

# Cambridgeshire Repeater Group



## Newsletter Number 42

Spring 2001

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# Editorial

Welcome to the first newsletter of the 'real' New Millennium. It's nice to go into the New Year with the group in a healthy position, with membership (slowly) on the increase and the future of all our repeaters secure for the time being. Let's hope that 2001 is another good year for us.

It was disappointing to see so few of you at the AGM last year, because it's your chance to have your say in how the group is run and to discuss any proposed changes. The most important item affects users of GB3PI the VHF speech repeater. You may not be aware that another repeater has been brought into service in Amersham, only 12.5KHz away. As a result of this, we have no alternative but to reduce the *receive* deviation of 'PI to avoid potential interference. This means that if you use 'PI you will also have to adjust your transmitters accordingly – if not your signals will at best sound awful through the repeater. If you don't feel confident to do this job yourself, then we may be able to arrange a 'clinic' at the rally this year to make the adjustment for you. This will only be possible if there is enough demand, so please let us know in plenty of time if you would be interested. In the past when we have organised similar facilities the response has been non-existent. In this case it is most definitely in **your** interest to make sure that your Tx deviation is adjusted correctly, and the clinic will only take place if enough members contact us **before** the rally.

Finally, please note that the date of this year's rally has had to be changed 'due to circumstances beyond our control'. It is now confirmed as the 29<sup>th</sup> April 2001, still at Bottisham Village College as in previous years. This year we are particularly desperate for helpers since we will be short-handed. If you can lend a hand please contact Paul or Roger. Sadly for the first time in ten years I won't be attending, as I'll be soaking up the sun on Bondai Beach at the time. But rest assured I will be thinking of you all...

73 de Terry G0UIO



	GB3PI	GB3PY	GB3PX	GB3PT	GB3PS	GB3PV	GB7PX	GB7PX-1	GB7PX-7
Operating Channel	R6	R88	R88	439.7125MHz	RM3	RMT12	144.950MHz	1299.425MHz	439.825MHz
First Operational	May 1972	April 1975		October 1978	1985	June 1987	August 1987	October 1980	October 1993
Location	Barkway, Herts	Maddingley, Cambs	Barkway, Herts	Barkway, Herts	Berkway, Herts	Maddingley, Cambs	Maddingley, Cambs	Maddingley, Cambs	Maddingley, Cambs
QRA Locator	IO02XA	JO02AF	IO02XA	IO92XA	IO92XA	JO02AF	JO02AF	JO02AF	JO02AF
Mode	Speech	Speech	Speech	9600bps data	Speech	FM TV	AX25	AX25	AX25
Polarisation	Vertical	Vertical	Vertical	Vertical	Vertical	Horizontal	Vertical	Vertical	Vertical
Transmitter:									
ERP	25W	19W	18W	20W	10W	25W	5W	25W	25W
Frequency	145.750MHz	433.200MHz	50.780MHz	439.7125MHz	1297.075MHz	1316.00MHz	144.950MHz	1299.425MHz	439.825MHz
Aerial: Type	2x2 ele yagis	Stacked dipoles	Dipole	Stacked dipoles	White stack	Alford slot	Dipole	15+15 yagi	8 ele yagi
Direction	North	South-east	Omni	Omni	Omni	Omni	Omni	315	315
Height (a.g.l)	58m	30m	37m	42m	52m	30m	31m	30m	15m
Height (a.s.l)	210m	93m	189m	194m	204m	93m	94m	93m	78m
Receiver:									
Frequency	145.150MHz	434.800MHz	51.280MHz	430.5125MHz	1281.075MHz	1249.100MHz	144.950MHz	1299.425MHz	439.825MHz
12dB SINAD at	0.18uV (p.d.)	0.19uV (p.d.)	0.175uV (p.d.)	N/A	0.18uV (p.d.)	N/A	0.32uV (p.d.)	N/A	N/A
Squelch opens at	0.13uV (p.d.)	0.17uV (p.d.)	As TX	As TX	0.18uV (p.d.)	N/A	0.34uV (p.d.)	N/A	N/A
Aerial: Type	As TX	As TX	As TX	As TX	As TX	As TX	As TX	As TX	As TX
Direction	(single ant wkg)	(single ant wkg)	(single ant wkg)	(single ant wkg)	(single ant wkg)	(single ant wkg)	(single ant wkg)	(single ant wkg)	(single ant wkg)
Height (a.g.l)									
Height (a.s.l)									
Access method	1750Hz tone plus speech	1750Hz tone	Continuous CTCSS	Valid data	1750Hz tone	Video signal (Sync)	Packet repeater	Packet link	Packet link
CTCSS (77KHz) access?	Y	Y	Y	N/A	No (planned)	N	N/A	N/A	N/A
CTCSS (77KHz) on transmit?	Y	N (planned)	Y	N/A	Y	Y (When accessed)	N/A	N/A	N/A
Timeout	2 minutes	5 minutes	None	None	10 minutes	10 minutes	N/A	N/A	N/A
Reaccess after timeout?	Y	Y	N/A	N/A	N	N	N/A	N/A	N/A
Reaccess period	85 seconds	5 minutes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Logic: Type	CMOS	Microprocessor	PIC	Microprocessor	Microprocessor	Microprocessor	TheNet X1-H	TheNet X1-H	TheNet X1-H
Designed by	G4HH	G4BIK	G0VQH	G6COQ/G6GZH	G4XHM	G4XHM	DARC/G8KBB	DARC/G8KBB	DARC/G8KBB
Battery backup?	Y	Y	Y	Y	N	Y	Y	Y	Y



# APRS<sup>®</sup> – An Introduction And Use With Voice Repeaters.

*-by Ciemon Dunville G0TRT*

Packet radio has come of age! The reputation of it being packet racket has changed with the introduction of APRS.

APRS stands for Automatic Packet Position Reporting System and is the brainchild of Bob Bruninga WB4APR. A tracking and messaging system was the idea; to be able to see, on a map, and chat in real time between any stations on the frequency without any prior knowledge of the network.

All that's needed to try this system is a computer, tnc and radio, although this is not strictly true. There are numerous different configurations of hardware, but the one mentioned is the point most people start at. Once the hardware is in place you'll need some software, the choice is fairly large, but suffice to say there's software for every platform from DOS thru Windows and Mac to PalmOS. The most popular choice in the UK is UI-View, written by Roger Barker G4IDE.

With APRS you can send, and plot on the map:

**Beacons** – your position, be it fixed or mobile. It's possible to indicate the type of station, anything from a boy scout, to space shuttle including car, bike, truck, school, the list is long.

**Course and speed** – for dead reckoning.

**Power Height Gain** - for frequency co-ordination by plotting circles on the map for each station.

**DF Report** – for foxhunting, or jammer location.

**Weather** – including rain, pressure and humidity. Various weather stations can be linked directly to APRS to automatically send the information.

**Objects** – it's possible to send object reports for such thing as accident locations, rallies, meetings, and the list is limited by your imagination.

**Status** – used to inform the stations current activity or something similar. A lot of stations put their best on frequency DX here, other use it to put a point of contact, be it a BBS, phone number or email address.

**Messages** – All APRS messages are instant, as soon as you press send, it goes. The beauty of these messages is that they are real time and as such it's possible to have large, round table discussions with as many stations as you like. It's also possible to send Bulletins, which are messages that are transmitted a couple of times an hour for a day, these might be used to notify people of a large accident that has blocked a major road. Announcements can also be made, these are long term messages, transmitted every couple of hours for a number of days, they could be used to let users know the local standards or point of contact for information.

**Queries** – There are various queries that you can ask of another station, giving status, position, stations heard etc.

**DX Cluster** – APRS is very useful for the DX Cluster user. By listening on the Cluster freq APRS picks up spots and plots them, thru callsign on a world map, all the spot information is available on various pages and the beauty is that you never have to transmit, keeping Cluster frequency loading to a minimum. Some software can be used to automatically retune the radio and turn the beam.

So, to participate with APRS from your car you'll need a 2m radio for 144.8 MHz, a tnc and a GPS. But from a repeater groups point of view this could be a problem if you use a 2m repeater. The added expense of

another radio and the interaction of the two radios would cause problems of de-sensing, and possibly overloading receivers. But there are ways around everything. Enter the Mic-Encoder.

The following is an extract from mic-e.txt, one of the readme files written by Bob Bruninga:

“The APRS Mic-Encoder allows any radio to be used for both voice and simultaneous APRS position/message reporting by integrating the packet into a very brief tone burst at the end of a voice transmission. With the Mic-E, no additional hardware is needed in the vehicle, other than a GPS unit.

The Mic-E system not only reports position, course and speed, and vehicle type, but also one of 7 messages, a Beacon Text, and 3 analogue telemetry values! By transmitting this data in only a short 0.3 sec packet burst at the end of a voice transmission, not only is this a period of dead time due to the almost universal courtesy beeps found on amateur repeaters, but the tone burst can be easily muted out at the repeater receiver, so that the other mobile users do not hear it. In this way it can be virtually transparent to voice repeater operation.

At the voice repeater receiver, a TNC picks off the position report and digipeats it out onto the dedicated APRS frequency 144.8MHz for mobile position reporting. Although any TNC can be used, the KPC-3Plus has a special mute circuit to prevent the packet tones from being re-transmitted over the repeater output. Also, using the callsign substitution of the TNC, the frequency of the repeater can be identified by simply making the MYCALL of the TNC match the repeater frequency, such as 145750. This way the PATH of the packet contains info on where the packet originated. If all voice repeaters digipeated onto 144.8 then anyone monitoring the APRS frequency will see ALL mobile position reports from ALL GPS mobiles on ALL frequencies!

There are two versions of the Mic-E. The small Mic-Lite which can be assembled inside a radio or Microphone case, or the full size TAPR box

which satisfies the requirement for user access to switches and the requirement for withstanding the pulling and tugging on the MIC cord. The Mic-E interfaces at the mic connector and the only external input is from the GPS. This makes the entire mobile vehicle position reporting system as portable as the microphone! Simply move the MIC from vehicle to vehicle, and as long as the radios are compatible at the MIC connector, then the vehicles are GPS ready!”

All in all, APRS has some real possibilities, not only for those that use packet. Implementing mic encoder support on a voice repeater would benefit not only the managers and users, both technically and practically, but also the APRS network. Repeaters are normally well sited and this would be ideal for APRS support too. Further reading can be found at the following web sites:

<http://go.to/APRSUK>

<http://web.usna.navy.mil/~bruninga/aprs.html>

<http://www.tapr.org>

<http://www.mb7uiv.co.uk/>

<http://www.packetradio.org.uk>

There are two main email groups for the discussion of APRS in general. Have a look at:

<http://www.egroups.com/subscribe/APRSUK>

<http://www.tapr.org/tapr/html/sigf.html>

Alternatively contact the Suffolk Data Group Packet Advice Line for advice on any aspects of data comms:

<http://www.suffolkdatagroup.freemove.co.uk/>

[steve@glyre.freemove.co.uk](mailto:steve@glyre.freemove.co.uk)

**Will the Cambridgeshire Repeater Group be first to implement Mic-E support in the UK?**

# **CAMBRIDGESHIRE REPEATER GROUP**

## **MINUTES OF ANNUAL GENERAL MEETING 17TH NOVEMBER 2000 STOW-CUM-QUY VILLAGE HALL**

**THOSE PRESENT:** G0ANV, G0DKE, G0HEM, G0KRB,  
G0UIO, G0WVE.  
G1ZPU.  
G3KKD  
G4BIK, G4NKW, G4WIA.  
G6FKS.  
G7DIU, G7JSB, G7JUC, G7SRK.  
G8CRN, G8IDL, G8KMM, G8MLA.  
M1AQP, M1CKO.  
2E1HLF, 2E1HLH.

23 MEMBERS PRESENT

### **1. CHAIRMAN'S INTRODUCTION.**

The Chairman, Gerald Gardner G0HEM, opened the meeting at 20.00 hours. Only twenty two members being present this did not represent the 40% necessary for a quorum. The Chairman suggested that the meeting should proceed under the Chairman's vote rule 10(1b). This was officially proposed from the floor by G0UIO and seconded by G7JSB and carried unanimously by those present.

### **2. APOLOGIES FOR ABSENCE.**

Apologies were received from: G0LUC, G0NDY, G0OQE, G0PYS, G1LTL, G3TWX, G4ETG, G4YHN, G6AHY, G7RVS, G8JHE, G8XLH, M1ADV, M1DDZ, 2E0ASU, 2E1CRK.

### **3. MINUTES OF PREVIOUS AGM.**

Minutes of the previous AGM were available at the meeting. There were no matters arising from these minutes. It was noted that Dick Pope's callsign in section 9 should have read G4HXX not G4XHX. G3KKD proposed and G4WIA seconded that these minutes be accepted. Passed unanimously by those present.

### **4. CHAIRMAN'S REPORT**

Gerald, G0HEM, noted that the change to a Friday night for the meeting had been dictated purely by availability of the hall. He thanked the members of the committee for their regular attendance at committee meetings and the Secretary for his prompt production of minutes. The Treasurer had once again maintained the accounts and membership records in an exemplary manner for which his thanks and also to Sheila, M1CKO and Ebony, 2E1HLF for their help with distribution of membership cards and newsletters. Also the Rally Organiser and his family for their hard work with the April Rally at Bottisham.

On Technical matters Eddy, G8CRN had kept the committee abreast of the work carried out by G1YFF, G1ZPU, G4HJW, G0VQH, G4BIK, G8MLA, G3KKD & G6KZH. It has been the hard work and often donation of equipment by these people that has kept the full complement of repeaters functional for the rest of us to use. The amount of time and travel costs donated to the group by these operators is not always appreciated by the users who so often seem to expect perfection.

Our Repeater Keeper, G4NBS also shoulders a tremendous responsibility as it his licence at risk from any violations of the rules.

Finally, all members will have appreciated the efforts of Terry, G0UIO for the continual improvements in the newsletter over the year as each issue has surpassed the previous one.

The success of the group depends upon the enthusiasm of all the members who enjoy such a good service for a mere 9½ pence per week!

The Chairman attended the RSGB presentation at Castle Donnington and RA presentation at Peterborough. RSGB request a single e-mail input to the group. RA continued to state support for amateur radio as a source of new communication engineers. RA also stated a willingness to listen and respond favourably to requests for novel uses of the amateur bands.

NTL have not yet invoiced us for next year's site fees. We await with interest.

## 5. TREASURER'S REPORT.

G7SRK presented the accounts for the year comprising the Rally Account, the Income and Expenditure Account and the Accounts for the year 1/11/99 to 31/10/00. These accounts have been audited by Graham Philips, G0KRB. This is the second consecutive year that the audit has been completed *before* the AGM. Many thanks to Graham for his help.

- Rally: profit on the event was 6.6% up at £701.62 compared with £658.27 last year.

The accounts for the year show

- income:           £1464.15           (last year: £1528.08)
- expenditure:   £1616.18           (last year: £882.76)
- a balance of:   £12335.54         (last year: £12457.36)

The balance is held in a Nationwide Business Investment Account.

In view of the healthy balance it no increase in membership fee is required.

Acceptance of the audited account was formally proposed by G1ZPU,

seconded by G8IDL and approved unanimously.

## **6. RALLY ORGANISER'S REPORT.**

GIZPU read G0LUC's report as Paul was away on business. He confirmed that the rally was successful this year. Car parking space was acceptable with the use of the field. It may be more of a problem again next year when the swimming pool will be open.

Once again, many thanks to all the helpers without whom the rally could not take place.

Bottisham Village College has been booked again for next year's rally which will take place on Sunday 8th April 2001. (Secretary's note: Subsequent to the AGM a clash of dates with the RSGB rally at Bletchley made it necessary to change the date to April 29th 2001.)

## **7. WEB SITE.**

G1ZPU reminded those present that our *NEW* web site URL is [www.gb3pi.org.uk](http://www.gb3pi.org.uk) . All newsletters are available via the web site and these include minutes of previous AGM's. Suggestions for improvement to the web site are welcome.

## **8. SECRETARY'S REPORT.**

G7DIU noted the effect of the paperless society by the extensive use of e-mail. Unfortunately this meant his taking 353 hard copies for the records over the last three years!

## **9. TECHNICAL.**

G0HEM gave history of the first amateur radio repeater in the UK: GB3PI.

The first application to the authorities was made on 5th November 1971. The repeater went on air from Pyes' Newmarket Road site on 14th September 1972 and moved to its present site at Barkway in April 1973. It was not until March 1974 that the next repeater GB3BC joined it on air. The original application papers are to be supplied to the RSGB Museum at Potters Bar as a record of the first repeater in the UK.

Reports on the repeaters were given by G8CRN. All repeaters have been maintained in service.

GB3PI has suffered a number of operating problems this year. Transmit deviation has been reduced as required by the RMC to comply with 12.5 kHz channel spacing. Rx remains at 25kHz so far and will soon be compromised by users of the Amersham repeater on 145.7375 MHz. Plans are being made to use a new VHF 5000 transceiver complete with new logic. Paging interference has been identified and it is hoped to arrange for notch filters in the paging transmitter Tx lines. Problems with the alignment of the cavity filters have led to reversion to two aerial working with good results. New back-up batteries have been purchased for £359 and are currently being conditioned prior to installation at Barkway. Despite this, the repeater remains the most heavily used of all our repeaters and is probably one of the busiest in the country.

GB3PY has suffered some PA output problems over the year but has been maintained in operation thanks to help from G4BIK and temporary loan of a Motorola unit by G1YFF with pre-amp from G8MLA. A new 1060 Tx unit will shortly be installed together with the original 460 Rx.

GB3PX antenna was found to be faulty and a new item has been purchased and installed by an NTL rigger. Performance has been restored. Investigation of the possible relocation of the antenna to a higher position is progressing slowly. Thanks to Bernie, G4HJW and Jenny, G0VQH for all their help with this repeater unit.

GB3PS continues in operation with relatively low occupancy. It is now vertically polarised.

GB7PX (packet node). 23cm beam antenna needs to be redirected from the defunct GB7HXA at Huntingdon to G6GZH's QTH at Over to give required link.

GB7PT A PRF10 transceiver prepared and kindly donated by Bernie, G4HJW, has been commissioned by G1ZPU and has replaced the previous FM1100 units with great improvement.

GB3PV, the ATV repeater, continued to operate well despite an intermittent logic fault.

Thanks to G0VQH, G1YFF, G4BIK, G4HJW, G6GZH, G8CRN & G8MLA for their help in maintaining the repeater equipment over the year.

## **10. NEWSLETTER COMPETITION WINNERS.**

G3NIE, Ray; G3PTQ, Terry (via G8IDL) and G6FKS, Sid were presented with their prizes.

G8IDL proposed a formal vote of thanks to Terry, G0UIO, for the excellence of this year's newsletters which had continued to improve with each issue. This was seconded by G7DIU and agreed unanimously by the meeting.

## **ELECTION OF COMMITTEE.**

Ian, G3KKD stood down from the committee although continuing to remain a member. G8MLA had been co-opted during the year for technical liaison activities. On a proposal from G3KKD seconded by G7JSB the officers were re-elected en bloc on a unanimous show of hands. The remaining committee members were again proposed to continue on an

en bloc basis proposed by G0KRB, seconded by G0DKE and again unanimously agreed by the meeting.

The officers for 2000 - 2001 are therefore:

G0HEM	Chairman
G0LUC	Rally Organiser
G0UIO	Newsletter Editor
G4NBS	Repeater Keeper
G7DIU	Secretary
G7SRK	Treasurer
G8CRN	Technical Liaison
G8MLA	Technical Co-ordinator

G0KRB agreed to continue as auditor.

## **11. ANY OTHER BUSINESS.**

G0HEM made a presentation of a framed manuscript to Ian Waters G3KKD in recognition of his services to the repeater group. This was acknowledged by loud applause from the audience.

Ian joined the group in 1987 and was Chairman in 1989 and again from 1995 to 1998. He also has been responsible for the majority of the work on GB3PV and the recent liaison with the use of Bottisham Village College and Stow-cum-Quy Village Hall.

The meeting was closed at 21:19 hours and many members repaired to the White Swan for refreshment.

G7DIU - Secretary



# TWO FILTERS AND A DIPLEXER FOR 23cm

*IAN WATERS G3KKD*

This article describes two interdigital bandpass filters for 23 cm that have been designed, made and tested to information contained in the ARRL publication “UHF/Microwave Experimenters Manual” page 6-39 to 42. It also describes a diplexer which uses one type of filter to enable transmission and reception via a single antenna.

Filter A is a fairly simple design of modest performance with active elements. It has a 3dB bandwidth of 8.2% or 105 MHz centred on 1282.5 MHz and thus covers the whole 23 cm band. It has a VSWR of 1.5:1 and, when made in aluminium, an insertion loss of approx. 1 dB.

Filter B is a somewhat more complex design with 5 active elements and a much better performance. It has been designed to have a -3 dB bandwidth of 1.1% or 14.5 MHz centred on 1316.0 MHz. and thus covers the RMT-2 repeater output channel, although it can be tuned to cover any other 14.5 MHz segment of the band, for instance a repeater input channel. It too has a VSWR of approx. 1.5:1 and, when made in aluminium, a slightly higher insertion loss of 1.5 dB.

The measured amplitude frequency responses of these filters are shown together in **Fig 1**. while the measured response of filter P is shown with an expanded frequency scale in **Fig 2**.

It may be mentioned that the ARRL information covers the design of 23 cm filters from 3 to 8 active elements and percentage bandwidths from 1 to 10%. In total 4 filters have been made using the ARRL data; they have all performed exactly as expected and have tuned up without difficulty. This gives confidence in the data which is more than can be said of that in some other publications

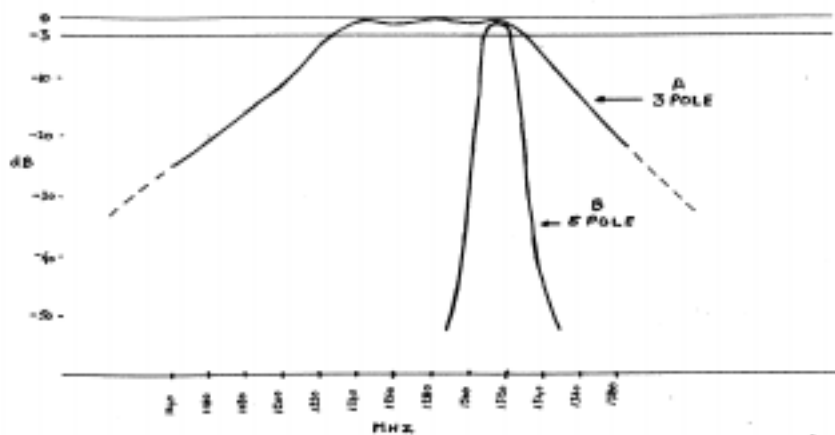


Fig 1 MEASURED AMPLITUDE/  
FREQUENCY RESPONSE, FILTER  
A & B GSKKD 20-3-1993

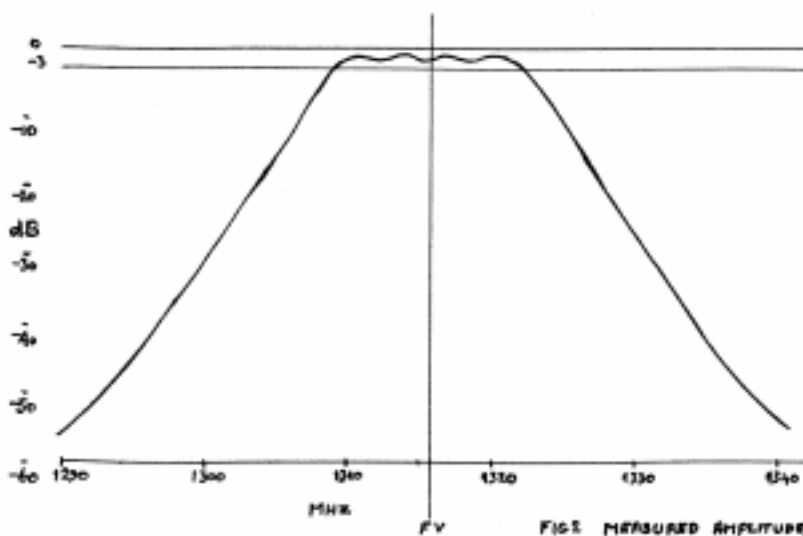


FIG2 MEASURED AMPLITUDE/  
FREQUENCY RESPONSE FILTER B  
GSKKD 20-3-1993

## **Construction.**

The filters can be constructed in aluminium, as I have done, or using silver-plated brass. Plated brass would probably give a better performance, although it is difficult to say how much better, but would be much more expensive.

The mechanical details of filter A are given in Fig 3 and those of filter B in **Fig 4**. They are quite simple to construct provided that a small lathe and the usual hand tools are available, but the work, especially for filter B, is quite time consuming. If no lathe is available the services of a friendly model engineer might be obtained.

The top and bottom plates are made from 1" x 1/4" stock aluminium strip. The side plates are cut from 16 SWG or preferably 14 SWG aluminium sheet. The top and bottom plates should be drilled and tapped to 3 or 4 BA and the sides attached with screws at 1" intervals. Care should be taken to remove any burrs and ensure good contact.

The rods are turned down from the next largest size of stock aluminium rod. They should be accurate to within  $\pm 0.002$ ". They are centre drilled and tapped for attachment to the top and bottom plates using any suitable screws. The tapped ends are countersunk slightly to ensure that electrical contact is at the circumference. The end rods, or input and output transformers, are drilled to accept the centre contacts of the input and output plugs. These are clamped by small screws in tapped radial holes at the ends of the rods.

The tuning screws may be of any size from 1/4" to 3/4" and can use any fine thread for which taps and dies are available. I have used 32 threads per inch which gives a very nice tuning adjustment. However care must be taken as fine threads can pick up and seize quite easily. Plenty of cutting paste or oil! Lock nuts are required which are tightened once the filter is tuned.

The connectors may be N, TNC or BNC to taste. The method of fitting will depend on the connectors available.

Rod Ø  
 1 & 5 0.514"  
 2 & 4 0.327"  
 3 0.353"

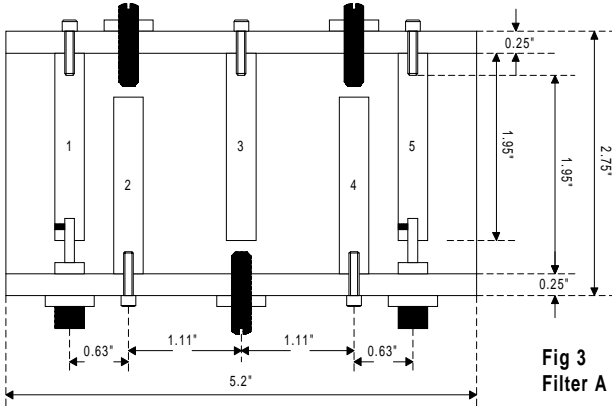
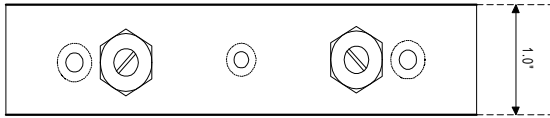
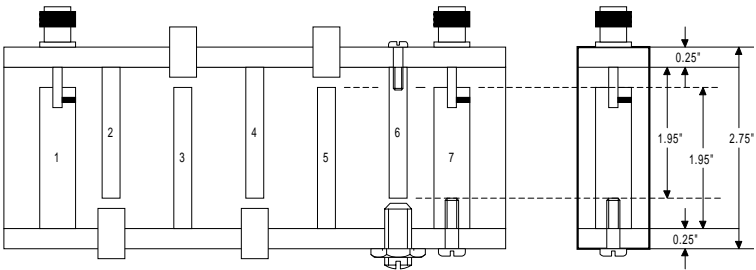


Fig 3  
 Filter A



Rod Ø  
 1 & 7 0.540"  
 2 & 6 0.380"  
 3,4 & 5 0.390"

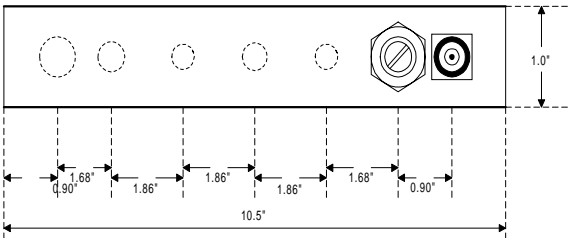


Fig 4  
 Filter B

## **Tuning Up.**

I have to admit that I have tuned these filters up using a sweep oscillator with frequency markers. This permits the passband to be set exactly as desired and the shape to be optimised with minimum ripple. One problem is to first tune the filter to allow enough sweep signal to pass through it to enable alignment to start. With the 3-element filter it is not too difficult to randomly turn the tuning screws until something is seen. The larger number of permutations possible with the 5-element filter make this much more difficult. I have inserted a c.w. signal at the passband centre frequency and looked for something at the output using a spectrum analyser. Once something is seen, even at -70 dB, the tuning can be quickly optimised. Another way, which I have not tried, would be to use a communications receiver.

I appreciate that not everyone has sweep generators and spectrum analysers. If anyone would like me to tune up a filter that they have made I would be happy to do so.

## **Applications.**

Filter A was designed for use as an image noise filter placed between the r.f. stages and the mixer in a receiver, or after the up-conversion mixer in an i.f. modulated transmitter to remove unwanted mixing products.

Filter B has been applied in a number of ways.

It can be used at the output of a transmitter, perhaps a repeater transmitter, to remove unwanted modulation sidebands. If the insertion loss of 1.5 dB is too much to lose, then assuming that the PA is a class AB linear brick amplifier, the filter may be placed between the drive stage and the PA. A class AB amplifier, if not overdriven, will not reinsert the removed sidebands and the loss of drive power can usually be made up quite easily.

It can be used at the input to a receiver, either at the home station or at a repeater to protect against adjacent channel, probably radar, interference.

It can be used at the home station in the feeder of a look thru antenna to reject sidebands of the stations own transmissions, which can degrade the look thru picture.

## **Diplexer.**

Two filters type B, one tuned to the transmit frequency and the other to the receive frequency, connected together by a coaxial T junction, as shown **Fig 5** can be used to make a very effective diplexer to enable transmission and reception via a single antenna. This may be used at a repeater constrained to use only one antenna, or at the home station to enable look thru via a single antenna.

The T splitter is made from an N type coaxial connector and two lengths of semi rigid coaxial line fitted into male N plugs. The length of these is such that the effective length from the centre point of the T to the start of the filter input transformers is one wavelength, taking the velocity factor of the coaxial line used into consideration. The theory is: Each filter has a reasonable match and so presents a low impedance at its passband frequencies, but a high impedance at the other channel some 65 MHz away. These impedances are transferred by the one-wavelength T arms to the junction point. An incoming signal thus sees a low impedance path to the receiver, while the other path appears as a high impedance. Conversely the transmitter sees a low impedance path to the antenna, but the route to the receiver appears as a high impedance.

The transmit filter suppresses out of band modulation products, particularly any that may be in the receiver passband. The receiver filter also suppresses the transmitted signal and any other signals beyond the wanted receiver passband. Although its insertion loss degrades the receiver sensitivity by 1.5 dB, the improvement in received picture quality in the presence of interfering signals makes this well worth while.

The transmit/receive cross loss is beyond the limit of practical measurement. When receiving a P1 picture, it is possible to switch the transmitter on/off without seeing any change in the received picture quality.

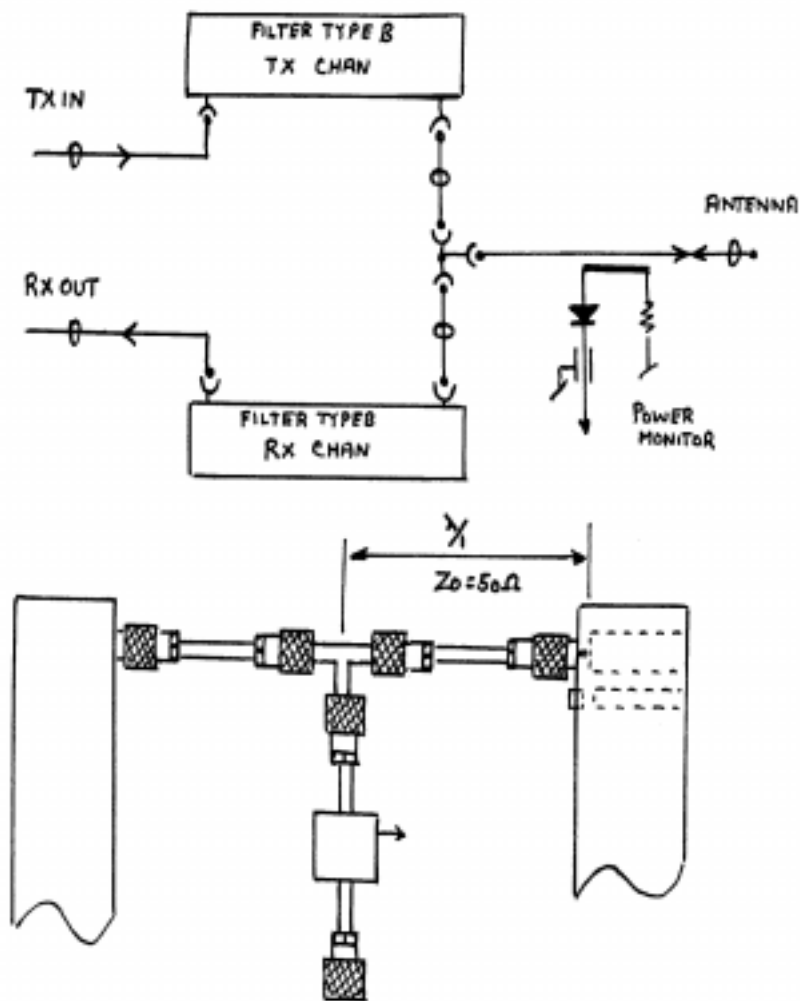


FIG 5

TX/RX DIPLEXER

G3KWD 20-3-1999

# Telephone Interference

*Phil Norris G3XVN*

So here it is. 40M on Saturday afternoon, the dreaded knock on the front door, and your next door neighbour says “could your radio be coming through on my telephone?”. Ten minutes of tests later and you know the answer is “yes” (big time!). A week later (and more tests) and you know that anything over 20 watts on 80/40M is knocking out next door’s phone and yours too!

When this hit my station recently it took me three months to sort it out, so hopefully if you get this problem, I can save you some time.

Background: I run an ICOM IC-706 at 100 watts into an 80/40M trap dipole, with one leg straddling the roof of the house, and a pair of BT approved phones which showed no problems in a similar situation in my last house.

Helpful amateurs offered numerous hints as below which I tried to no avail:

Clip on ferrites at the  
Wireless  
ATU  
phones

12 turns of the telephone cable through a large ferrite ring close to the phone.

As many turns as possible of the telephone cable wrapped around a six inch ferrite rod close to the phone.

Power the IC-706 from a car battery (to eliminate the PSU coupling to the mains).

IC-706 connected to a dummy load (to confirm it was the aerial which was causing the damage. It was!).

However, trawling through back editions of RADCOM yielded a suggestion that you could buy an RF2 filter which plugs into the standard skirting board phone socket (a.k.a. BT Freelance LJU10/14A) from BT shops. Unfortunately BT shops and BT central customer sales all denied any knowledge of such a filter (but read on).

I then invited BT engineering to visit me to try to sort out the problem. Pleasant surprise? They turned up the very next day! Not so surprising? The engineer tried very hard, had some good ideas, fitted his filter in a number of different places BUT failed to make any improvement because he didn't have the BT Freelance LJU10/14A plug-in filter recommended above!

Eventually I was advised by G8ATO (Norman) on GB3VH that the RF2 filter could be acquired from COMTEC at High Wycombe (01494-450921 and ask for Rob), and they were able to supply the filter which completely cured the problem both in my house and next door.

COMTEC's stock code is 990148, description is Protector LJ10/14A RFI and they cost £6.99 each. Unfortunately COMTEC have a minimum order value of £20, then there's VAT on top and £6.50 delivery, so you're going to shell out over £30, but you'll have three filters and they do work.



## **M1DFR Silent Key**

It is with regret that I have to report that Oliver M1DFR passed away in Addenbrookes Hospital on the 20<sup>th</sup> January after a month's illness. He will be missed on GB3PI, especially for his evening 'rag-chews'

# The SMID-GEN CW/SSB Receiver

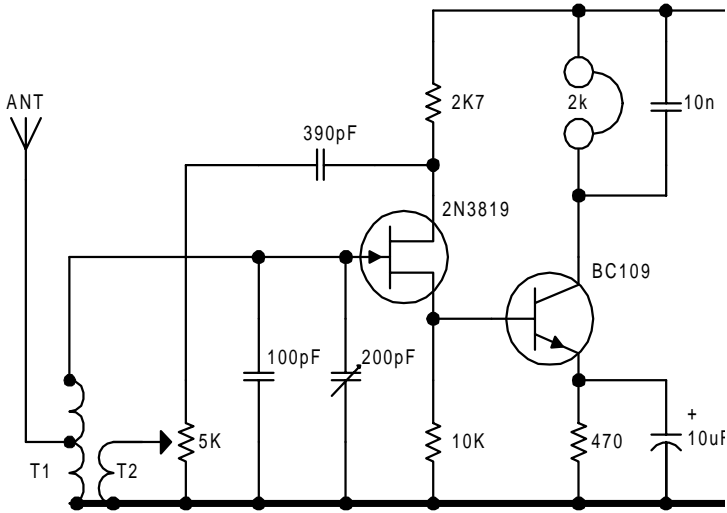
*John Smith G4KJJ*

I was impressed by the MB4 receiver that appeared in SPRAT last year and I became interested in seeing how simply and cheaply I could design a receiver that would receive amateur and commercial transmissions and give an acceptable level of performance with minimal component count and sophistication. The result is the SMID-GEN. I use the term *design* loosely as the circuit uses standard component configurations for a regen. and a one transistor amplifier. To my surprise and delight it worked first time!

Until you have used a Regenerative receiver it is difficult to appreciate just how amazing its performance can be. Within a few minutes of operation listening to 40m cw transmissions using a 2 metre antenna stations throughout Europe were received. In the evenings it was necessary to shorten the aerial to avoid over loading and a 30 cm wire on the bench was sufficient to bring in many stations. However don't get too excited – construction and operation of such a simple receiver requires care and patience. Good quality components, air spaced variable, rigid construction, slow motion drive, short wiring, careful tuning, problems of hand capacitance and minimum band spread have all got to be catered for. This is a radio that requires careful driving and experimentation to achieve the results mentioned. It is not a radio that would instantly be successful in the hands of an inexperienced constructor despite its apparent simplicity.

The mark 2 version was built just for 40m, fine tuning by slow motion drive and the Regen. pot plus body and hand capacitance! Once these features are appreciated and experience gained the world is your oyster, (well, at least most of Europe) for less than a fiver! Tuned circuit caps are pf; I suggest experimenting with different caps across the coil for alternative bands. Use your station Rx to monitor the

regeneration frequency. The prototype was built on matrix board and the final version using the copper island technique on copper clad board. A good pair of high impedance phones is required or you could increase the component count and use a transformer to 8 ohms.



© G4KJJ 20

### Winding details of transformer T1/T2

T1 28 turns centre tapped 28 SWG on T50-2 toroid with 8 turns for T2 connected at the earth end

Note: The T2 coil must be wound in the opposite sense to the T1 coil, otherwise regeneration will not take place.



# CRG Members 2001

G0: ANV, DKE, HEM, UIO, VQH, WVE

G1: LTL, XAM, ZPU

G3: KKD, PTQ, PWK, XVN, WXW

G4: BIK, LKF, NBS, NKW, WIA, YFV, YHN

G6: FKS, NMK, RNN

G7: DIU, JSB, JUC, SRK

G8: CRN, IDL, JHE, KMM, MLA, UGR

M0: BYB

M1: AQP, CKO, GPD

M5:

2E1: CRK, HLF, HLH

2E0: ASU

KC2BWZ

43 Members.

*[Don't worry – this figure is so low because not many came to the AGM and paid their subs. The membership forms are being sent out with this newsletter to save on postage. Hopefully I'll have trouble fitting all the members on one page in the next issue... ED]*

# Letters

Sir

May I congratulate you and your team on production of recent newsletters. The technical content, info on repeater installations plus the humour thrown in for good measure.

After the brownie points, now a brick. Not at your team sir, but at a few, a very few, who use bad language on GB3PI. Heard recently, quote; “poxy car”, “towing a poxy trailer”, “On the poxy A14”. In another QSO the word ‘bastard’ was used. This may be normal on 27MHz channel 19 but do we want to have it on our repeater? We should be proud to demonstrate amateur radio to other people, but at the moment one has to be selective, more so when children or ladies are our passengers. I am **not** a prude, sir, I have served in the army and worked on a building site and factory line in my working life. Do other listeners find this offensive along with the crude jokes that proliferate on repeaters? I expect a lot of flak, but these people (amateurs!) have the right of reply via your newsletter.

73 de John Nash G6HKQ

## CAMBRIDGESHIRE REPEATER GROUP

I wish to apply for / renew my ordinary / family / student (under 18) membership of the Cambridgeshire Repeater Group. I enclose the necessary subscription (£5 / £7 / £3) respectively and agree to be bound by the Groups constitution.

Name .....

Callsign .....

Address .....

.....

.....

 Postcode .....

Please delete the following if appropriate-

1. I agree that my details may be held on a computer database, which is not registered under the Data Protection Act. (If you wish you may have a copy of the information held about yourself.)
2. I am willing to have my Callsign included in any list of members which may be issued by the group.

Signed.....

Please make cheques payable to the “**Cambridgeshire Repeater Group**” and send them to the Hon. Treasurer :- Mr. R.Carder G7SRK, 45 Chalklands, Linton, Cambridge, CB1-6JQ.

*Thank you for your support.*

**The membership form overleaf is included for your convenience, in case you lose the one enclosed with the newsletter - don't worry, we don't want you to pay twice!**

If you know anyone who regularly uses the Cambridge repeaters and isn't a member of the group, please pass a form on to them.

With your continuing support we can continue to improve the service to our members and ensure the future of *your* repeaters.

# General Knowledge Quiz

- 1) Who was Tsar Nicholas II's youngest daughter?
- 2) Of which country was Sir Keith Holyoake Prime Minister?
- 3) From which inn did Chaucer's pilgrims set out in Canterbury tales?
- 4) In which sport has Stephen Roche achieved success?
- 5) Which country is the home of feta cheese?
- 6) What is the difference between dicotyledon and monocotyledon?
- 7) Larry Hagman is the son of which famous actress?
- 8) Whose autobiography was entitled *Is That It?*
- 9) What was once called brimstone?
- 10) In the world classification system for plants, what are aquatic plants containing chlorophyll always called?
- 11) Who said the famous phrase 'An army marches on its stomach'?
- 12) In which film did Elvis Presley play the rôle of a boxer?
- 13) Of what was John Demjanjuk cleared in 1993?
- 14) Give the popular name for antirrhinum.
- 15) What post was held by H. R. Haldeman at the time of Watergate?
- 16) Which well-loved cartoon animal made his debut in 1937?
- 17) What is the height, in feet, of St Paul's cathedral in London?
- 18) 'Mayday' is the word used for a distress signal. Where does the word come from?
- 19) On which book was the musical *Cabaret* based?
- 20) What type of furniture is a davenport?

Answers as usual to Roger, G7SRK.

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