, but more importantly, an improvement in the antenna is expected to be implemented later in the year. Angie says that the "CW" ladder boys had better look out once she really gets going! Running 10W into a 4-element Yagi, 171 separate stations in 11 countries have been worked on c.w. by mid July. One recent contact was with GD0ELY, the XYL of GD4XTT.

The Sporadic-E opening on June 17 gave **Philip Lancaster G0ISW** (LDN) a

number of new locators. Using 100W and a 13-element Yagi he made s.s.b. contacts with HG8QG (KN04), IK8DYD (JN71), I0AMU/0 (JN61), IS0AGY (JM49),LZ1WL (KN12), LZ2WY (KN23), YU1CF (KN03), YU7ACO (KN05) and YU7AU (KN04).

Despite being away on holiday, **Ian Wright GW1MVL**, kept tabs on the band by operating mobile from various WAB squares. A postcard from sunny Devon gave details of some of the medium haul s.s.b. contacts made around the UK, with just 10W and a vertical whip.

The 432MHz Band

A report from **Paul Brockett G1LSB**, shows just how good the band can become during these periods of good tropo propagation. From his QTH in Lincolnshire, Paul recently worked GM4IPK (IO99), 2 x DL, 5 x OZ, 14 x LA and 11 x SM. Some of the more interesting contacts included SM6CEN/M (JO66) and SM6EUP/M (JO67).

Despite not having a 432MHz antenna, John G0EVT (YSW) was still able to work LA1T on July 8 for a new country and square. Enterprisingly, he used his 144MHz Yagi and, although it was not a perfect match, was still able to squeeze a few watts out of the TS780 to make a contact.

Dave Brown GD4XTT has finally got his 430MHz beam aloft, but unfortunately the wrong "N" plug was acquired for the H100 feeder. By the time you read this, Dave should have sorted out that problem and will be radiating a much stronger signal on the band.

Pat Billingham G4AGQ (SRY) mentions that he is unable to get on the air during the week and finds it difficult to make spare time at the weekends. Pat was therefore very pleased to work F2JR/P (JN03) during a recent French contact, for a new a new locator square on the band.

Working GM on 432MHz is quite an event for G6HKM, but Ela picked up GM4TXX/P and three new counties during the VHF NFD weekend. On July 16, a QSY from 144MHz with Bob G4VCJ gave a contact with Cleveland, a rare county on any band for those located in the south of England.

GM0GDL worked GD6ICR (IOM) on July 10, for a new square and country. Mervyn still requires many squares in southern and central England. Perhaps someone would like to contact him (QTHR) to arrange schedules.

G0ISW runs an unusual, but obviously effective antenna system, comprising of 16 phased dipoles. Feeding this arrangement with 10W from an FT-767, Philip made contact with DJ9RX and DL5BAW, both in JO43 square.

The Microwave Bands

Tropospheric conditions have been quite exceptional at times this summer. One such opening occurred during the evening of July 7, when a group of amateurs were operating from a lighthouse on the Norwegian coast. Using the callsign LA1T, they were copying GB3MLE on 10.4GHz. The beacon, running only 1W e.r.p. to sectorial horns beaming north/south, was copied at good strength over a 700km path.

July 1-2 wasn't blessed with good conditions, but the attraction of all those stations out portable for VHF NFD was too much for G6HKM (ESX). A total of 8 new counties were worked, including Essex for the first time this year. An incomplete QSO meant that GM4BYF/P was a regrettable getaway. As Ela said, you can't win them all!

Annual c.w. Ladder

	Band (MHz)				
Station	**50**	**70**	**144**	**430**	**Points**
G4ASR	78	-4	248	-1	331
G4OUT	—	19	155	—	174
G0HGA	—	—	171	—	171
G4XEN	-7	—	144	-9	160
GM4CXP	29	-1	114	-1	145
G0FYD	—	—	-67	—	67
G3FPK	—	—	-32	—	32
G0FYD	—	—	-31	—	31
G4VOZ	—	27	—	-4	31
G4AGQ	—	10	-11	—	21
GD0ELY	-1	—	-14	—	15
GW4HBK	—	15	—	—	15
GW4VVX	—	—	—9	—	9

Number of different stations worked since 1 January 1989

Gordon Emmerson G8PNN (NLD) made use of the good conditions by working, on 2.3GHz, OZ1JXY (JO46) and DG4BB (JO43), taking his total for the band to 8 countries, 29 squares and 17 counties.

Jack Brooker G3JMB recently ran some tests with G8LSD between Lizard Point, Cornwall to Beachy Head, Sussex on 10GHz. Although the weather was fine, no signals were heard over the 395km path. More luck was had during a recent microwave cumulative contest. Jack worked a total of 16 stations on both wide-band and narrow-band modes, the best DX being F8WN/P (IN99) at 172km.

Activity on the 24GHz band appears to be on the increase. A survey by the RSGB Microwave Committee indicates that over 30 operators are now active on the band.

Any "microwavers" that just happen to be in the Dallas/Fort Worth area between October 5 - 8 may be interested to know that the North Texas Microwave Society are hosting the 1989 Microwave Conference at the Flagship Inn, Arlington, Texas. The Flagship Inn is located at RT.360 and I30, only minutes away from DFW Airport. The technical programme will include WA5WCP on laser communications, WA8NLC on MMIC multipliers and 2.3GHz transverters, WA5VJB on 10GHz EME, AA5C on microwave equipment construction, K5SXK on dish feeds for the microwave bands, K5ZMJ on microwave ATV, K9MK and KF5N on high power solid state amplifiers, VE4MA on high power 2.3GHz amplifiers, W0PW and K0RZ on microwave propagation and KD5RO on microwave EME with a 3m TVRO dish. Sounds like it's going to be a great time. If you can't make it to the conference, it will be possible to obtain published proceedings of the technical programme from the ARRL.

Beacon & Repeater News

A new beacon GB3CTC, located near St. Austell (IO70) was switched on at 2000UTC on July 12. It runs 45W to a dipole beaming SW/NW on 50.0425MHz. Within the first hour of operation it had been heard in CT, DL, EA, T7 and 9H. By the next day, it had been heard in Africa and North America. Thanks are extended to members of the Cornwall Beacon and Repeater Group for constructing, installing and maintaining this series of beacons.

The first 430MHz beacon in Eire has recently come on the air. Signing EI2WRB it is co-located at Portlaw (JO62) with the 144MHz beacon which uses the same callsign. The beacon, on 432.870MHz runs 50W to a 5-element NBS Yagi beaming south-east. Reports would be welcomed by EI8GO.

The Swansea 144MHz repeater GB3SA on channel R3 is now back on the air from its new site following some initial EMC problems. The beacon keeper GW4RXO, would welcome reception reports.

The south London 144MHz repeater, GB3SL, was recently closed down for a 28 day cooling-off period following extensive abuse by a few of its users.

The Department of Trade and Industry has recently licensed a number of new packet repeaters on 70MHz and 1.3GHz. In addition to this a number of 430MHz packet radio stations, mostly mailboxes, have been approved. It is hoped that these will clear the congestion on and around 144.650MHz. The county of Derbyshire has been rewarded with a number of new units. They are GB7CD at Bolsover, details from G6ANN and GB7RP at Wirksworth, details from G0CXD. The Matlock mailbox GB7DAD recently received DTI clearance for its 432.675MHz port and is now active. Further details from the sysop G3MME. Haywards Heath in Surrey now has a 430MHz repeater on channel RB5. Further details can be obtained from Clyde Hinton G1TCH.

It was a pleasure to receive a letter from the Secretary of the Gibraltar Amateur Radio Society, Jim Watt ZB0D. Contrary to my report in the July column, reports of reception of ZB2VHF on 50MHz and 70MHz should go to Jimmy Bruzon ZB2BL and not to ZB0D. The beacons are now operating from a site very nearly at the highest point of the rock of Gibraltar at 420m a.s.l. A packet repeater ZB2BU on 144.675MHz is operational from the same location which provides a good coverage up the coast, linking EA7H in Huelva to the west and EA7B at Almeria to the east. Jim's main interest is in data communications but as earlier reported is also active on 50MHz. He thinks he may have confused a few operators with the ZB0 prefix which is the Gibraltar equivalent of the UK class B licence.

Expeditions

Claus Floesser DL2GBT, will be active on 50MHz using the callsign 9H3EH between September 21 to October 19.

QRZ Contest!

Sept 9-10 IARU Reg.1 FSTV 1800-1200UTC

Sept 9 24GHz cumulative 1500-2100UTC

Sept 10 10GHz cumulative 0900-2100UTC

Sept 17 70MHz Trophy 0900-1600UTC

Sept 24 AGCW-DL 144MHz cw 1900-2300UTC

Oct 7-8 IARU 432 - 24GHz 1400-1400UTC

VHF Tables

Just a reminder that I will be introducing, in January, an all time 144MHz QRB table detailing furthest distances worked via Tropo, Aurora, Sporadic-E and Meteor Scatter. Because of the lead times involved please start sending me your results now, and certainly by the November cut-off date, so that the table can be successfully launched.
Also in January, I will be integrating the 50MHz and 70MHz bands into the locator squares table.

THE NEXT THREE DEADLINES ARE SEPTEMBER 27, OCTOBER 31 & NOVEMBER 28

RTTY

Reports to Mike Richards G4WNC
200 Christchurch Road, Ringwood, Hants BH24 3AS

DX News

A very interesting DXpedition to the Pacific is taking place between October 19 and November 23. The team will be led by OH1RY with OH2BGD operating the RTTY station. The locations and callsigns to be visited are: Vanuatu (YJ0RY), Fiji (3D2VV or FW0?) and Conway Reef (3D2RY). I don't at present have the QSL details, but I will include them in the column as soon as I find out.

BARTG Changes

Pat and John Beedie who have been responsible for membership, components and publications are retiring from this post on November 4 this year. This will obviously leave a significant gap which will effect all BARTG sales. This gap is being filled by three people as shown here:

Membership Secretary
Ann Reynolds G6ZTF
169 Bell Green Road,
Coventry,
Warcs CV6 7GW

Components and Software
Ted Hatch G3ISD
147 Borden Lane,
Sittingbourne,
Kent ME10 1BY

Publications
Peter Addams G6LZB
464 Whippendell Road,
Watford,
Herts WD1 7PT

The changeover to the new addresses will take effect from 4 November 1989.

Software Index

One of the common problems facing newcomers to the hobby is how to get started with regard to what computer or software package to buy. In view of this, I thought it would be useful to bring together some of the more common packages so as to make the choice a little simpler. Probably the easiest way to handle this is to start with the sources of software and highlight the computers that they cover.

Technical Software

This Welsh based company has been supplying data transmission and reception programs for some time and has built-up a very good reputation. For receive only use the RX-4 has proved to be very popular and supports RTTY, c.w., SSTV and AMTOR.

One of the main attractions of this program is that it does not require a separate terminal unit, the tone decoding being carried out in software.

The performance can be enhanced by fitting the TIF1 interface, which provides some input filtering. The RX-4 program and TIF1 interface are avaiable for the following computers: BBC, Commodore CBM-64 and Spectrum.

If you are a really keen listener then the RX-8 may be for you. The RX-8 is a combined hardware and software package which runs on a BBC computer. As the name implies, the package features eight modes - RTTY, ASCII, c.w. SSTV, AMTOR, FAX, Packet and UoSAT 1 & 2 . The features are too numerous for me to be able to do it justice here so if you're interested contact Technical Software.

For the transmitting amateur the only suitable program is the TX-3 which features RTTY, c.w. and ASCII transceive with all the normal features such as split screen, type ahead buffer and user memories.

Although this program uses a software interface, rather like the RX-4, an external terminal unit or TIF1 interface is still required to control the transmission and provide the audio transmit tones for connection to the microphone socket.

For prices and further details of these products the address is: Technical Software, Fron, Upper Llandwrog, Caernarfon LL54 7RF, Tel: (0286) 881886.

J & P Electronics

This is another well established company with a good reputation for after sales service. They have developed a very comprehensive range of software covering most of the common home computers.

If you are a Spectrum owner they have separate programs for RTTY, c.w. and SSTV receive only or transceive with the receive only programs being cheaper of course. For a combination of all three modes the RMS-3 program is very good value for money. These programs use a software interface so saving the cost of a full terminal unit. The only exception being the RTTY programs which need either a filter unit or a separate terminal unit. Suitable filter units being available from J & P at a very reasonable price. If you're interested in FAX transmission and reception there are two very popular programs available. For receive only the only additional equipment required is a drum speed generator to provide accurate and stable timing signals. This of course can be supplied by J & P. The transceive package was reviewed in this column last month and requires a different hardware module. This provides the transmit tones and p.t.t. switching in addition to the drum speed generation.

The Commodore range of computers are also catered for with c.w. receive only programs for the C16 and +4. This is augmented by c.w. reception and RTTY receive or transceive for the VIC20 and C64. All of these programs need the J & P c.w. interface for c.w. and a tone demodulator for receive only RTTY or a full terminal unit for transceive.

MSX computers didn't really catch on in the UK so are often available quite cheaply. J & P have a c.w. receive only and RTTY receive or transceive programs for these types of computers. These programs do not use a software interface so a c.w. interface and RTTY filter unit or terminal unit will also be required.

The only Sinclair computer catered for is the ZX81 where there are programs for c.w. and RTTY reception. The c.w. program does not need an interface, but for RTTY a filter unit is essential.

The Amstrad 464/6128 range are catered for with RTTY and c.w. receive only programs which require the c.w. interface and a RTTY tone demodulator.

The BBC B, Dragon and Atari computers have c.w. receive only programs available all of which need the c.w. interface.

Finally, there is a SSTV receive only program for the Atari 520/1040ST range of computers. This package needs a dedicated interface which is supplied complete with the approprite leads.

In addition to these software packages J & P can supply a range of hardware accessories to aid the data operator.

For more information contact: J & P Electronics, Unit 45, Meadowmill Estate, Dixon Street, Kidderminster DY10 1HH, Tel: (0562) 753895.

ICS Electronics

This company specialises in data communications, particularly hardware devices such as inteligent terminal units and packet t.n.c.s. One very interesting item in their range is the AMIGA-FAX. This package enables the transmission of and reception of FAX images with a resolution of 640 x 400 (256000) dots with 16 grey levels. This is very high resolution for an amateur computer-based system. In addition the software allows images to be manipulated quite extensively prior to transmission and after reception. The complete package comprises a hardware interface which plugs into the parallel port, software on disk and a comprehensive manual. Please note this package is only suitable for use on machines configured for the PAL European colour system.

For more details and prices contact ICS Electronics, Unit V, Rudford Industrial Estate, Ford, Arundel, West Sussex BN18 0BD, Tel: (0903) 731101.

G3WHO

One of the most popular programs for amateurs using the BBC B and Master computers are those from Peter Harris G3WHO. There are currently two programs in the range, both of which are supplied on EPROM The main program is called the BBC AMTOR MKII as features RTTY, c.w. and AMTOR transceive. Being EPROM based the program is very easy and quick to start and features the usual split screen with type ahead buffer. One common problem with communication modes that rely on accurate timing like AMTOR is that the computers internal timing is not normally stable enough. The G3WHO program overcomes this problem by using an external 1kHz clock which has to be supplied by the user. This is not a real problem as G3LIV can supply the necessary hardware and the details are also included with the program. The G3WHO program requires the use of a full terminal unit for interfacing with the transceiver so this must be borne in mind when choosing a package.

The second package from G3WHO is a RTTY only program which includes all the features necessary for RTTY transceive but does not need an external clock, just a terminal unit.

For more information contact P.J. Harris, 10 Appleby Close, Great Alne, Alcester, Warwickshire B49 6HJ, Tel: (0789) 81377.

CRUG

This user group provides a very useful service to Commodore owners particularly those with older machines.

For PET 3000 and 4000 series machines there are EPROM based RTTY and AMTOR programs available separately. Although I'm not covering packet software in this

section, there is one packet emulator program called DIGICOM which CRUG can supply at a very reasonable price.

Details of these programs and membership can be obtained from CRUG (Sales), 22 Whiteford Avenue, Bellsmyre, Dumbarton GB2 3JT.

BARTG

Being the national organisation for amateur data enthusiasts, this group has quite a range of software and hardware available. Most of the software is handled with BARTG acting as the interface between the author and the end user. This system seems to work quite well and it certainly gives the keen amateur who has written his own software a very convenient shop window.

Dragon users are well supported with some good software from G4BMK covering RTTY, c.w. and SSTV. All of these are cassette based so can run on the most basic machines which, incidentally, are often available very cheaply at rallies.

On the Commodore front there are G4BMK RTTY programs for the VIC-20, C64 and C128 ranges and c.w. for the C64/128.

Electron users will be pleased to note that a RTTY program is available from BARTG for this poorly supported computer.

The only BBC program in the range is the RTTY routine by G4TGJ.

Finally the Amstrad PCW8256 and 8512 computers have some limited support from a program by G4EVS. Though readers should note that the original versions at least, did not include a type ahead buffer.

I have heard reports that BARTG have a RTTY program for IBM compatible computers, but it has yet to appear in their shop window, so maybe its not quite ready yet - watch this space for more info.

In addition to these software packages BARTG can supply a wide range of hardware including interfacing leads to make starting a RTTY station simplicity itself.

For details of items in the shop window and membership see the item in this column giving details of the new BARTG addresses.

Pearsons Computing

John Pearson (G1FTU) specialises in amateur radio software for the Spectrum computer and features transceive packages for RTTY, c.w. and SSTV.

One common feature with all his programs is that no interface is required - the transmit signal emits from the EAR socket and the receive audio is fed to the MIC socket. This has a tremendous advantage in terms of economy as a terminal unit is not required.

The RTTY program has all the standard features and also allows the user to vary the baud rate in 5 baud steps between 45 and 110 bauds which can be useful for s.w.l.s.

The c.w. program feature auto-tracking of the received signal which greatly simplifies reception.

SSTV fans will be pleased to hear that the G1FTU program is compatible with most types of SSTV transmission and is also interface free.

The address for further information is: Pearsons Computing, 42 Chesterfield Road, Barlborough, Chesterfield, Derbyshire S43 4TT.

IBM Software

There are many packages appearing for this computer and one of the best areas to look is the Public Domain Software Library, Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL.

I'm sure I have missed some sources of software so if you know of any not listed here then please drop me a line and I will print the details for all to see.

CQ World Wide RTTY DX Contest

This well supported contest takes place on the weekend of September 23/24 so you should have received this issue just in time to prepare yourself and have a go!

Although the name implies it is a RTTY contest, AMTOR, ASCII and Packet are all allowed providing of course you don't use digipeaters on Packet.

The contest runs from 0000UTC on Saturday 23 September through to 2400UTC on Sunday 24 September. The entry classes are: Single operator all band; single operator, single band; multi-operator all band and short wave listener.

That's it for another month - do you have any items you would like me to cover, perhaps an equipment review or some packet news. If so, please drop me a line and I will do my best for you.

THE NEXT THREE DEADLINES ARE SEPTEMBER 27, OCTOBER 31 & NOVEMBER 28

Amateur Satellites

Reports to Pat Gowen G3IOR
17 Heath Crescent, Hellesdon, Norwich, Norfolk NR6 6XD

First this month comes the latest update on the current set of amateur-radio satellites of general activity interest plus the news on those in the pipeline.

UoSATs

Whilst OSCAR-9 continues it's deepening spiral to earth atmosphere, OSCAR-11 happily continues without threat to it's extinction. Until further notice, UoSAT-2/OSCAR-11 will be performing Whole Orbit Data Surveys on the following channels for the days given. Sundays, Channels 2 and 61; Mondays, Channels 1, 2, 3, and 61; Tuesdays, Channel 53; Wednesdays, Channel 19; Thursdays, Channels 1, 2, 3 and 61; Fridays, Channels 0, 10, 20 and 30; Saturdays, Channels 10, 11, 19 and 29.

Ross Forbes WB6GFJ reports that he now has full store and forward facilities for UoSAT-2, with successful commanding, loading and retrieval all functioning to perfection. He joins other gateways, consisting of ZL5BA (Antarctica), VK5AGR, AP2UP, ZL1AOX, ZS6SAT, DB2OS and, naturally, GB2UP.

Dave Rowan G4CUO, is closely following the demise of UoSAT-1. He firmly believes that the date of re-entry will be somewhat earlier than that given by our formula using 16.666r as the re-entry mean motion. He bases this on the earlier observance of the ISKRA satellites, rather similar in mass and aspect, which burned out at a period of 89 minutes, e.g. a mean motion of 16.179775 orbits per day. If we now apply this figure to each new period from the latest Keplerian element set, we get to mid-September for re-entry. The formula suggested is therefore: Decay Epoch = Reference Epoch + ((16.179775 - latest mean motion)/(latest decay x 10)). The latest value at the time of writing this column in late July indicates fall-out around September 14. It is still a guesstimate, as the drag factor is varying hugely with the solar flux variations, (see "Keplerian Elements").

Dave has been studying the telemetry, which is "spoken" by the Digitalker each Wednesday on 145.825MHz f.m. to save the trouble of c.w. or computer translation. One merely needs to take the number following the channel number enumerator, divide it by 5, take it from 474, multiply it by 1.01, and one has the temperature in degrees C. Generally speaking, a read out of 450 to 500 means about 0C, toward 400 it is warming, and above 510 cooling. Dave finds that whilst many values are constant, the baseplate temperature (channel 09) is up to 65 degrees celsius, and that the A battery (channel 08) and the B battery (channel 18) are getting progressively warmer. The -Y baseplate (channel 39) is worth watching too.

The sad thing is that the increasing battery temperature may soon mean the boil-off of the KOH electrolyte in vacuum, and that we may well lose the power source long before the eventual physical decay, preventing reading the final destruction values.

UoSAT D and E

A complete engineering model combining the two spacecraft for joint testing has been assembled at the UoSAT Spacecraft Engineering unit complete with boom motor and module boards contained in their housing boxes. The vibration tests were performed in mid-July at the Royal Aerospace Establishment at Farnborough, and qualification to the over 1000 G shock tests has been underway to ensure that the pair endure the rigours of the launch taking place in the ten minute window on November 10 at 0200UTC. Dr. Martin Sweeting G3YJO, the UoSAT project director says that the noise produced by the vibrator "...is louder than that of an underground metro train passing by in a narrow station!...".

Once in orbit the UoSATs will become UoSAT-OSCAR-14 and 15, as they will be the first satellites to be placed into space from the launch vehicle, followed by the four other microsats which will then become OSCARs 16, 17, 18 and 19.

RS-12/13

Contrary to expected plans, the new Soviet pair were not integrated with the COSMOS Maritime Satellite which was launched into orbit on the date given earlier in this column. They are fitted (and have been so since December last year) to the COSMOS MARISAT next in line for launch, but this depends upon the life duration of the existing and still functioning MARISAT to ensure continuity. We shall know when this time comes, as the next MARISAT to

be activated will be that already in orbit carrying currently operative RS-10/11 transponders. When this primary COSMOS-1861 payload is permanently activated, the powerful 150MHz RTTY like signal will cause wide band blocking of the RS-10 and 11.145MHz uplink receiver, preventing the Mode A transponder use due to severe QRM evidenced on the downlink. Thus, users should listen for this forthcoming permanent problem, and will so get an early indication that the new satellite launch will be imminent, as it will need to be "on site" for the standby replacement for COSMOS-1861. The most likely time for the launch of the COSMOS carrying the RS-12/RS-13 transponder combination would now appear to be late December this year or early January 1990, but it could well be postponed to March or April of 1990, according to lifetime expectancy.

Vern Riportella WA2LQQ, the last AMSAT president, visits the Soviet Union regularly in his capacity as part of the Nuclear Test Ban Treaty Inspectorate, and on the July 4 holiday visited RS3A, the Russian RS command station and Radio Sputnik Laboratory near Moscow. He had a two hour chat with Valery Salenko, the Laboratory Director; Vladimir Luban, the Vice-Director; Vladimir Eraksin, the project group chief; German Mikle; Leonid Maksakov RA3AT, the command station chief; Leonid Labutin UA3CR, as member of the Satellite Communications Committee of the Radio Sports Federation of the USSR, and Boris Stepanov UW3AX, editor of *Radio* magazine. Under discussion were matters of amateur satellite history, competitions and nets on satellites, the use of satellite transponder modes, co-ordination of national AMSAT tasks and activities, means of information exchange, and a wide variety of related topics.

RS-14

From **Leonid Labutin UA3CR** comes news of the next Soviet in line amateur radio satellite. The building of RS-14 is now underway for incorporation with the bus of the GEOS Geological Survey Satellite to be placed in a 1000km 83 degree inclination orbit in the middle of 1990. It is to be a Mode B transponder only, with a 100kHz passband bandwidth uplink from 435.080 to 435.180 to give an inverting downlink from 145.950 to 145.850MHz, with a ground station control commandable 2 watts or 10-12 watts p.e.p. of output, with c.w. beacons at either end of the passband on 145.850 and 145.950MHz. The antenna will be a single combination monopole, adequate for the orbital height path loss involved.

ORBITA, the new Soviet satellite group now distinct from DOSAAF are to combine with AMSAT-DL to incorporate RUDAK-II with the RS-14, with UA3CR performing the digital (packet radio) side of operations, and other new USSR groups the r.f., electrical, electronics and mechanical engineering. UA3XDU heads the building group situated some 200km from Moscow, a second group is located with RC2CA in Minsk, and a third with RL7GD in Kazahkstan. A group in Perm is also involved, as is RA3AT, plus RW3DZ with the educational programme. Additional support is likely from other eastern European countries.

The new RUDAK will have two channels upgoing, one on 435.100MHz for 1200 baud f.s.k., and the other on 435.150MHz for 4800baud f.s.k. The currently proposed downlink for the 1200baud p.s.k. is 145.950MHz, but interchangeable with the normal beacons, so this may change later to 145.990MHz due to the probability of UoSAT D and E downlink activity on the earlier proposed frequency. RUDAK-II is fundamentally similar to it's failed predecessor RUDAK-I, but will have an i.f. of 10.7MHz and a sensitivity of -120dB. All power supplies for both the linear mode B transponder and the RUDAK will be supplied from the primary GEOS payload. Detailed discussions are taking place with DJ4ZC of AMSAT-DL for the incorporation and integration with RS-14, which may yet be known as RS-OSCAR-21, so as to number sequentially with the other coming satellites.

OSCAR-13

The eclipses at perigee lasting from August until November mean that A-O-13 will now be off for a time for monopole Southern Hemisphere operation. The current schedule until November 16 is for mode B transponder operation from Mean Anomaly 003 to 160, followed by Mode JL from MA 160 to 200, Mode B again from MA 200 to 240, then off from 240 to 003 to maintain the battery charge in eclipse. Mode S transponder operation is set for between MA 210 and 222.

Rod Clewes G3CDK reports that his Mode L operations are improved dramatically by the use of his newly acquired DATON speech processor using 30dB of compression, giving far better readability of his s.s.b. signal on the downlink. Rod was using a single 2C39 valve power amplifier, giving 60 watts of output to his four stacked 24cm helicals, but has replaced this with a German solid state linear providing 70 - 80 watts, which gives him 2dB improvement. He was earlier troubled by intermittent oscillation from his pre-amplifier, but upon investigation and taking down his mast, found a very bad v.s.w.r. due to a loose plug connector to the helicals.

G2BFO reports that he finds that some 50kW e.i.r.p. (ca. 47dBw) is needed to get into the Mode S transponder. He hears the beacon well, but finds that the 70cm power required to produce a reasonable signal much greater than anticipated. GW3XYW finds that he needs to use his e.m.e. dish for effective communications. As it was earlier recommended that only 27dBW (500W e.i.r.p., or 25 watts to a 13dB antenna) would be needed to produce a 10dB signal to noise ratio downlink return, the general feeling is that something must have changed in the Mode S transponder status, the practical power uplink requirement being a factor of some one hundred times the earlier theorised.

FO-12

The Japanese Amateur Radio League (the JARL) now warn in their official publication *JARL News* Vol. 2, No.1, that due to power conditions on the spacecraft, there may be continuing unexpected interruption of the planned transponder schedules. They say, "in the initial period of about one year following launch, the satellite attitude has changed as the spacecraft has rotated about its axis. This rotation resulted in rather uniformly sunlit conditions, which assured an average power generation capability of about 6.5 watts at the beginning of life". The item continues: "This motion, however, has ceased gradually over time and at present, little rotational motion is observed. This has resulted in significantly reduced power generation capability, which makes the battery subject to deep discharge cycles. In addition to this, temporal degradation of the solar cells is also evident. The Ni-Cad storage batteries no longer charge up as quickly to the proper operating voltage, even under good solar conditions". Additionally, it is also known that the high demand upon power availability is caused through a single voltage regulator, which alone dissipates 2 watts of the precious needed transponder power as heat.

The JARL release concludes: "Consequently, power conditions aboard the satellite have deteriorated. This is the reason why operation has been limited to such an extent. The transponders are able to function normally, provided that sufficient power is required".

The planned future schedule of FO-12 is as follows:

From	Until	Mode
0053 August 27	0904 August 27	JD
2237 September 2	0649 September 3	JA
2157 September 5	0600 September 6	JA
1915 September 8	0327 September 9	JD
1848 September 13	0300 September 14	JA
1512 September 26	2324 September 26	JA
2150 September 30	1244 October 1	JD
2029 October 6	1123 October 7	JD
1042 October 10	1824 October 10	JA

At all other times, the transponders will be off to permit maximum battery charge to develop. Remember that JD is the packet-radio digital store and forward mode, whilst JA is for analogue c.w. and s.s.b.

JAS-1-b

The JARL news continues with a request for help when the forthcoming Fuji-OSCAR-12 sister satellite flies, saying "JAS-1-b, with its improved power and antenna sub-systems, is scheduled for launch in early 1990. Details will be provided as soon as they become available. We would greatly appreciate receiving telemetry reports, especially from locations where the satellite is out of sight of Japan. These would be most useful in helping us to evaluate satellite performance".

In the meantime, it is learned that both the mechanical interface check and the electrical interface check have both been successfully carried out at the NEC Corporation Yokohama factory. The mechanical tests include confirmation of correct weight, dimensions, and alignment of the module panels, plus the fitting check of July 4, to ensure that the coupling part of the satellite mates correctly with the launch rocket. The coupling procedure was also exercised. The electrical tests confirmed that the connector wirings and respective signal levels all matched the specifications set, and that all electronic and electrical functions operated correctly.

The JARL also announce a Fuji award for operators and s.w.l.s using either the existing or future Japanese satellites. Applicants should send in evidence of holding QSL cards from 10 different amateur stations using the transponder in either the mode JA c.w. or s.s.b. modes (NB. NOT digital). The QSL listing should give the callsign worked or heard, date and time, band and mode of the station, plus either $4.00 US or 8 IRCs for the award and postage. (Note: the QSLs themselves need NOT be sent - if they are, then add a further sufficiency of IRCs for their safe return). If the QSLs are not sent,

then the listing must be accompanied by a statement from the applicants national society or from any two amateurs other than the applicant certifying that the QSL cards of the contacts listed are in the possession of the applicant, and that the items of the cards are correctly listed.

MIR

The continuity of the manned MIR mission, originally set for August 30, has been postponed, and the SOUZ-TM-8 vehicle carrying the two new cosmonauts, Alexander Viktorenko and Alexander Serebrov is now planned for the middle of September, to be preceeced by a PROGRESS automatic docking launch of supplies one month earlier. The two new crew members have a huge work-load to perform, and although pre-trained, are not so keen on amateur radio activities as some of their predecessors, so do not expect a lot of 145.525MHz activity. More on MIR next month!

Keplerian Elements

In addition to the full set of Keplerian elements sent in by **Birger Lindholm**, a stop press addition follows for two spacecraft that users will wish to have the latest data on, i.e. OSCAR-9 and MIR. On the day of "going to press" they are as follows:-

Satellite	OSCAR-9	MIR
Epoch Year	89	89
Epoch Day	196.61107725	191.597165
Inclination	97.5520	51.619000
Right Asc. of Asc. Node.	252.2025	246.542700
Eccentricity	0.0002584	0.000998
Argument of Perigee	140.8665	140.605300
Mean Anomaly	216.5051	219.564300
Mean Motion	15.66491	15.568690
Decay rate or Drag Fact	0.00097478	2.245E-4
Epoch Orbit Number	43343	19481
Beacon Frequencies	As listed in Keplerian Set	

The reasons in listing the additional updated set for OSCAR-9 alias UoSAT-1 is to provide the rate of change of period, drag factor and eccentricity that has taken place since Julian Day 175 (June 24) and the above, Julian Day 196 (July 15). This change is now considerable, and dealt with under the current column headed UoSAT's and past issues as Mort d'OSCAR. The new set for MIR, thought presently to be under remote earth command, will permit followers to keep tracks of this orbiter for when it becomes manned and active again in mid-September.

Satellite	NOAA 9	NOAA 10	NOAA 11	METEOR 2/15	METEOR 2-16	METEOR2-17
International Designation	84-123A	86-073A	88-089A	87-001A	87-068A	88-005A
Object Number	15427	16969	19531	17290	18312	18820
Element Set Number	396	240	95	266	287	127
Epoch Year	1989	1989	1989	1989	1989	1989
Epoch Day	178.48001492	178.55956945	178.55544590	175.38681730	175.13804845	174.96934957
Inclination	99.1431	98.6355	98.9397	82.4670	82.5632	82.5432
Right Asc. of Ascending Node	165.6229	208.8529	122.5200	148.0103	214.0385	275.1635
Eccentricity	0.0014515	0.0012502	0.0011185	0.0011431	0.0012528	0.0015527
Argument of Perigee	287.3150	218.8160	199.9721	242.2012	170.6318	248.6900
Mean Anomaly	72.6432	141.2114	160.0955	117.7993	189.5093	111.2607
Mean Motion	14.12068748	14.23066843	14.11053109	13.83729851	13.83485889	13.84174526
Decay Rate/Drag Factor	0.00000822	0.00000992	0.00000840	0.00000198	0.00000219	0.00000415
Epoch Orbit Number	23390	14541	3893	12461	9347	7062
Nodal Period	102.034422	101.247312	102.108165	104.125145	104.143632	104.091830
Period Drag	4.209E-06	4.962E-06	4.310E-06	1.077E-06	1.192E-06	2.256E-06
Increment	25.506049	25.312008	25.526200	26.160695	26.164577	26.151783
Increment Drag	1.059E-06	1.249E-06	1.084E-06	2.693E-07	2.980E-07	5.639E-07
Beacon Frequencies	137.620=APT	137.500=APT	137.620=APT	137.850=APT	137.400=APT	137.400=APT
Reference Equator Crossing	03 JULY 1989	01 JULY 1989	01 JULY 1989	01 JULY 1989	29 JUNE 1989	29 JUNE 1989
Reference Orbit Number	23468	14590	3942	12553	9415	7132
Time (HHMM.MM)	0009.87UTC	0006.89UTC	0043.14UTC	0056.52UTC	0120.56UTC	0042.28UTC
Degrees West	112.21	68.52	163.86	150.52	87.10	16.51

Satellite	METEOR 2-18	METEOR 3-02	OSCAR 9	OSCAR 10	OSCAR 11	OSCAR 12
International Designation	89-018A	88-064A	81-100B	83-058B	84-021B	86-061B
Object Number	19851	19336	12888	14129	14781	16909
Element Set Number	51	208	613	412	468	152
Epoch Year	1989	1989	1989	1989	1989	1989
Epoch Day	178.60748832	178.90592127	175.12060121	174.42674285	174.60656127	177.26246302
Inclination	82.5231	82.5377	97.5518	26.1731	98.0025	50.0159
Right Asc of Ascending Node	150.9363	168.0753	229.1842	258.6318	233.2168	270.4283
Eccentricty	0.0012198	0.0019265	0.0000824	0.6055703	0.0012230	0.0010754
Argument of Perigee	279.0496	116.1302	112.6109	52.9375	307.1522	8.6970
Mean Anomoly	80.9283	244.1758	247.5087	348.3573	52.8563	351.4053
Mean Motion	13.83810723	13.16854107	15.62617469	2.05879393	14.63683629	12.44399976
Decay Rate/Drag Factor	0.00000117	0.00000391	0.00109175	0.00000053	0.00002955	-0.00000025
Epoch Orbit Number	1652	4432	43007	4534	28248	13053
Nodal Period	104.119146	109.409250	92.214060	699.2	98.440898	115.652635
Period Drag	6.365E-07	2.468E-06	4.127E-04	-	1.359E-05	1.866E-07
Increment	26.158765	27.481112	23.048089	175.3	24.611063	29.239400
Increment Drag	1.591E-07	6.171E-07	1.039E-04	-	3.418E-06	4.625E-08
Beacon Frequencies	137.300=APT	137.850=APT	14.002/21.002 29.510/145.825	145.810/145.987	435.025/2401.5 145.826	435.913/.797
Reference Equator Crossing	01 JULY 1989	01 JULY 1989	29 JUNE 1989	30 JUNE 1989	29 JUNE 1989	29 JUNE 1989
Reference Orbit Number	1699	4473	43084	4548	28427	13088
Time (HHMM.MM)	0008.38UTC	0030.30UTC	0111.70UTC	0525.56UTC	0010.18UTC	0145.80UTC
Degrees West	132.89	120.75	60.57	102.08	41.14	41.79

Satellite	OSCAR 13	RS 10/11	SALYUT 7	MIR
International Designation	88-051B	87-054A	82-033A	86-017A
Object Number	19216	18129	13138	16609
Element Set Number	36	796	635	912
Epoch Year	1989	1989	1989	1989
Epoch Day	147.06007421	177.00089940	179.98011901	179.97686166
Inclination	57.2077	82.9251	51.6081	51.6208
Right Asc of Ascending Noe	206.1830	231.6400	259.6968	304.7112
Eccentricity	0.6723768	0.0012450	0.0001046	0.0010410
Argument of Perigee	204.7577	34.2801	56.0682	102.1880
Mean Anomaly	96.6993	325.9199	304.0422	258.0323
Mean Motion	2.09696457	13.71987510	15.42494059	15.56139958
Decay Rate/ Drag Factor	0.00000137	0.00000363	0.00011498	-0.00055868
Epoch Orbit Number	727	10060	41001	19300
Nodal Period	686.6	105.016291	93.293674	92.474924
Period Drag	-	2.026E-06	4.643E-05	2.132E-04
Increment	172.2	26.379957	23.705214	23.503629
Increment Drag	-	5.066E-07	1.143E-05	5.246E-05
Beacon Frequencies	145.812/435.651	29.357/.403 145.857/.903 29.407/.453 145.907/.953	19.953	143.625=Voice 166.125=Data Ranging (a.m.?)
Reference Equator Crossing	25 JUNE 1989	29 JUNE 1989	04 JULY 1989	02 JULY 1989
Reference Orbit Number	788	10102	41079	19348
Time (HHM.MM)	0325.64UTC	0131.97UTC	0048.00UTC	0125.98UTC
Degrees WEst	122.45	70.73	59.1	12.27

Propagation

Reports to Ron Ham
Faraday, Greyfriars, Storrington, West Sussex R20 4HE

Radio Observation of Meteors.

Any form of ionisation within the earth's complex atmosphere will, depending upon its size and position, bend or reflect the paths of radio and television signals. Each month I carry reports of interference to these transmissions caused by auroral manifestations, disturbances to the normal state of the upper (F1/F2) and/or lower (E) regions of the ionosphere and sometimes meteor trail reflection. The latter is well described by Mansweto Grech 9H1GB in the December 1988 journal of the Malta Amateur Radio League. He said, "The signal is not reflected by the meteor particle itself, which is usually the size of a grain of sand, but from the stream of ionisation left by the meteor as it is heated and vaporised by friction with the atmosphere." In my view, this must be the briefest creation of random ionised gas that we know of.

Random meteors, often called "shooting-stars", are obvious because they appear, just for a few seconds, as a streak of bright light darting across the night sky. Periodically, the earth, on its orbital path around the sun, encounters great swarms of these particles which are known throughout science as "meteor showers", Fig. 1. Most astronomical societies have a meteor section and, subject to weather, place members at vantage points to estimate the number of meteors seen during the time of their expedition. Vantage points are usually high spots where the site is free from terrestrial lighting and the maximum amount of sky is visible. Although meteor trails, called radiants, manifest around 100km above earth the radiants of a shower are named after the constellation of stars from which they appear to come. During the predicted peak of a meteor shower, radio amateurs around the world take advantage of this extra ionisation to make DX contacts on the v.h.f. bands. Briefly, under such random conditions the operators must repeat their messages, in high speed Morse code, several times

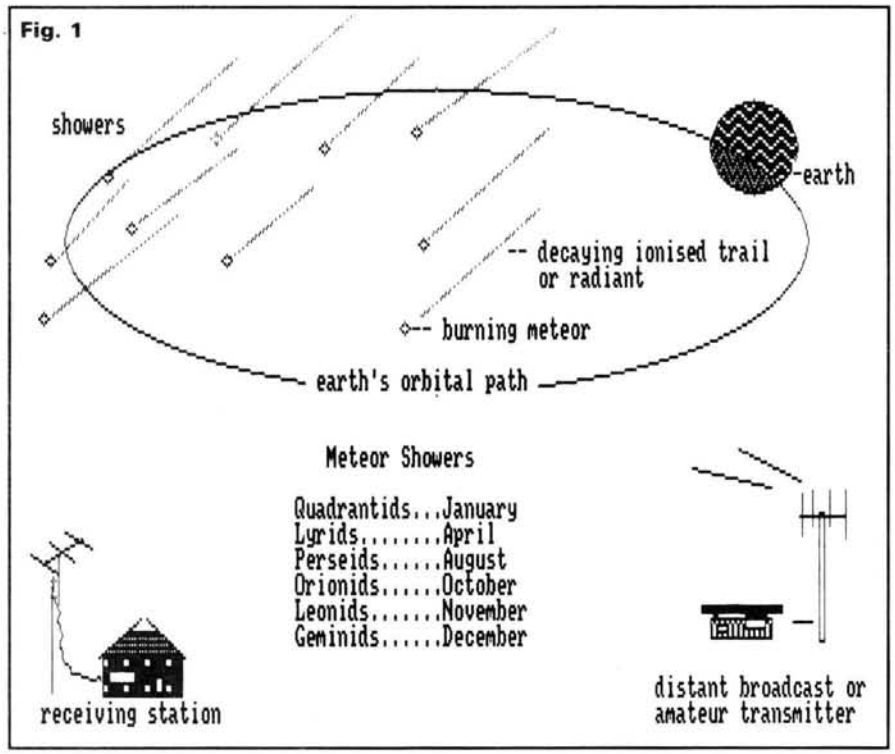

Fig. 1

during pre-arranged 5 minute transmission periods which gives the receiving station a chance to piece together many tiny "pings" of the transmitted signal before the message is complete and the reply is sent to confirm the QSO. It is not uncommon for TVDXers to see "pings" of pictures in Bands I and III and for beacon watchers to hear a moments signal jump out of the background noise while a shower is in progress. More on this subject next time.

Solar

Although the solar flux units for June began the month at 192 and ended a bit up at 200 a new cycle-high of 327 units was reached on the 15th. The daily fluctuations can be seen on the computer print out, Fig. 5, kindly supplied by **Neil Clarke G0CAS** (Ferrybridge).

From his observatory in Selsey, **Patrick Moore** sent the drawings he made of the sunspots strung out across the disc at 1050 on June 25, Fig. 2, some bunching up and smaller ones appearing at 0805 on the 28th, Fig. 3 and the new ones appearing around the east-limb at 1230 on July 11, Fig. 4.

In July, **Cmdr Henry Hatfield** (Sevenoaks), using his spectrohelioscope, observed the sunspot groups (Gps), filaments (fils) and quiescent prominences (QPs) that are listed in Fig. 8 and with his radio telescopes he recorded individual bursts of solar radio noise, at 136MHz and 1297MHz, on June 30 and July 10, 12 and 19. In June, **Ron Livesey** (Edinburgh) located seven active areas on the sun on days 21 and 29, 9 on 22 and 28, 10 on 10 and 23, 11 on 11 and 18 and 12 on the 17th. In Bristol, **Ted Waring** counted 21 sunspots on July 2 and 16 and 34, 44 and 67 on days 8, 22 and 23 respectively and in Maldon, **Ted Owen**, with his projection system, watched the progress of 3 small spots and one large near the central meridian on July 13 and a couple of small groups around the centre on the 17th and 21st.

Aurora

"Because of the summer twilight aurora reports are minimal and only possible from the American continent where the auroral activity zone comes down to into lower latitudes in darker skies," wrote Ron Livesey in his June report to the British Astronomical Association. Ron is their auroral co-ordinator and the visual reports that he received from Michael Boschat (Nova Scotia) for the 21st and for the other days from Jay Brausch (North Dakota) are listed in Fig. 7. Doug Smillie GM4DJS (Wishaw) told Ron about the "poor radio propagation" on 7MHz on June 7 and 8 and the auroral tones he heard on signals in the 50 and 144MHz bands from 1350 to 1908 on the 10th.

Magnetic

Reference to Neil Clarke's print-out, Fig. 6, of the Ap index for June shows the peak unsettled period coincided with the high solar output during the first half of the month. Ron Livesey's "Jam-jar" suspended magnet magnetometer confirmed active conditions on the 10th and 20th and he received reports from Karl Lewis (Saltash), David Pettitt (Carlisle) and Doug Smillie of storm conditions on days 6, 7, 8, 9, 10 (severe) and 20. Doug uses a Hall effect magnetometer.

Sporadic-E

Although the number of Sporadic-E openings seem to be down and most of them less intense compared with last May, June and July, East European f.m. broadcast stations have been heard each time between 66 and 73MHz. I tune this range with an ex-military R216 v.h.f. communications receiver fed by a chimney mounted dipole and counted 35 of these stations around 1800 on July 5, 21 at 1745 on the 12th, 10 at 1730 on the 19th and 40 during a big disturbance early on the 22nd. During some events unidentifed pictures, most likely from the USSR, were received in Band I on Chs. R1, 2 and 3 (49.75, 59.25 & 77.25MHz) plus their sound signals on 56.25, 65.75 and 83.75MHz respectively. On the 22nd I heard Radio Moscow's ident around 72.5MHz at 0900 and 6 Italian stations in Band II between 98 and 101MHz at 1000.


Fig. 2

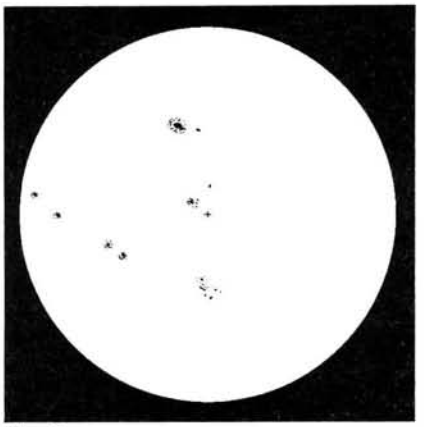
Fig. 3

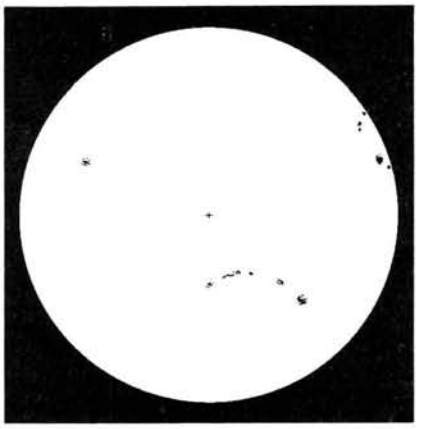
Fig. 4

The 28MHz Band

Ern Warwick (Plymouth) received signals from both Americas, Australia and Canada on July 4, Brazil on the 7th and 11th, Australia on the 9th and Argentina on the 10th. Also on the 10th John Levesley G0HJL heard one station in Africa and three in Argentina. "Not too much short skip, but I did manage to work into Devon and Cornwall on July 15", wrote Don Hodgkinson G0EZL from Hanworth. The beacon chart, Fig. 10, shows a consistent path to South America.

Propagation Beacons

Firstly my thanks to Mark Appleby G4XII (Scarborough), Chris van den Berg (The Hague), Vaclav Dosoudil OK2PXJ (Kvasice), Henry Hatfield, Don Hodgkinson, Ken Lander (Harlow) Greg Lovelock G3III (Shipston-on-Stour), John Levesley, Ted Owen, Fred Pallant G3RNM (Storrington), Ted Waring and Ern

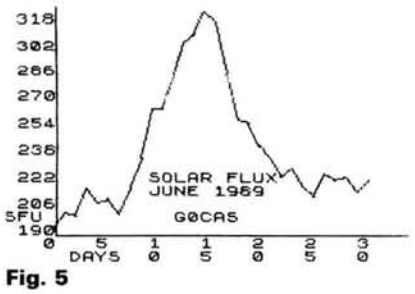

Fig. 5

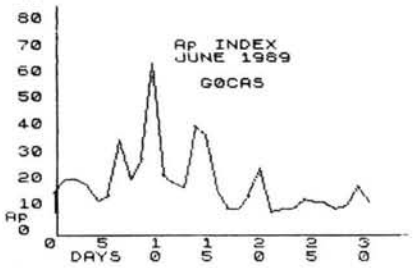

Fig.6

DATE	OBS	REPORTS
June 01	1	glow
June 06	1	active aurora
June 07	1	rayed band
June 08	1	rayed band
June 09	1	active storm
June 13	1	rays
June 14	1	active aurora
June 21	1	homogenious arc
June 28	1	rays
June29	1	rays

Fig. 7

Warwick, for their 28MHz logs and interesting comments which enabled me to compile this month's chart, Fig. 10.

Ern Warwick added EA1AW (28.247MHz), LU1DZ (28.216MHz) and PA3AWV (28.036MHz) to his list this time and Mark Appleby read "VVVDE PY2AMI PWR 5W ANT GP LAT22 45S LONG47 16W LOC GG671F ALT600M BOX31 ZC13470 AMERICANA/SP". "All the Yanks seem to have died out", remarked Ted Waring who, like his fellow beacon watchers, found little activity in the north American direction this time. Fred Pallant reports a continuous carrier where ZS1LA should be and he has only logged the beacon on the days when he actually heard it key its call-sign. Fred added that the signal from WA4DJS was 569 at 0841 on July 10.

Although the 28MHz chart is much shorter this time, due mainly to the lack of Canadian and stateside beacons, Ern Warwick frequently heard IK6BAK and PY2AMI on 24MHz, CT3B, OH2B, ZS6DN/B and 4X6TU/B on 14.100MHz and DK0WCY on 10.144MHz. On some days during the period he logged JA2IGY, KH60/B, LU4AA and 4U1UN/B on 14MHz and reports that the signals from KH60/B were "echoy" at 0912 on July 10.

Tropospheric

The slightly rounded atmospheric pressure readings shown in Fig. 9, were taken at noon and midnight from the Short & Mason Barograph installed at my home in Sussex. The slight variations in the high pressure, which our chart cannot show, coupled with really hot weather caused the v.h.f broadcast band (87.5 to 108MHz) to open up for short periods toward the continent on July 5, 12, 17, 20 and 21. At times during these openings the signals from French and German stations were exceptionally strong and although John Levesley (UK-627) had little to report for the 934MHz band this time he did make contact with GY-186 in Guernsey at a distance of 161km on July 19.

Date	Groups	Filaments	Quiescent Prominences	Notes
03.07.89	3	20	8	1 group is almost flaring
04.07.89	3	22	3	all three regions could flare any time
06.07.89	4	16	6	a near flare on east limb
11.07.89	1	23	8	a plage almost flaring
12.07.89				groups as yesterday
13.07.89	3	18	10	high cloud hampered observation
18.07.89	2	28	9	seeing is good in glimpses
19.07.89				groups as yesterday, bright patch east limb
20.07.89	4	22	13	sub-flare in a plage

Fig. 8

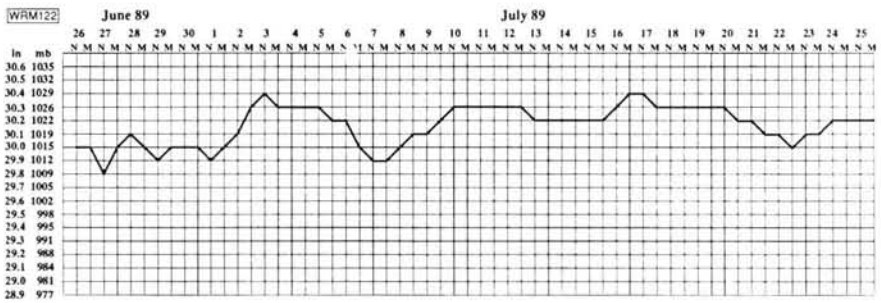

Fig. 9

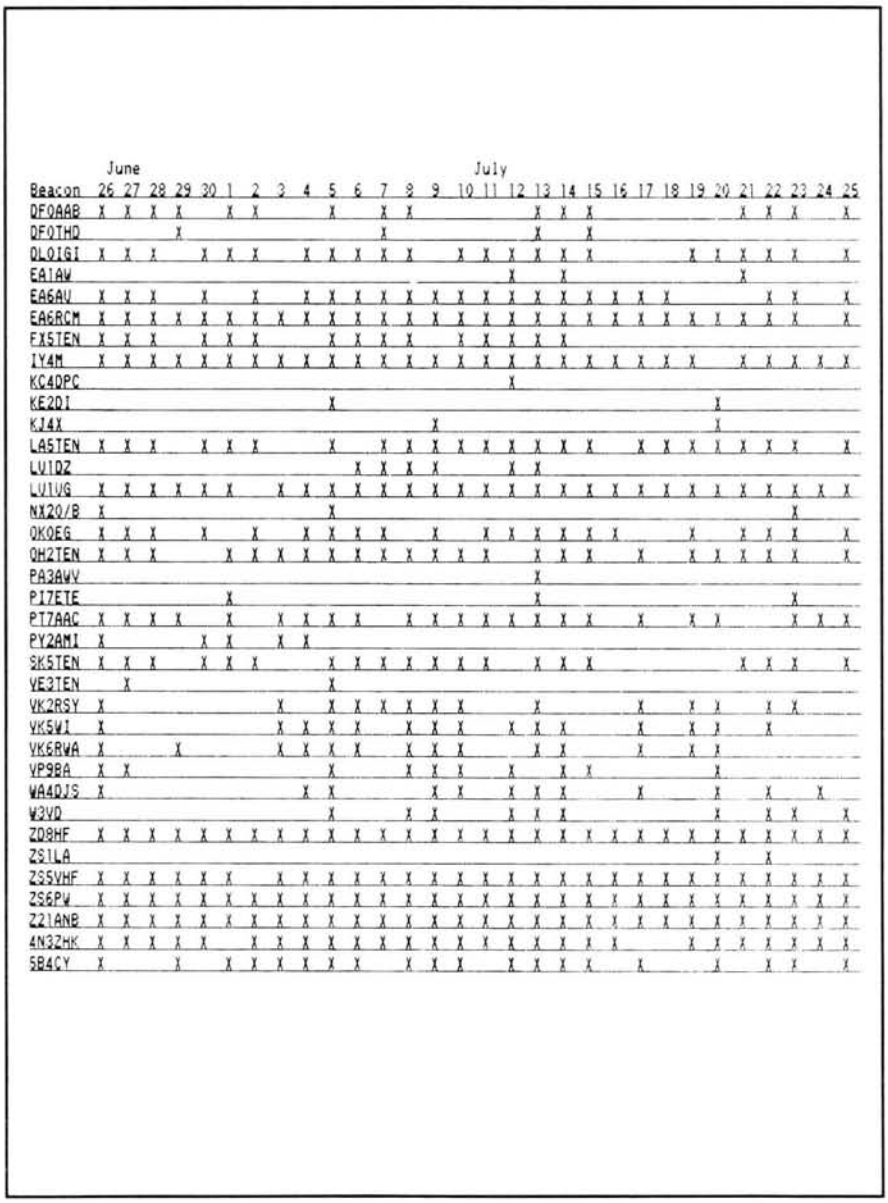

Fig. 10

Broadcast Round-up

Peter Shore

Following much activity earlier this year, the short wave radio scene seems to have quietened down, with no news of dramatic developments on, or off, the air.

On the other side of the world, it seems that Radio New Zealand's International Service is to be on the air by mid January, to coincide with the Commonwealth Games in Auckland. There is to be one 100kW transmitter aimed towards the Pacific area. However, if good frequencies are chosen (perhaps the same as those used by RNZ's 7.5kW transmitters at present), reception should be reasonable here in Europe, and this column will bring you further news from down under as it becomes available.

As one broadcaster plans expansion, another fights reductions, or even closedown. Radio Canada International looks to be in a tenuous position at present, with budget cuts at the Canadian Broadcasting Corporation, CBC, of which RCI is part. During the coming five years, CBC will suffer a reduction in its budget of Can $141 million and it seems that RCI will be the hardest hit. RCI's staff are urging listeners to write to the station, urging the powers that be not to close the station. After all, the station staff reckon, it is the listeners for whom the station operates, and if the CBC management and the government realise how many there are, and how vociferously they would protest a closure, then maybe there is a chance to stave off reductions in services and possible closure.

Stations which are not funded by governments seem to fare marginally better at present. Christian radio broadcasters are planning a major expansion, and HCJB, FEBC, TWR and ELWA are planning to start transmitting in 124 new languages, each of which reaches a population of at least one million. HCJB has plans to start broadcasts in Georgian and Tukmen to reach the USSR, in Kongo to African nations and in Luri to Iran, amongst a total of fifteen new languages for the Ecuadorian station.

Radio Free Europe and Radio Liberty seem to be enjoying something of a renaissance in terms of listening figures now that jamming of the two stations has stopped. The organisation which runs the station has carried out research into audiences in the Soviet Union, which suggest the RI's language services have gone up by as much as 50 per cent, whilst the BBC's Soviet audience appears to have fallen a little. The station put the increases down to the improvement in packaging and presentation of programmes which has been enabled by the cessation of jamming. However, one wonders whether the upturn in listening is surprising since it must be more pleasant to listen without fighting through a distorted "Mayak" signal.

Meanwhile, in Poland, a survey carried out by the government suggests that listening to foreign broadcasts is on the decrease. During the period of industrial unrest in the country in the spring of last year, it is estimated that one in three Poles listened to overseas radio stations. Today, that figure has reduced to one in five, with the most popular station being Radio Free Europe, the Voice of America in second place and the BBC in third.

The Deutsche Welle relay station at Trincomalee in Sri Lanka was due to be in full operation from July. The installation had been interrupted several times because of the civil unrest in the country. The relay station, which broadcasts to the Asian region, is fed by satellite from Germany using the Intelsat VA F12 satellite over the Indian Ocean.

Radio Macao is to commence broadcasts for the scattered Portuguese communities in Asia. Macao, which reverts to Chinese sovereignty in 1999, will continue broadcasting a Portuguese station for the territory, and Asian region. Their h.f. broadcasts are due in 1992.

Radio France International is at present considering plans for new relay facilities in Thailand and Jibuti which would have three or four 300kW and a similar number of 500kW transmitters. Inside France, twelve existing 100kW senders are to be replaced by the same number of 500kW transmitters.

Audibility of Iran may improve, too, in the not too distant future, although without the help of British technology! A contract for ten 500kW transmitters and fifty antennas, together with a computer control system, has been awarded to AEG-Telefunken. The estimated completion date for this major project will be during 1994 - and one wonders whether German technology will improve the audio quality on VOIRI's broadcasts.

A while ago, this column reported on the demise of a Radio Station Peace and Progress service and suggested that it might be time for that particular station to be laid to rest. The Soviet Union clearly has other ideas, since a new Hebrew broadcast is now heard between 1500 and 1530, doubling the Hebrew output of Peace and Progress to seven hours a week.

Update on 25MHz (11m)

Radio Moscow has been noted using the 11m band for the first time. The station has been using 25.78MHz between 0500 and 1300 with World Service in English and Swahili between 1100 and 1300UTC.

United Arab Emirates Radio in Dubai is now noted with its domestic Arabic service on 25.9 and 25.67MHz from 0215UTC sign-on until 0600 on 25.67MHz whilst the 25.9MHz channel continues through the day until 1600.

The Voice of America's special test for the EDXC Conference at Morokulien proved only moderately successful on June 15 and 16. A relay of VoA Europe on 26.04MHz was scheduled on each day between 1400 and 1700, but only heard in most of Europe on the second day from fade in at around 1530 until the scheduled sign-off.

Radio Yugoslavia uses 25.795MHz for English 1200-1250 daily.

European Station

All times UTC (=GMT)

Albanians now benefit from a second domestic radio channel between 0700 and 1200 on 1.458MHz.

International listeners can hear English from Radio Albania:

1830 on 9.48MHz & 1.395MHz
2230 on 9.48, 7.21 & 1.395MHz
0230 on 9.76, 7.065 & 6.085MHz
0800 on 11.835 & 9.5MHz
1130 on 11.835 & 9.48MHz
1400 on 11.985 & 9.5MHz

The first two broadcasts are directed to Europe.

Radio France International broadcasts in English:

0315-0345 on 15.3, 15.155, 15.135, 11.995, 11.79, 11.7, 11.67, 9.79, 9.745, 9.55, 7.28, 7.135, 6.045 & 3.965MHz
1245-1315 on 21.645, 21.635, 17.72, 15.365, 15.155, 11.67 & 9.805MHz
1400-1430 on 21.77MHz
1600-1700 on 17.795, 17.62, 15.36, 11.705 & 6.175MHz

English is also heard in Paris on 738kHz between 1600-1700 daily.

Deutschlandfunk is using 810kHz in the Greater Berlin area 24 hours daily. This frequency has, in the past, been used in the city by BBC and Radio Canada International. It is not known whether the use of this channel has been officially sanctioned. The range is about 80km from West Berlin.

Radio Finland's new transmitter on 558kHz has gone into service, relaying a mixture of the YLE national networks, together with Radio Finland's English, French and German programmes.

English new bulletins from the Voice of Greece may be heard:

0130 on 11.645, 9.42 & 9.395MHz
0300 on 9.42, 9.395 & 7.43MHz
0840 on 17.55 & 15.625MHz
1040 on 15.63 & 11.645MHz
1235 on 17.55, 15.63 & 11.645MHz
1520 on 17.55, 15.63 (not Tuesdays) & 11.645MHz
1840 on 15.63 & 11.645MHz (both off air on Tuesdays)
1920 on 11.645 & 9.395MHz
2334 on 11.645 & 9.395MHz

RAI in Rome is operating at less than full capacity because of major engineering works on its transmitting facilities. Frequencies for English are:

0350-0410 on 17.795 & 11.905MHz
0425-0440 on 9.575 & 7.275MHz
1935-1955 on 11.8, 9.71 & 7.275MHz
2025-2045 on 11.8, 9.575 & 7.235MHz
2200-2225 on 11.8 & 9.71MHz

Italian broadcasts to Europe are heard:

0514-0425 on 9.575 & 7.275MHz
1430-1455 on 9.71 & 7.235MHz (beamed to Malta)
1555-1635 on 9.575, 7.29 & 5.99MHz
1700-1715 on 1.44MHz (Sundays only via R. Luxembourg)
1730-1745 on 1.44MHz (Mon-Sat only via R. Luxembourg)

Radio Portugal has just one thirty minute programme beamed to Europe on weekdays only, heard at 1900 on 11.74MHz. Frequencies for this programme, beamed to Africa, are 15.25 and 11.82MHz.

For the Middle East and Asia, there is a thirty minute programme on weekdays at 1600 on 15.21MHz, and to the Americas at 0230 on 11.84, 9.705, 9.68 and 9.60MHz.

African & Middle Eastern Stations

Reports have come in of an unidentified Angolan station operating on a frequency varying around 4.872MHz between 1945 and 2100, but not in parallel with listed Angolan stations on 5.04, 4.86 or 4.82MHz. This may be Emissora Provincial de Cuando Cubango, listed in *WRTH* as irregularly using 4.78MHz, although it may be confused with Mozambique Radio on 4.8724MHz.

Chad can be heard with French on 4.904MHz between 0425 and 0600, and again at 1830 until 2200. The frequency of 7.12MHz is used between 1300 and 1400.

Africa No. 1 in Gabon has moved to 9.58MHz in parallel with 15.475MHz, replacing 4.83MHz. These frequencies are probably used between 0500-0600 and 1600-2300. Meanwhile Radio Botswana has started using 4.83MHz between 1830

and 2000, replacing its usage of 4.82MHz.

Voice of Israel's Network B programmes in Hebrew can be heard on short wave:

0600-1200 on 21.54, 17.545 & 15.095MHz
1200-1400 on 21.54, 17.59, 17.545, 15.095 & 11.585MHz
1400-1630 on 21.54, 17.545, 15.095 & 11.585MHz
1630-1830 on 21.54, 17.545 & 15.095MHz
1830-2000 on 21.54, 17.545, 15.095, 11.655 & 11.585MHz
2000-2200 on 17.545, 15.095, 11.655 (not daily) & 11.585MHz (not daily)
2200-2310 on 17.59, 17.545, 15.095 & 11.585MHz

Libya's frequency usage has been interesting lately. A 49m channel is currently in operation between 1015 and 0330, around 6.11MHz, but varying between 6.104 and 6.11MHz (no doubt to the annoyance of registered users of frequencies thereabouts). Channels used at the same time are 7.245 and 15.235MHz.

Radio Africa, located in Equatorial Guinea, has changed its name to Radio East Africa. The station is on the air at weekends on 9.585MHz between 0500 and 1400. The frequency of 7.19MHz is also used daily between 1700 and 2300.

Radio Omdurman can be heard on 9.435MHz between 0500 and 2100, including an English language newscast at around 1945.

Radio Tanzania uses 4.785MHz from sign on at 0200 until 2100 closedown, with 9.685MHz used in addition from 0455 until 1530.

Voice of Tanzania is on the air between 0300 and 2000, using 6.015MHz from sign on until closedown, supplemented by 11.734MHz between 1500 and 1800. Programmes from both Tanzanian stations are in Swahili.

The Voice of Turkey's English programmes are on the air:

0300-0350 on 17.76 & 9.445MHz
1230-1300 on 17.785MHz
2000-2050 on 9.825MHz
2200-2250 on 17.76, 9.685, 9.665 & 9.445MHz

Asian & Pacific Stations

Radio Australia has increased its Chinese language broadcasts from one to five and a half hours daily, using 17.715MHz between 0400 and 0930, a channel used until recently for weekend sports coverage. A new weekend only channel of 21.525MHz is used for Sportsworld and rugby league coverage between 0200 and 0730 on Saturday and 0400 until 0730 on Sunday. Additional channels used for these sports broadcasts are 21.74 and 15.24MHz.

Radio Bangladesh has suffered from some transmitter problems in recent weeks, but is now back on the air, with Voice of Islam 0800-0830 and the General Overseas Service in English 1230-1300 on 17.714 and 15.195MHz and with English to Europe at 1815-1900 on 11.51 and 7.52MHz.

Radio Beijing English to Europe is heard in the evening:

2000-2100 on 11.5, 9.82, 8.26 & 4.13MHz
2100-2130 on 3.985MHz (via SRI)
2100-2200 on 11.5, 9.82, 8.26 & 4.13MHz

Trans World Radio in Guam targets Asia between 0805 and 0930 with 15.21MHz and includes a DX magazine at 0845 on Sundays. The broadcast is repeated for Australasia at 0930 until 1100 on 11.805MHz. Evening transmissions are heard at 1500-1635 to Asia on 11.65MHz, with the DX magazine heard on Saturday at 1515. English is broadcast on Mondays only from 1635-1705 on the same frequency.

KYOI, the Mariana Island based station belonging to the Christian Science Monitor is off the air until November whilst new transmitters are being installed.

Radio Veritas Asia from the Philippines is heard with English 1500-1530 on 15.443 and 11.74MHz, and at 0130-0200 on 15.36 and 15.32MHz.

Radio Korea from Seoul in South Korea has English beamed to Europe:

0800-0900 on 13.67 & 7.55MHz
0915-0930 on 13.67 & 9.57MHz (World News Service)
1800-1900 on 15.575MHz
2030-2130 on 15.575, 7.55 & 6.48MHz

Stations from The Americas

Some Bolivian stations have been noted in Europe recently. Radio Perla del Agro, Cobija, Pando is a new station heard 2330 until 0200 sign off on 4.60MHz.

Radio for Peace International is Costa Rica is now operating:

1500-1900 on 25.945 & 7.375MHz
2000-2400 on 25.945 & 21.565MHz
0300-0430 on 21.565 & 13.66MHz (Tuesdays to Saturdays)
1730-2330 on 25.945 and 21.565MHz (weekends only)

Voice of Nicaragua is heard on 6.10MHz in Europe as late as 0600, with English reported between 0300 and 0400.

Radio Surinam International, broadcast over Radiobras, is now using 17.755MHz at 1700 until 1750, with English included amongst the Dutch, Sranan and Tongo languages.

THE NEXT THREE DEADLINES ARE SEPTEMBER 27, OCTOBER 31 & NOVEMBER 28

ATV

Reports to Andy Emmerson G8PTH
71 Falcutt Way, Northampton NN2 8PH.

Following on from last month's survey of goodies for the Amiga computer, here is a review (by fellow BATC member Dave Wilson) of a program written specifically for video production in the home studio. Despite a few rough edges, it does produce some extremely professional results and would be ideal for the ATV shack or indeed a small facilities house or educational studio.

ZVP Videostudio Program (for the Amiga computer) *

The program was kindly supplied for review by Probe Marketing (Probe House, Burnham on Crouch, Essex CM0 8HR), from whom it is available at £79.95.

This program is a collection of useful facilities for the video programme maker. The package is designed to run on Amiga 500 or 2000 machines and requires two disc drives and 1Mb RAM. The output is 625 lines PAL interlaced Hi-Res and the full facilities will be realised when used with a genlock device that will key the background video on a specific colour, e.g. the Rendale genlock unit but not the MiniGen unit.

The first thing I noticed was the quality of the instruction book which looked like a photocopy of a typed original. It is very worrying to find several blank pages in succession. Between the "connections to equipment" diagrams and the page entitled "Do's and Don'ts when using Videostudio" is a single page showing examples of the fonts used - and 6 blank pages!

Here is a list of the appendices in the same order that they appear in the book 1, 2 (Fonts), 4, 2 (Choosing VCR for editing), 5, 6, 9, 11, 10, 12, 13, two blank pages then appendix 15. Appendix 3 was supplied on a separate loose page. Perhaps this could benefit from a bit of editing.

The program is supplied on 2 discs and combines several useful functions

(1) TITLE function offers the choice of a full screen title sequencer, horizontal or vertical scroll titles (with or without a window to allow the background to show) and subtitles. The subtitle part offers keyed-in text (plain or with outline or drop shadow effect), text in a black box to aid visibility over a distracting background or addition of a multicoloured logo on the title line.

The logo can be your own, drawn on DPaint or a similar graphics package. A full screen copyright warning is supplied for your own use. There are plenty of demonstration files for you to view to give an idea of how your titles would look, but not all of them work. In scroll text there is a Demo6 file shown on the JOBLIST (list of files on the disc) but if you try to load the job you get the error message "Can't find file...". Similarly, the subtitle program has a demo file that cannot be found - "Test" file crashed.

"CAPTOR" function allows titles to be superimposed over IFF files - Interchange File Format, the standard files produced by any Amiga software (several supplied). One of the functions in the menu lists the background files - pic, cube, gb, leaf and sunset but I have found no method of changing the background in this part of the program.

(2)TIME FUNCTIONS (most of these require the Amiga A501 clock and 512K memory module).

Option 1 sends you to item 8 on the main menu - the full screen clock. Option 2 is a VTR countdown clock with fade to black at -5 seconds and the ability to type in programme title, recording details etc. Option 3 Countdown Clock, a digital display which counts down to zero. (All the following TIME FUNCTION displays are digital). This requests you to enter the number of seconds to count down from; so, for example, you could enter 90 seconds and, after asking whether or not the tenths of seconds are to be displayed, the program asks if you want to display the minutes figure.

If you answer "no" the box just shows 30 seconds which could be confusing. The countdown starts when you press the spacebar. It would be nice to have the option so that when minutes display was not selected the total number of seconds left was displayed.

Another interesting point is that when you have entered the number of seconds to count down from, you see the request "display tenths of sec?(Y/N)" and "display minutes?(Y/N)". If you have the CAPS LOCK light on or use the shift key when you answer Y to these questions, the program ignores the input and does not display the minutes or tenths of seconds, a point not mentioned in the instruction book. Your replies to these questions must be in lower case for everything to work correctly.

Option 4 Frame counter. The menu shows the format of the display i.e. tells you if the hours are displayed or just the minutes and seconds. This function counts the frames in the format HH:MM:SS:FF i.e. counts up in twenty-fifths of a second.

Option 5 Stopwatch shows a 6 digit display on the menu MM:SS:TT. In actual fact only a 5 digit display is shown on the screen (minutes, seconds and tenths - not hundredths as might have been expected.)

Option 6 Inset time of day gives a choice of 12 or 24 hour clock display and then asks if you require to "display tenths of sec? (Y/N)". If you type in Y you see the seconds ticking away but if you reply with a N you see only the hours and minutes. The requestor is obviously wrong and should read "display secs? (Y/N)". I have found an annoying flashing on the last part of this display.

There is no Option 7

Option 8 Inset date.

Option 9 Inset time and date. This function puts a black box in the bottom right hand corner of the screen with two lines of display. The top line is the time - hours, minutes and seconds i.e. 15:05:30 and the bottom line is the date i.e. 31/01/1989. This box display can be toggled on and off using the spacebar BUT the box does not completely disappear - a narrow horizontal strip remains so that you can see approx the top fifth of the time display (the time is frozen but displays the correct time when you toggle the full box on again).

At times the box has a staggered right hand edge which looks slightly untidy, the amount of which depends on the figures displayed in the timebox. If, for example, this function was selected at a time of 1:11:11 i.e. eleven seconds past eleven minutes past one in the morning, the top line of the display would be very short as the display uses proportional spacing. The width of the top half of the box expands to fit the wider numbers i.e. at 2 o'clock - 2:00:00 but does not contract when the numbers get narrower again. Only on the widest combination of numbers does the width of the top part equal the lower half.

(3) TEST. This gives colour bars, various monochrome test signals i.e. crosshatch, "multiburst" frequency grating, greyscales etc. and an electronic testcard which you could modify to add your own customised touches (your name, callsign etc.) since it is an IFF file which you could load into DPaint or other graphics packages.

Various tone signals accompany the test pictures. I could not use the colour bars as a test signal unless I was feeding the RGB into a correctly set up professional PAL coder.

(4) PICTURE IN PICTURE. This allows you to add a small picture such as a logo over your video and this segment gives control of selection, position and size of this insert.

(5) LOGO. A full-screen logo is supplied but you can make your own with a drawing package. This part of the program displays that together with extra words if required i.e. "A production for the BATC. (c) 1989". This can be faded up and down using the + and - keys on the keyboard.

(6) WIPES. The main use for this is for owners of a genlock system that allows the blue signal from the computer to be replaced by the background video. This section gives a choice of 9 wipe shapes - horizontal, vertical, diagonal, rotating etc. which are cued by the + and - buttons on the keyboard.

(7) MATTES. This is similar to item 6 in that a blue static shape is designed to be replaced by a background video in the genlock device. There are 9 shapes to choose from for special effects and the size can be altered to suit your application using the + and - keys. As well as the usual binocular and telescope shapes there are mattes for a keyhole, rifle sights, video or SLR camera viewfinder.

(8) CLOCK. You can display the clock with or without date or logo and your text can be typed in. This menu also gives access to the time functions index.

(9) VIEW IFF. This loads IFF fullscreen pictures and allows you to fade these up and down.

Conclusions

A useful combination of titling and graphics programs. If all the minor niggles that I noticed could be ironed out, it could be a very good package.

If you only want a clock program, I do not think that it would be good value for money but if all the facilities can be used then it would certainly be cheaper than buying a separate program for each function.

*Note: since this review was written (during May) version 2.2 has been released, with a better manual (now properly printed). Some minor changes have been made, though the main facilities remain unchanged.

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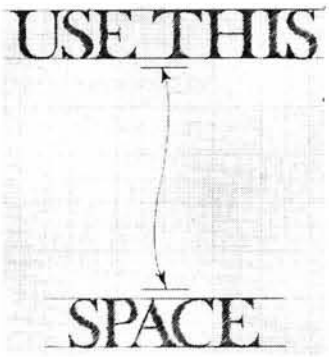

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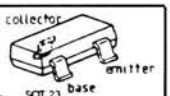

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Equipment review by Mike Richards
Practical Wireless Sept 1989

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With 99 programmable memories the IC-R7000 covers aircraft, Marine, FM Broadcast, Amateur Radio, television and weather satellite bands. For simplified operation and quick tuning the IC-R7000 features direct keyboard entry. Precise frequencies can be selected by pushing the digit keys in sequence of the frequency or by turning the main tuning knob. FM wide/FM narrow/AM upper and lower SSB modes with six tuning speeds: 0.1, 1.0, 5, 10, 12.5, 25KHz.

The IC-R7000 has 99 memories available to store your favourite frequencies including the operating mode. Memory channels can be called up by pressing the memory switch then rotating the memory channel knob, or by direct keyboard entry. A sophisiticated scanning system provides instant access to the most used frequencies. By depressing the Auto-M switch, the IC-R7000 automatically memorises frequencies that are in use whilst it is in the scan mode, this allows you to recall frequencies that were in use. The scanning speed is adjustable and the scanning system includes the memory selected frequency ranges or priority channels. All functions including the memory channel readout are clearly shown on a dual-colour fluorescent display. Other features include dial-lock, noise blanker, attentuator, display dimmer and S-meter and optional RC-12 infra-red remote controller, voice synthesizer and HP 1 headphones.

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