# HRT

Incorporating SCANNERS

## HAM RADIO TODAY

AUGUST 1994 £1.80

# RALLY 'BARGAIN HUNTING' SPECIAL

Our 'rally survival guide' shows you how to get the best buys!


## BUILD A FAST NICAD CHARGER FOR YOUR PORTABLE RIG

## So What's in a Callsign?

**Choosing your new call!**

## 'Callbooks on Disk'

**Two of the latest tested**

9 770269 826048 08

ARGUS SPECIALIST PUBLICATIONS asp

NOVICE • PACKET • REVIEWS • PROJECTS • SATELLITES

# HRT



# CONTENTS

## HAM RADIO TODAY

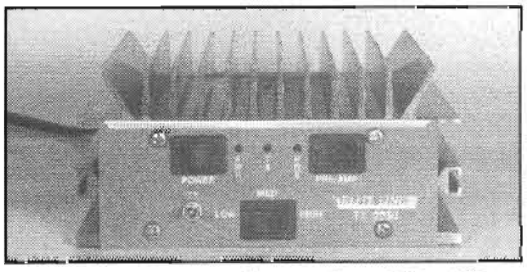
VOLUME12 NO.8 AUGUST 1994

## REGULAR COLUMNS



## REVIEWS





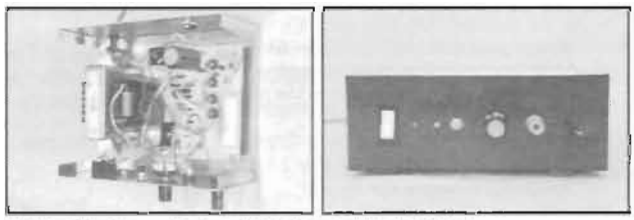
**Mainline 75W 2m Linear Amplifier Kit Reviewed**

## FEATURES



## PROJECT





**'PROJECT - FAST NICAD CHARGER'**

## NEWS AND VIEWS

# CQ de G8IYA Editorial

## *A changing image at rallies*

Many amateurs will be venturing out during the summer rally season in the (hopeful) sunshine, each to have a good time in their own way. This usually takes in a spot of 'bargain hunting' amongst the stands, and very often it also combines a social occasion. It's not that often when an amateur, who's active on the bands, can wander around a rally without 'bumping into' other amateur friends, some they've possibly never met before. Because many rallies are 'area' events, some even 'national' events, they usually draw amateurs from a much wider area than that of a local club. They also draw amateurs who you may never see down at any local club!

In my Editorial last month, I portrayed a long car queue to get into a typical popular rally, with a £10 admission fee once at the end of the queue. Just after that, I went along to the Drayton Manor rally. Don't get me wrong, I'm not complaining, not at all, I knew what to expect, but I also knew what to look forward to inside the rally grounds. The long queue at opening time was there, about a 20-30 minute tail-back along the main road of cars, their drivers all waiting to pay to get in. The admission price for my car-load was £9.50. A feeling of deja-vu crept over me - I was only 50p out! It was, incidentally, a super rally as always, with plenty of 'junk' as well as 'black box' stands. It's one I always try to get to if I can, and the superb Drayton Manor theme park makes it a good day out for the whole family.

### Differing attractions

So, where did my 12 and 10 year-old sons want to go first? The numerous theme-park rides (with the wrist-band 'go on anything you want, all day' tickets I'd bought them)? The zoo? To get an ice-cream? No - they wanted to go round the rally stands first to see if they could find some low cost computer hardware and software! My 12 year old even came away with more cash than he'd come with, by doing an initial 'deal' with a stand owner who purchased some software from him.

He's currently planning on using his computer, with the 56 kilobaud 23cm packet link we have here, for real-time multimedia (computer video and digital audio) communication over the local, and not-so-local, amateur airwaves. A further high-speed packet 'wormhole' is planned to link our area with LONNY, the London-New York packet wormhole. I don't shudder to think what will happen in the foreseeable future, as I've a good idea of what will, and it looks exciting.

Amateur radio hasn't started to change, it has changed. It's continuing to change in leaps and bounds that amateurs of say, 10 or 20 years ago, may never have dreamt possible. Even the well-established 80m nets, with many very mature and highly-respected amateurs whose callsigns are almost a 'household name' in amateur circles, are sometimes interspersed with comments of "I'll just check the latest propagation conditions on the DX-cluster" or "my CD-ROM callbook tells me his address is..." or "I've just had a message downloaded to my TNC from VK3.. in Sydney who asked if I'd listen for him on 80m tomorrow morning".

The growth of the use of computers in our hobby is a hard fact. It isn't just the 'specialised' amateurs who use them, as was the case in past years. Is it surprising that many rallies nowadays also have a large number of computer-based stands as well as amateur radio transceiver, aerial, and accessory stands? What about those stands with row upon row of shareware software offerings, arranged into sections covering propagation, logging, Morse, packet, DX clusters, and rig control? I've just received a set of MFJ 'Windows' software for review, planned for next month's issue. The things this software can do are, literally, incredible. If you remember HRT's article 'The Silent Key' in the Jan 1993 issue, you'll know what I mean.

**Here's one of this year's Drayton Manor rally attractions the HRT Editor did'nt take advantage of!**

### Scanners

Another 'newcomer' during recent years is that of people having been introduced to our hobby via scanner listening. Even The RSGB, who have publicly been 'dead against' scanners, even have a scanner review in the May/June issue their DiY Radio magazine which is specifically aimed at beginners. Looks like they've been listening. The latest Scanners 3 book (available from our sister company Argus Books - see recent adverts in HRT) by the late Peter Rouse, was edited by our very own Tech Ed, and it includes details of 6m, 4m, 2m, 70cm and 23cm FM and SSB/CW activity, together with amateur bandplans, details of typical propagation, aerials, even when contests such as VHF NFD occur. An interest in this could help already enthusiastic listeners start a new hobby, that of not just listening but also that of eventually getting a ham licence and talking back. Or keyboarding back. Maybe soon multimedia videoconferencing back.....

### Next month

HRT's recent free 'scanner software' offer was so popular, that next month I'm hoping to offer a similar collection for readers but with amateur radio based software and text files. Watch this space!

# LETTERS

## Letter of the month

Dear HRT,

On reading your Editorial in the February issue, may I ask you, and others, not to be too off-hand in condemning institutions for apparently over-charging for NRAE and RAE courses. I am in the process of trying to set up both courses at the Sixth-Form College where I teach. The situation which the government has knowingly established in all schools like ours is that we have to pay for the use of our own facilities when running courses out of normal teaching hours. Our local packet radio group has had to decline a quotation from the College to hold a boot sale and equipment auction, because it was too expensive, despite the fact that I had negotiated an £85 discount for them!

We are doing our best to introduce our students to amateur radio. Laying on courses is a logical extension of this, they cannot be held during normal hours – the students have a full timetable, so after hours is the only option and we have to be able to cover our costs. I don't expect we will have any takers in view of this, despite being centrally situated for our local area!

All is not plain sailing, even for those of us trying to expand the horizons of our hobby!

George Brown, G1VCY

**Editorial Comment**

**We at HRT still think that over £100 to attend a Novice Course in one reported instance to the RA is a lot of cash for a 10 year old to find out of his pocket money. But we do sincerely applaud some people who are voluntarily tying to help our hobby rather than just to make a few quid for themselves out of prospective newcomers.**

Dear HRT,

Someone should tell Dennis Barber G0UFS/KB8GCF (June letters) that he's missed the April issue by a couple of months. His suggestion that those of us who like to use proper English are small-minded must be a wind-up! His suggestion that we should all use 'internationally accepted' words like antenna, hood and trunk seem fair enough, until you read on and find that he's only promoting the use of the terms used in his adopted country. Presumably if he'd emigrated to France he'd want us all to speak French, and if it was Japan we'd all have to say "It are not raining here in Tokyo". Dennis can use whatever terms he likes, but if it's all the same to him I'll carry on speaking English.

Meantime, here's my own contribution to the 'Campaign for un-American English'. When we go to the theatre and buy a copy of the sequence of events, we call it a 'programme', when we write down a sequence of events and tell a computer to action it, we call it a 'program'. Dare I suggest that since in both cases we mean the same thing (a predetermined 'order of happenings'), we use the same word? Let's leave the version with letters missing to our friends across the pond, and show our individuality by using computer programmes!

Sorry Dennis, but I did like your other letter bemoaning the demise of British education – sad but true!

Abuse arising from any of the above points will be cheerfully accepted via GB7XJZ!

Paul Duell, G0TLG

Dear HRT,

Ref. antenna/aerial debate. Quite simply, a vertical aerial is an antenna and a horizontal long wire is an aerial!

73, Roy Harry, G0EWC

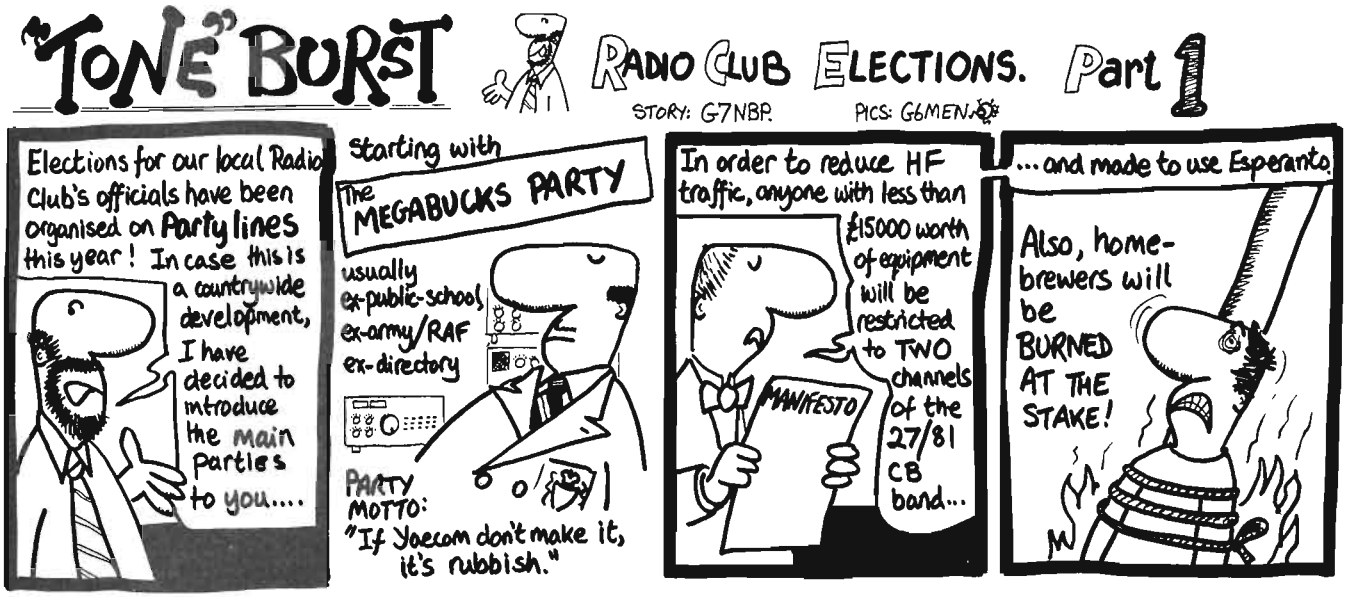
Dear HRT,

I read Dennis Barber's letter in the June issue with interest and I have only one comment to make. For someone who can give a modern GCE holder a run for their money, he seems sadly lacking in the basic knowledge that this country is called Britain, not England. I know its just a small point, but it tends to annoy the rest of us in the 'provinces'.

G. Wilkie, GM0RMT

## £10 for the Letter of the Month

Do you have something constructive to say on the state of amateur radio today? Perhaps you'd like to put your viewpoint to the readers, get some discussion going, or give an answer to one of the issues raised? We'll pay £10 for the best letter we publish each month. So write in with your views, to Letters Column, The Editor, Ham Radio Today, ASP, Argus House, Boundary Way, Hemel Hempstead, Herts HP2 7ST, or fax your letter direct to the Editor's desk on 0709 263429. Please keep your letters short, we reserve the right to shorten them if needed for publication. Reader's views published here may not necessarily be those of the magazine




Dear HRT,

Regarding your letters column (April 94), I noticed your answer to Mike Parker re US licence procedures. I hold a US Advanced Licence and am also an acredited VE with both the ARRL and the W5YI groups. I wrote to the RSGB (I'm a member) about the whereabouts of any VEs, but as is usual with RSGB, no answer was the stern reply, they always seem to ignore requests for information etc., the reason I left the RSGB once before. However, my query is, are there any US accredited VEs in the West Country? Failing that, who would be the best to contact regarding offering my services should it be needed? Is there a pool of VEs in the country? I would welcome any advice or information, as you seem pretty well informed and may have the answer.

I got the Novice Tech and General books, also the Advance manuals, took the test in Cleveland Ohio and went right through and 13 wpm. I think the books for each grade are excellent for learning from, a system that I think would work well over here, but that's just my opinion.

Tom Waters G0GQJ/N8WHF

**Editorial comment;**

**There are VE teams covering some areas of the UK, for example London, Shefford, exams have been held at the Leeds Rally this year and are planned for next year's London Show. Maybe you could contact your VEC and suggest a 'roster' of VEs for your area?**

Dear HRT,

I am very interested in Amateur Radio and I would like to get my Novice Class B licence, but I am having great difficulty finding anyone who is willing to run a course for me, a friend and his dad. I have written, also, to the RSGB and I received a list of people who are supposed to be able to run the course, but when I contacted them they said they couldn't. My friend's dad has been trying for a long time to get someone to do the course but has had no luck. I live in Chiswick, London and I just can't get anywhere. Can you help me?

Your sincerely,
Daniel Robinson age 12.

**Editorial comment;**

**Have you tried your local radio club? They can often offer a great deal of support, the nearest one to you is probably the Acton, Brent & Chiswick ARC, Tel. Mr. C. Mulvany G0JRY on 081 749 9972 for details. Otherwise I am afraid it will be a case of having to travel to one. Unless any of our readers can help?**

Dear HRT,

Having been a reader of HRT for some time now I find the magazine most worthwhile and good value for money. I am particularly taken with the almost family feeling created by the close visual presence of the Lorek family in every issue I have seen; HRT would not be the same without them!

Is it too much to hope for that, for the future, the readership can look forward to photographs of the Lorek cat, the Lorek dog, the Lorek hamster, the Lorek gerbil or even the Lorek canary? Thank you for an interesting and informative read.

W. T. Johnston.

**Editorial comment;**

**Well if you really like I'll photograph my two cats, I don't have any other pets, only Chris!**

**MORE LETTERS NEXT MONTH**

# So What's in a Callsign?

*Roy Clayton G4SSH offers a guiding hand to recipients of that hard-won RAE or Morse test pass slip*

Congratulations! Your hard work has at last paid off, and you have just received your eagerly awaited Radio Amateur's pass slip from City and Guilds (or Morse Test pass slip from RSGB). Stand-by world, here we come!

At this point, **stop**! Before you rush off to the postbox with the application form for your well deserved licence, just sit down and pause for though for ten minutes or so. It could make a tremendous difference to your success as a radio ham, especially if you intend to attempt to work long distance (DX) stations, on HF or VHF.

Most successful candidates like yourself are so overcome with relief at receiving their pass certificate that they write out the cheque in a daze and have the application form in the post within the hour. Fine. This ensures that they have a shiny new G7 or G0 callsign in the minimum possible time (often within a few days). However, unless they are particularly fortunate, they will then spend the rest of their amateur radio lives regretting their moment of rashness. Why? Read on.

Let us follow a typical application from a fictitious amateur called Dave, who was determined to be the first in his Morse Class to have an 'A' class callsign. Within 24 hours of receiving his pass slip his application form was in the hands of Subscription Services Ltd. in Bristol, where it was processed through the system. British callsigns are allocated in strict alphabetical order, so as the last callsign issued was (say) G9USM. Dave was allocated the call G9USN, which was back through his letter box in 48 hours. Fine (you might think) so where was the problem?

## What's the problem?

The problem was that Dave had not the slightest interest in using CW on the air (in fact he threw his Morse key in the river just after he posted the application). However, with trembling hands he opened the envelope, saw the magic words 'Validation Document', gave a cry of delight and rushed into the shack, determined to make his first phone QSO with some exotic location on the South Pacific. OK so far? On went his gleaming new rig and with baited breath Dave quickly tuned through the 20m band until, to his amazement, he heard CE0ZIG calling *CQ*. Easter Island, what a start, talk about beginners luck!

Now Dave had been a short wave listener for a number of years and he reckoned (quite rightly) that there would be a few other stations who had also heard the call and who would be equally eager for a QSO with this rare DX station. Quick as a flash, Dave had the microphone in his hand and attempted to get his shiny new callsign on the air first, to beat the rush.

If you still can't see the problem, then try saying the phonetic version of Dave's callsign a couple of times and see just how snappy this really was;
*Golf Nine Uniform Sierra November*
*Golf Nine Uniform Sierra November*

Now do you see just what Dave has lumbered himself with? Only a suffix, to be used mainly on SSB, with not less than nine syllables. What a disaster! Fred up the road, with *Golf Nine Mike Golf Mike*, managed to nip into the pile-up, work the station, fill in the log and write out the QSL whilst Dave was getting out his second call! OK, so I exaggerate slightly. But the point should well and truly have sunk home by now. Never trust to luck in the allocation of your callsign, be it class A or B, remember; it is your's for life.

## What can you do about it?

The answer is to choose your own callsign. The first job is to look on the back of the application form that comes with the pass slip, or of course each month in *HRT*. This will give the address and helpline phone number of SSL who issue the callsigns. Ring this number and enquire which callsign is presently being issued for the class in which you are interested. Simple. The latest callsigns issued are also announced on the GB2RS news broadcast every week. Armed with this knowledge you can now apply for the callsign of your choice. The rules stipulate that you can reserve any callsign six months in advance of its expected date of issue. SSL will give you an approximate date for the one that you select.

Now is the time to stop and consider just what your main operating mode will be. If it is going to be SSB, then go for a callsign with short crisp syllables. If you are a dedicated CW man then you also want crisp characters, but these will be completely different from the ones chosen by an SSB operator. In CW you must avoid single character Morse letters such as *E* or *T*, as these can be lost during fading band conditions, or run together with the next symbol. Also avoid the letters *G* or *K* as the last letter of the callsign (which causes confusion if you repeat your call). In the DX world you often have just one shot a being heard by a rare station before the pile-up starts, so make it as easy to read as possible.

Some people will favour a personalised suffix, such as *ALF*, *JOE*, *KEN*, or *SUE*, whilst others will want their initials, or instantly remembered letters such as *BBC*, *SWL*, *XYL*, or even the same letter repeated three times. Whatever you choose, spend a while either trying it out on the Morse key, or speaking it aloud in phonetics. Always seek the advice of an experienced radio amateur before finally choosing a call; for example, the suffix *TVI* might seem an attractive call to remember, but would it be an absolute nightmare to use on CW.

Once you have decided on the call (with a second choice), ring SSL to confirm that it has not already been reserved. If not, then now is the time to get your cheque and the application in the post, with the request in writing. You may have to wait a few weeks or even months until the allocation reaches your selected call, but what is a few months when you will be known by, and use that call for the rest of your life? Good luck on the air. Believe me, some callsigns are worth two S-points on the meter

# Callbooks on DISK

***The HRT Editorial Team investigate a new breed of commercially available UK callbooks, PC disk based types!***

One of the most useful operating accessories in anyone's station is that of a callbook, i.e. a book listing the names and addresses (or at least the locations) of licensed amateurs. For some time now, printed callbooks have been readily available, these either covering just the UK and/or EI (like those published by the RSGB and the IRTS), or larger ones covering many countries such as the ARCI 'North American' and 'International' callbooks.

## Uses

If you're a HF operator, these are of course invaluable for looking up direct QSL address information, either for the station worked or for the address of the QSL manager if given. For VHF and UHF operators, a UK callbook is similarly useful, and when you hear that weak 'CQ' on the band, you can quickly find out where the station is located so that you can rapidly point your beam in the right direction without having to 'hunt'. Address listings are, of course, also very useful for amateur radio club and repeater group secretaries!

But how about the case where you remember which town or village your amateur friend lives in whom you've lost track of, or maybe you just know their surname, but you can't remember the rest, their callsign for example. Maybe you'd like to drop them a line or a packet message? Likewise you may like just to find out who the other amateurs in your locality are, or one you're going to visit. Looking through several tens of thousands of amateur's details in a printed callbook isn't a quick way to find out! Enter the computer database.

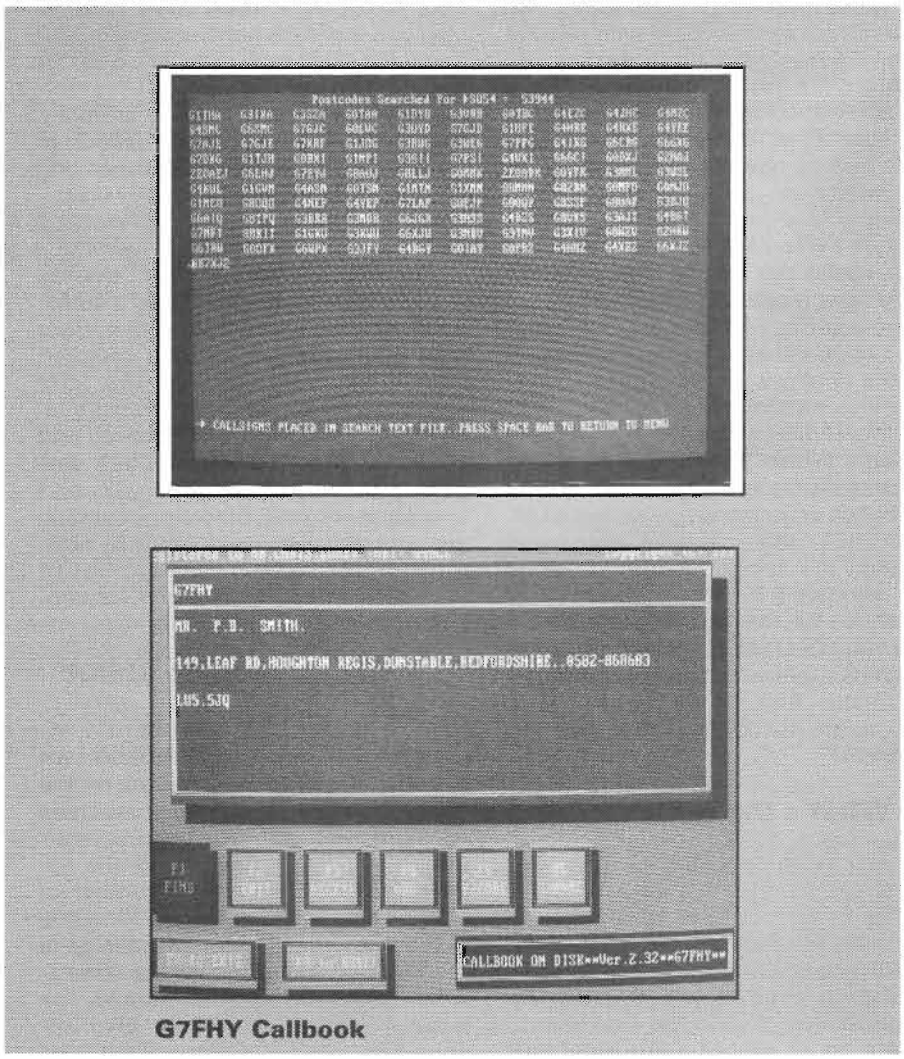
## In the beginning..

There have been CD-ROM based US and international callbooks for a while now on the worldwide ham market. These can arguably be rather 'over the top' for, say, use as just a UK callbook, their price may also prelude you buying the latest one every 6 months or so just to 'keep up to date'. Also none of those we've seen to date (Buckmaster, QRZ etc.) contain UK novice licensee details.

There have also been a few 'UK disk callbooks' probably based upon information taken from early databases (i.e. now out of date) using a shareware database program, 'doing the rounds'. However, these show there is a definite and enthusiastic interest, and it isn't surprising that two commercially available 'callbooks on disk', with the very latest up-to-date information including Novice calls, are now available on the amateur market.

## G7FHY Callbook

This comes from the keyboard of Pat Smith G7FHY, in two versions. The first is a 'restricted' shareware version, not reviewed here as it is only holds early information with limited facilities. The 'full' version comes on three 1.44Mb disks, and uses information purchased direct from the SSL. Its callsign listings, we found, were exactly those given in the 1994 RSGB callbook as published last year, with the exception of Class Bs which went up to G7PSI, just a page or so short of the RSGB offering. It currently doesn't give listings of the callsigns and postcode areas of 'particulars withheld' stations.




G7FHY Callbook

The callbook allows you to;
1) Search for a callsign together with QTH details,
2) Edit the details of an existing callsign (but not the callsign itself),
3) Delete a callsign along with all the details relating to it,
4) Add a new callsign together with QTH details,
5) Find all callsigns in a postcode area,
6) Find all callsigns relating to a surname,
7) Find the location and details of many packet nodes,
8) Find the location and details of many packet BBSs,

It comes in at £15.00 including p/p, but if you don't want the packet BBS and node data it's only £10.50. Further 'stand-alone' programs are available at £5.00 each covering packet BBSs and nodes, another covering repeaters, and a further one giving an international 'prefix finder', all having 'look-up' and 'edit' features.

Installation was very easy. Just put the first of the three disks into your computer, select your floppy drive, and type 'go'. The program does the rest! Usage was similarly extremely easy, with a 'menu' screen showing the functions of the various 'one-press' computer keys for the program's various facilities. A 'hidden' F9 key also allows a 'shell to DOS' function. Around 7Mb of hard disk space is required, and the program sensibly re-uses 'edited space' rather than filling this up with blanks to save your disk filling up. We found a very handy feature of the program was that, after a 'search' of, say, all amateurs in a given postcode area, the resulting callsigns were placed into a text file in a 'searches' sub-directory on the computer's hard disk. Subsequent searches simply added to this data, with an appropriate title separating each result. This can of course then be manually printed out, edited with your word processor, or deleted as you like. Pat also tells us he happily runs the callbook, and his full-featured packet terminal program, both on his computer under 'Windows', both operational and displayed on the screen at the same time.

The G7FHY callbook is constantly being revised, with two 'data' updates planned each year, timed to coincide with RAE results and the subsequent 'flood' of new licences! Pat adds that next issue, due out in September this year to include the recent RAE passes, will probably also include postcode information of 'withheld' entries.

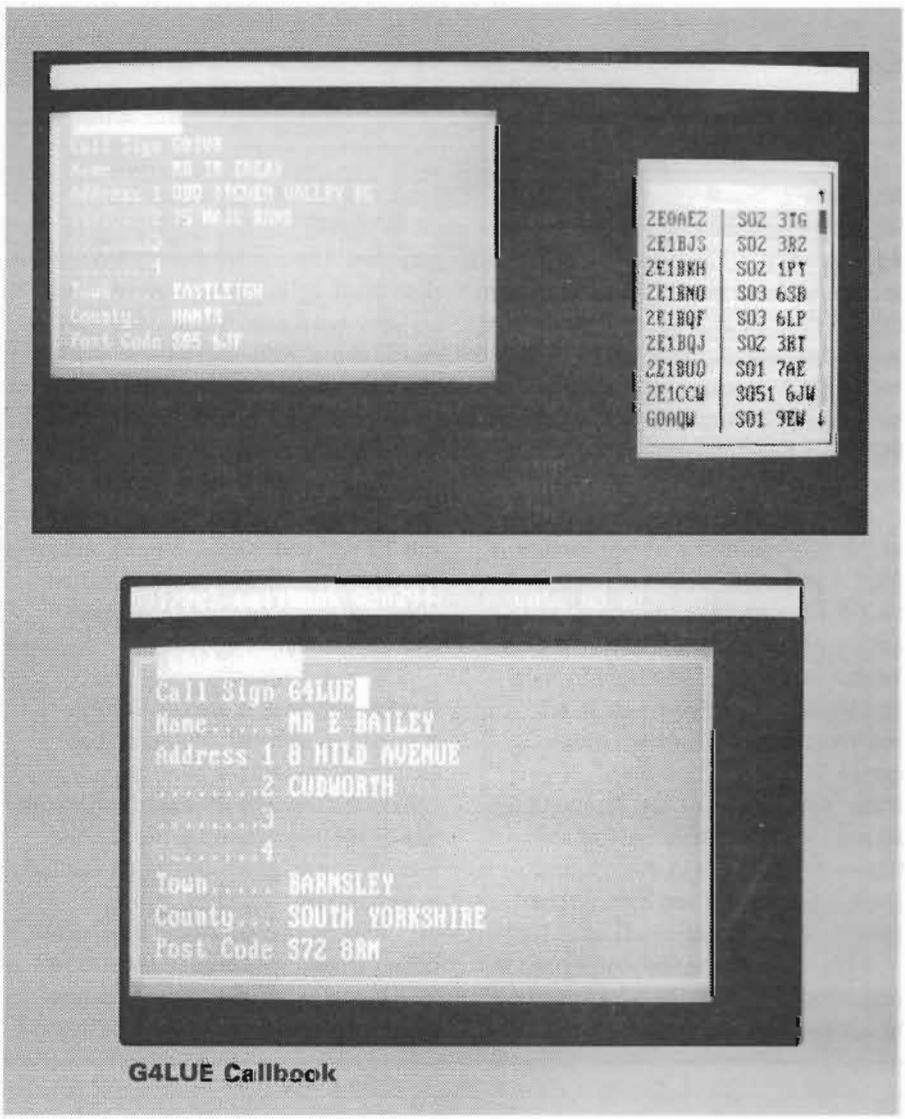
You can get your copy direct from Pat Smith at C&E Computers, 149 Leaf Road, Houghton Regis, Dunstable, Beds, LU5 5JQ, cheques payable to P. Smith. Make sure you give your full name at the time of ordering, and callsign if held, for registration information.

## G4LUE Callbook

Ernie Bailey G4LUE was indeed the chap whom many UK amateurs, including the HRT Tech Ed, obtained their first 'free' public domain type callbook-on-disk from. This shows that Ernie has been involved with this subject for some time! Maybe we've got him to blame for all this?

He's now purchased the very latest 10th April 1994 data from the SSL, with callsigns covering up to G0UQZ, G7SGS, 2E0AHR and 2E1CUL, and released this with a custom-written database by Nigel G0LOV, as a commercial offering. It comes on three 1.44Mb PC disks and is priced at £10.00 plus £1.50 p/p. Together with individual callsign data, it also features repeater, packet node, BBS, and beacon information, and includes the callsigns and postcode area information of all 'withheld' callsign listings. A 'stripped down' version with a limited number of callsigns is also available as a shareware offering.

You can search by either callsign, postcode area, or town. For example, you can find the callsigns of all



G4LUE Callbook

amateurs in Southampton by asking for a 'town' search, or indeed areas of a given town under a 'postcode' search, or even packet BBSs or voice repeaters in your area. Ernie tells us a 'surname' search in the callsign isn't currently available, although this may be featured on the next update with the latest SSL information included, due out in Winter this year.

You can also 'scan' through any of the listings, and a handy feature is that, if you enter a callsign that isn't found, the program offers you the option of instructing it to find a close 'match' to this, for example to help you if you may have typed in an incorrect letter. A further useful option is that of a 'wildcard'. If you enter, say, G4L** or G4L??, it will list all the callsign details having any letters or numbers in the '*' or '?' – great if you're not too sure of the details you're after!

The disks come with full installation instructions, you just need to put the first one in, select your drive, type 'install' and follow the instructions on screen about changing disks as required. The installed program and data takes up around 15Mb of space on your hard disk, future ones may need up to 20Mb, and the installation checks that you've got 20Mb free on your hard drive before allowing you to install this. If, however, you're subsequently short of hard disk space, Ernie tells us you can manually delete the 'KEY.1' and 'KEY.2' files to reduce the space needed down to less than 10Mb, at the expense of the 'town search' facility.

A 'speaking version' of the G4LUE callbook is also currently planned, which will of course be extremely useful for blind or otherwise visually impaired amateurs. We at HRT commend Ernie for his initiative in this, which Angus G3OSS is helping in.

You can obtain your copy either direct from Ernie Bailey G4LUE, 8 Hild Avenue, Cudworth, Barnsley, South Yorkshire S72 8RN at £10.00 plus £1.50 p/p, cheques payable to J. Bailey, or from distributors Venus Electronics in Camberley, Poole Logic in Poole, Capital Products in Manchester or M. J. Components in Harrogate, all of whom attend radio rallies throughout the UK.

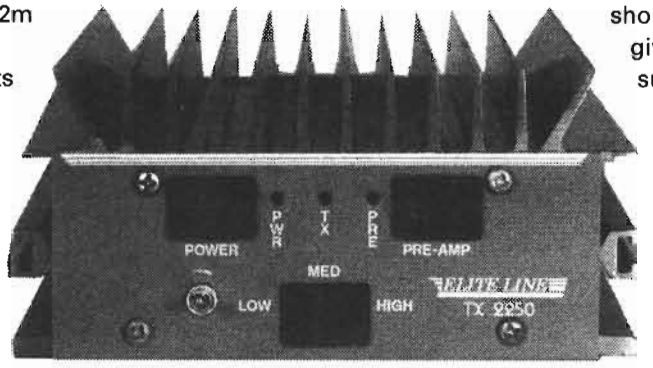
## Conclusions

The age of the 'callbook-on-disk' is certainly with us. At the moment, we at HRT see that such a database complements, rather than replaces, the comprehensive amount of other information often found in printed callbooks, such as repeater coverage maps and so on. Each offers advantages, and disadvantages. However every PC-owning amateur we've spoken to has been wildly enthusiastic about the latest offering of 'callbooks-on-disk', the usual immediate question after seeing one 'live' being "Where can I get a copy?"!

# Mainline 75W 2m Linear Amplifier Kit Review

*Nigel Utting GJ7LJJ increases his RF potential on 144MHz*

Whilst I get great pleasure from operating a relatively low power 2m station, and have made respectable long distance contacts from Jersey (to PA, HB, EA) with just 10W into a roof-mounted 7-element DeeComm 'ZL Special' aerial, there are times when the ability to summon up a little more power would be very useful.




I had initially intended to buy a commercially-made linear amplifier of around 50-80W output, but in view of my recent introduction to home construction (and to decrease the strain on my wallet!) I opted for the 75W 2m linear amplifier kit offered by Mainline Electronics. I chose the Mainline kit not least because it accepts a 10W input as provided by my Icom IC260E. Theoretically, the linear gives from 2W output with 250mW input, to 75W output from 10W input; the maximum input power being 15W. The frequency range of the linear is 144-148MHz and FM, SSB and CW modes are catered for; an 'on- board' RF-sensing relay is employed for automatic aerial switching.

The kit arrived in a sealed bag containing the pre- drilled and tinned, double-sided PCB of excellent quality. The various components were sealed in further small plastic bags 'by family', i.e., resistors in one bag, capacitors in another, diodes/transistors in a third, and the relay and a sachet of heat transfer grease in the last. The power device (a Motorola MRF-247) came separately. My only complaint was that the MRF-247 (not inexpensive if ordered on its own) was not particularly well wrapped against the rigours of postal transit, although the rest of the kit nestled happily in bubble-wrap.

In the USA, the kit (which is manufactured in Ohio) is supplied complete with box, heatsink, connectors, on/off switch, power socket, etc. Here in the UK, Mainline make it clear that the enclosure, heatsink, etc., shown in their catalogue are for illustrative purposes **only**, and that those items are **not** included as part of the kit (with a consequent reduction in cost). I had considered using a suitable Eddystone aluminium box and attaching a large external heatsink (likely to be needed with a 75W amplifier on long transmissions) but I eventually ordered Mainline's very smart, silver/blue-anodised HF1HS heatsink, which is intended for their high-power HF linear kits.

Increasing the effective output of my 2m rig from 10W to around 75W would be of little benefit if I could not hear distant and/or weak stations replying to my calls, I thus thought that adding a pre-amplifier would be advisable.

Before thinking about adding extras, it was time to cut open the sealed packets, check off the components against the itemised list, read the instructions, re-read the instructions, then start soldering. As far as checking off the components is concerned, the manual helpfully quotes colour code combinations for resistors and the manufacturer's semiconductor markings. But some of the capacitors are less easy for the beginner to sort out, a magnifier also helps. The kit comes with an 18 page photocopied manual which explains, step-by-step, which component should be placed where. It also gives useful guidance on points such as how far above the surface of the PCB various components should be fitted, and how to wind the required coils.

The constructor is encouraged to check off each step as it is completed, by placing a √ between the brackets printed next to each instruction. Unlike some other kits, the component names (C1, R2, Tr3, etc.) are **not** printed on the PCB. Placement is simply by reference to the illustrations in the manual.

Only one major hitch occurred during my construction efforts. According to the instruction sheet, whilst holding component Q2 (the MPS-2222 switching transistor) **with its flat face towards you,** the centre conductor should be gently bent **away from you.** The resulting triangle of legs I inserted into the corresponding triangle of holes in the PCB, and soldered the device in place. I then noticed the (previously unread) **final** sentence of the instructions which said that the flat face of Q2 should now be facing diode CR3 and resistor R2. Whoops! My Q2 was facing in the **opposite** direction. In fact, the base, emitter and collector on my Q2, as supplied, were laid out in the opposite manner (c-e-b) to the way they were illustrated in the instructions (b-e-c). The morals of this story are: (i) read the **entire** instruction **before** applying solder, and (ii) where the arrangement of conductors is critical (as on a transistor), **check** that the arrangement on your component is the same as the instructions assume. I carefully unsoldered Q2 and reinserted it with the correct orientation.

The braids of the stub filters (pre-cut lengths of Teflon-coated coax) are

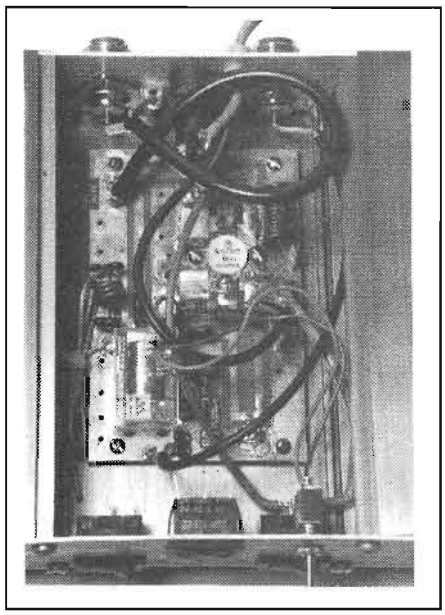
soldered directly to the ground plane of the PCB. When soldering the braid of filter SF1, make sure to position it such that you do not encroach on the area which will form the 'footprint' of the TX/RX relay. The kit includes a length of 16swg enamelled wire from which coils L1 and L2 are wound. The instructions tell you to cut (in imperial measurements) 4.5in of this wire for L1, followed by 12.25in of wire for L2. My kit included the above allowances with not more than 1in left over. Therefore, do not cut a generous length of wire for the first coil, on the basis that this will automatically leave enough for the second, since this may not be the case!

Several of the capacitors are of the metal clad type i.e., sandwiched layers of mica and aluminium. These capacitors will absorb **all** the heat a 17W soldering iron produces, without leaving any over to melt the solder! In the circumstances, you will find that a larger soldering iron (preferably 25W with a medium/large tip) will be required if these components are to be reliably soldered in place.

The instructions refer to lengths of Teflon-coated coax which are used to connect the input and output of the PCB to a pair of SO239 sockets at the rear of whatever enclosure you use for the linear. No lengths of Teflon-coated coax for this purpose appear to be supplied with the UK kit (although other lengths of Teflon-coated coax are supplied pre-cut as the stub filters). I therefore employed RG174A/U ('miniature' 3mm 50Ω coax) for the input and RG58 ('normal' 5mm 50Ω coax) for the output.

The drilling of the heatsink should be carried out **before** the MRF-247 power transistor is soldered to the PCB. The idea is that, with the transistor sitting in its cut-out in the board and lightly bolted into place, the subsequent soldering will hold it in a relatively stress-free position.

Before injecting any RF into the completed kit, I measured the voltage between ground and the base of the MRF- 247 and adjusted this to the correct value of 0.6V. This was after a solder bridge had been discovered, and removed, between the base leg of the MRF-247 and ground!



In this connection it is worth noting that this design of linear draws a small current all the time it is connected to your 13.8V supply. The toggle switch does **not** carry the full 13.8V, 9A load. It's only used to switch in the relay to allow routing of RF through the amplifier when in the 'on' position. Consequently, if the linear is used mobile, there will be a small, but permanent, drain on your car battery unless the linear is isolated from the battery when the vehicle's engine is off.

With input and output connectors temporarily soldered in place, and using the smallest input I could muster (0.5W from a 2m handheld), the output of the completed, heatsink-mounted kit, was measured with a Diamond Power/SWR meter. 0.5W input generated 2W output, 2W input generated 20W output, and 10W input generated 55W output. The input SWR was below 1.5:1, success!

The instructions suggest that a correctly-constructed kit will require very little adjustment, and this seems to be true. If necessary, small adjustments to SWR and output power may be made by unsoldering and moving certain, specified metal-clad capacitors.

One point to bear in mind is that final, full-power testing (at around 75W output) requires a reasonable dummy load (and one that will give a reasonable SWR at VHF). A typical 15W, finned dummy load may quote a maximum input of 100W, but that is for **short** periods only, and time may be lost in waiting for the load to cool between high power transmissions. You must also ensure that your power supply is capable of providing a **continuous** current of 9A/13.8V, and preferably more, if loud transformer 'hum' and a dip in supply voltage are to be avoided.

The final touch is to add front and back panels to the heatsink, bearing the main on/off switch, input/output connectors, etc. Mainline can supply a suitable set of screen- printed front, back and bottom panels, complete with hardware, if required.

The front panel, as supplied, carries switches for the full 13.8V supply, pre-amplifier on/off (which will eventually be relevant to this project) and a low/medium/high control (which will not!), plus three LEDs for power on, pre-amplifier on and TX. I have added a small toggle switch for amplifier IN/OUT, separate from the 13.8V supply switch.

Rather than mount an in-line fuse holder in the power lead, I have fitted a chassis-mounted fuse holder to the front panel. The rear panel has cutouts for two SO239 sockets. I am not a fan of PL259 plugs, their performance leaves something to be desired at VHF. I used N-plugs/sockets to connect my linear to the outside world.

In summary, Mainline's 75W 2m linear amplifier kit is straightforward, and certainly very enjoyable, to put together. The instructions are clear, and with the possible exception of identifying one or two components, the beginner should experience no insurmountable problems in building an excellent 2m linear. My thanks go to GJ7AOG for copious advice and coffee while I was putting this together.

# Project – Fast Nicad Charger

*Steven Goodier G4KUB and John Goodier G4KUC show how to build a rapid nicad charger for your handheld*

Rechargeable Nickel Cadmium batteries (nicads), have been available for some time now, and most operators who own portable equipment are bound to have a set. Portable transceivers such as handhelds are usually supplied with a sealed pack and a conventional 'slow charger'.

## Charging nicads

The traditional way to charge nicads is to leave them connected to a constant current source for between 14-16 hours, this is fine if you are in no hurry to use your batteries, but it can be a little inconvenient if you wish to use your transceiver within the next couple of hours. The alternative is to fast charge the cells, and as the name suggests this means charging the nicads at a much higher rate thus dramatically reducing the time taken to produce a fully charged pack. An acceptable charge rate would be C/1, and for an AA size cell this would be 500mA for 1 hour continuously. In other words, charging a pack of AA nicads at a rate of 500mA would reduce the charging time from 15 hours down to just 1 hour.

## Design considerations

My design goals for the charger were;
1) 240 volts mains operated with most of the components on a single printed circuit board to make construction straight forward and easy.
2) Able to fast charge a number of different types of nicads including PP3, AAA, AA, C and D size. Charging rates are selected from a front panel switch and are programmable by the constructor.
3) Able to fast charge a number of different voltage packs, with the constructor having full control over the charge rate via a number of variable resistors.
4) Impossible to select fast charging without starting a 1 hour timer. After 1 hour, fast charging stops and switches in a trickle charge resistor.

This article describes the design and construction of a fast ni-cad charger capable of charging 500mAh packs in one hour. A number of easily made modifications are detailed to allow charging of other packs, including the Yaesu FNB-4 1000mAh pack, the Kenwood PB-4 1600mAh packs, along with any other combination of C and D size cells up to 2200mAh. Each switch position is custom made to suit a particular pack, so you must know the type of battery you wish to charge before construction starts. However, each position can be easily modified to suit almost any type of battery by changing the value of a resistor. It is the total pack voltage which determines these changes and not the charge rate, but using the transformer specified and up-rating the voltage regulator will enable you to fast charge nicads rated at least 2200mAh.

## Circuit description

Most nicad chargers use a constant current generator, which is then used to supply the dead battery with a steady amount of current for re-charging. The more current supplied to the batteries, the faster they will charge. My design has replaced the constant current generator in favour of a number of selectable voltage outputs, of which a fixed value resistor is placed in series with the output to supply the charge rate. If we make the output voltage variable it is then possible to adjust the charge rate to almost any value we wish. As charging takes place, the resistance of the pack increases and the charging current will gradually drop. For example, when charging the Yaesu FNB-4 500mAh pack, the charge rate starts at around 1.1A but falls off to around 215mA after 1 hour.

T1, BR1 and C1 form a simple unregulated DC supply of around 25V across C1. The charger section is based around an LM317 voltage regulator, the output voltage of which can be changed by switching in a number of different resistor networks via SW2. The charge rate is determined by two factors, the first being the pack voltage; the higher the pack voltage the higher the output voltage has to be or charging won't take place. The second factor is resistor R13, this can be almost any low value resistor, the current flowing through it is set up via one of the preset potentiometers VR1 to VR6. One other factor is the resistance and voltage of the pack being charged. This will ultimately change as it charges, thus affecting the charge rate itself.

Since the values of R2 to R7 will greatly depend upon the total pack voltage you wish to charge, I have compiled a suggested list of resistor values for the four switch positions. You may wish to experiment with these resistors, but you will probably find the values chosen will suit most needs.

## Fast charging

R12 is the trickle charge resistor which supplies around 7 to 20mA

depending upon the condition of the batteries. This is always in line when the charger is first switched on ,and is selected via RL1b. To start fast charging you must press SW3, which is a push to make switch. This will short the relay contacts RL1a and place voltage, which is tapped off C1, onto the input of IC2. The jpurpose of IC2, a 7812 voltage regulator, is to place a supply onto the timing circuit based around IC3. Once the relay RL1 is energised, R12 is switched out via RL1b and R13 is switched into circuit. Because the relay is now energised, SW3 can now be released and a constant unregulated supply is placed onto the input of IC2, which will remain there until RL1 drops out after 1 hour.

## Timer circuit

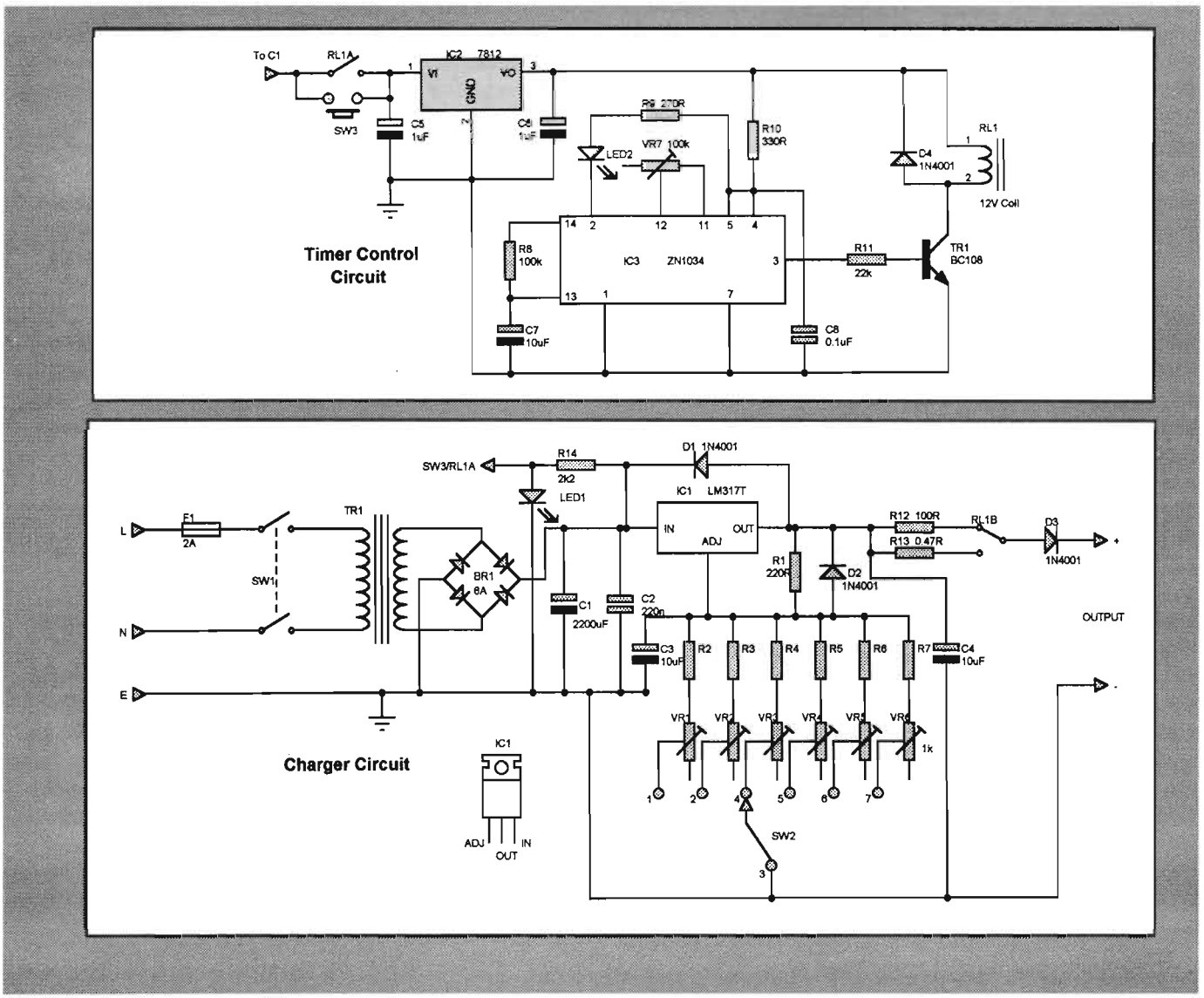
An important safety feature of this design is the inclusion of a timer. This will start as soon as fast charging begins, and once the timing period has finished will switch in a trickle charge resistor. I first tried a number of timing circuits based on the 555, but these proved to be highly inaccurate over a period of 1 hour. My attention turned towards the ZN1034E precision timer IC, which is more accurate over longer time periods.

The timer is based around IC3. Pin 1 is the trigger and since it is wired to ground, the timing process begins as soon as power is applied to the circuit. The timer is supplied from the voltage regulator IC2, but since the ZN1034E has its own 5V regulator built-in, R10 is used to limit the current into the chip. R8 and C7 set the frequency of the internal precision oscillator, by changing their values the timer can be made to function over a period of below a second to over a week. With the values chosen and with the calibration pins 11 and 12 shorted together, the timing period will be about 49 minutes. By adding a 100k calibration pot VR7, the period can be increased to 1 hour and 15 minutes or any point between.

As soon as the timing period starts, pin 3 switches high and turns on TR1 which in turn energises RL1. RL1 has two functions, first it maintains a continued supply on the input of IC2 via RL1a, thus supplying voltage to the timer circuit itself. Secondly, it switches in the fast charge resistor R13 via RL1b. LED 2 lights when the timing process is in operation. Once the timing process has finished, pin 3 goes low and RL1 drops out, removing the supply voltage to IC2 and switching back into circuit R12. The timing process cannot begin without first pressing SW3, and it can not start again without pressing SW3. This simple feature effectively stops the charging process repeating itself, and gives protection from overcharging.

## Construction

Construction of the nicad charger is very simple. Most of the components are mounted on a single



printed circuit board measuring 115mm x 90mm in size **(beginners please note this project involves mains electricity, care must be taken, ask an experienced constructor for help if you require it – Ed).** Before you start to mount the components, make sure that the copper side of your PCB is clean and free from grease. Start by soldering into place all the resistors including the seven preset pots. The fast charge resistor R13 is a high power 10W wirewound type, and should be mounted slightly off the board.

Next mount the capacitors, taking care to insert the electrolytics correctly. There are also four diodes to solder into place, so double check you have mounted these components the correct way round. Don't forget the wire link between R14 and R9. Use an IC holder for IC3, and once this is soldered into place we can move onto IC1, IC2 and TR1.

Since IC1 runs quite hot, it must be mounted on the back panel which acts as a heatsink. I would advise you to purchase the TO3 version of this voltage regulator, or better still, obtain the 5A version. IC1 is connected to the main control board by first soldering a length of three way ribbon cable to its position on the PCB, this can then be soldered to the appropriate pins on the IC. Be very careful and double check that you have connected the correct leads from the printed circuit board to the corresponding legs on the IC. The 12V regulator IC2 needs a small heatsink, this is best attached to it before soldering it into place. As a guide, when it is correctly mounted the metal back is facing the relay RL1. Some of the bottom fins of the heatsink may need removing due to the closeness of C5 and C6.

TR1 is a small BC108 transistor or equivalent and is mounted closer to RL1, the emitter points to the timers calibration pot VR7. Finally, solder into place the relay RL1, you may have to slightly enlarge the mounting holes to get this component to fit. That completes the construction of the charger board.

## Housing the charger

The choice of box to mount the mains transformer, PCB and other components is up to the constructor, I used a vinyl covered box of 204 x 153 x 76mm. The PCB is secured at either corner by 6BA stand off pillars. On the back panel mount IC1 using an insulating kit and thermal grease to ensure good heat dissipation. Check with a continuity checker or ohm meter that there is no short circuit between the metalwork and IC1. The mains cable is passed through a grommet and the earth wire must be bolted to the metal work of the case. The live then passes onto the mains on/off switch, and then onto the transformer. Always take care to earth the case and use a low amperage fuse in the plug.

## Final wiring

I found it best to wire the printed circuit board up to most of the components before it was mounted into its final position in the box. The mains transformer has two secondary windings marked 0-9 0-9 at 2.7A and these must be wired together to form a single 0-18V, 2.7A output. To do this connect the 9V output from one winding to the zero volts output of the other. It is then a simple matter of making the remaining connections to the mains transformer, bridge rectifier and the mains switch SW1. Double check all wiring and when you're happy, move onto testing and setting up the unit.

## Testing and setting up

With a 3A fuse in the mains plug, connect a voltmeter set to read 25V across the unit's output. Set all the variable resistors VR1 to VR6 to their mid position and switch on. Start from position 1 on the switch and check that VR1 will vary the output voltage. How much this voltage will swing by will very much depend upon the value of its in-line resistor, this in turn will be determined by the maximum pack voltage you can expect to charge in that position. Move through all the switch positions and check that each subsequent preset resistor will vary the output voltage.

Now turn preset resistors VR1 to VR6 all fully anti- clockwise, i.e., to give minimum voltage. Before moving onto the connection and charging of nicads, it is advisable to test and calibrate the 1 hour timer.

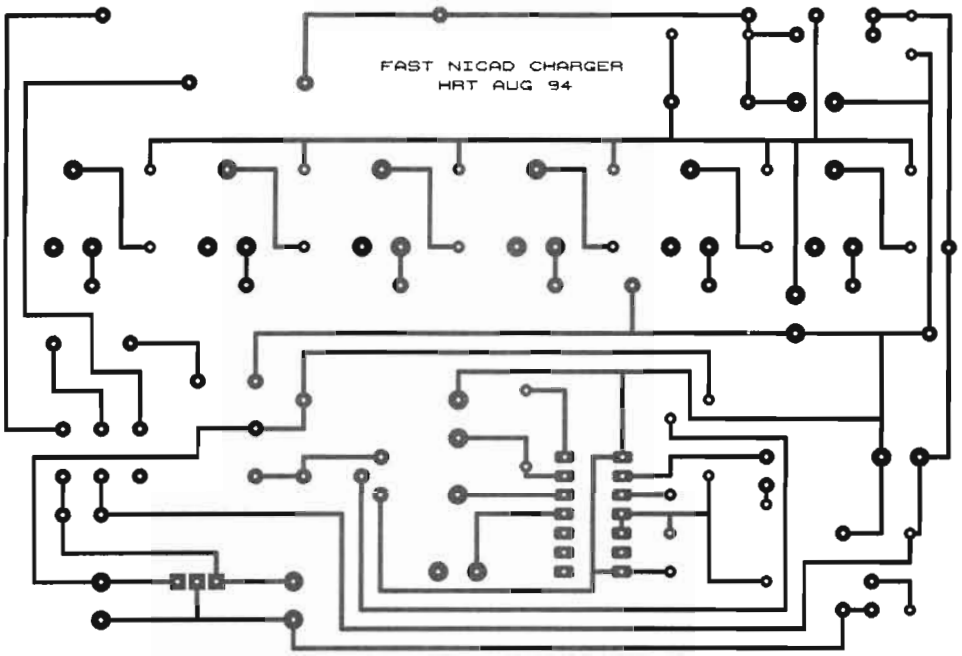
## Timing circuit

The timing circuit is easily set up by the adjustment of a calibration pot VR7. If you have an accurate ohm meter, set VR7 to read about 35k across pins 11 and 12 of IC3, failing that set VR7 to about the 11 o'clock position. The only way to set the timer accurately is to leave it running for 1 hour and time it with a stopwatch or clock. To start the timer, press SW3, this will activate RL1 and LED2 will light and stay lit for the full hour.

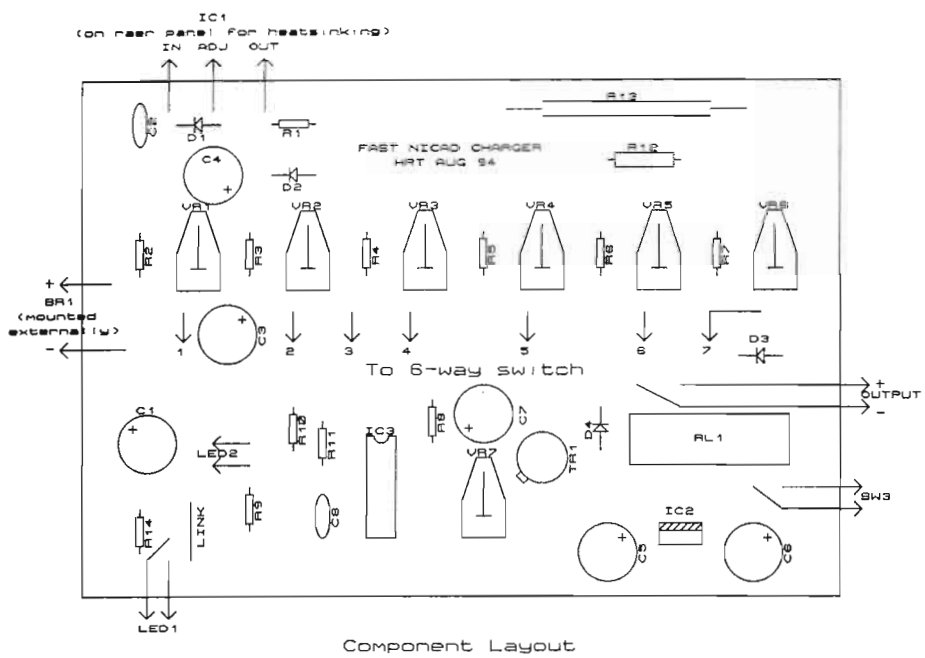
When the timing period is over, RL1 will drop out and LED2 will extinguish, as soon as this happens check the time and adjust accordingly. To increase the time period adjust VR7 to give more resistance (clockwise), to decrease the time period adjust VR7 anti-clockwise. The swing of the calibration pot should give a timing range of between 49 minutes and 1 hour 15 minutes. Once set the ZN1034E is very accurate and each timing period should be within a few seconds.

## Setting the fast charge rate

You're now ready to connect a set of nicads to the output and calibrate one of the switch positions for a 1 hour fast charge. The following example is the setting up and charging of six AA size, 500mAh nicads, but the setting up procedure for other packs is exactly the same regardless of pack voltage and charge




PCB layout (full size)




Component Layout

rate. I chose switch position 3 for this size of pack, therefore we will be dealing with the calibration of VR3.

The easiest way to set this up is to connect a voltmeter across the output terminals and adjust VR3 to read 10.08V. For other charge rates and packs, you will need to use the following procedure;

Before switching on, connect an ammeter in series with the positive lead, set to read about 50mA. Set SW2 to the correct charge position for that pack and switch the charger on. The meter may show the trickle charge rate, if it doesn't or shows a very low reading then adjust the required preset resistor. You will notice that as you increase the output voltage, the trickle charge current will slowly increase, set it for around 20mA.

Now switch your current meter to read at least 2A and start fast charging by pressing SW3. The amount of current drawn will dramatically increase, possibly to over 1A for 500mAh cells, do not worry. Wait until the reading settles down, although the amount of current drawn will be dropping all the time, and note the reading after a minute or so. What you are looking for is a reading of at least 200-300mA above the capacity of the cell, i.e., if you are charging 500mAh cells then adjust for around 700mA. Leave the charger running for 30 minutes and check the reading, by now the charge rate will have fallen. You are looking for a reading of about 50-75mA over the capacity of the cell at the half way stage, it is below the expected level then re-adjust for this reading.

## Modifications for higher rated packs

If you are planning on charging higher rated packs of around 1200 to 2200mAh, then the setting up

5A version of the LM317 series, this device is usually marked LM or UA338K and is housed in a TO3 package. Be warned, that when charging at 2.2A the voltage regulator will run fairly hot, especially when having to drop a lot of voltage. Therefore, you may need to bolt a heatsink to the back of the case to handle the extra heat generated. Finally, uprate D3 for any general purpose 3- 4A diode.

Another possible modification is the addition of a front panel variable resistor that could be used to constantly alter the charge rate, thus making it possible to charge a number of 'odd ball' cells. If you are considering doing this modification for one of the switch positions, then you must also include a method of monitoring the charge rate. This could be done by including a front panel current meter or connecting a standard multimeter in line with the pack.

## Conclusion

My charger has been in regular use for some time and has been a very worthwhile addition in my shack. Nicad batteries can go flat with very little warning, and to be able to charge them in one hour instead of the usual 15 hours is very beneficial. It now means if you are planning a day out and you have forgotten to charge your batteries the night before, a full pack can be ready within the hour.

Most readers should be able to complete the project with little difficulty, I am sure you will obtain full use from this charger. The approximate cost of construction including a box is around £30, which is relatively cheap when compared to other fast chargers.

**For any queries regarding this project write to the author c/o the Editor at the HRT address**

**Components list;**

**Resistors;**
R1 – 220R
R2 to R7 see text and Table 1
R8 – 100K
R9 – 270R
VR1 to VR6 – 1k preset
VR7 – 100k
R10 – 330R
R11 – 22k
R12 – 100R
R13 – 0.47R 10W R14 – 2k2

**Capacitors;**
C1 – 2200µF elec 35V
C2 – 0.22µF
C3 – 10µF tant 35V
C4 – 10µF tant 35V
C5 – 1µF tant 35V
C6 – 1µF tant 35V
C7 – 10µF tant 16V
C8 – 0.1µF disc

**Semiconductors;**
IC1 – LM317T or similar 1.5A
IC2 – 7812 12V 1A regulator
IC3 – ZN1034E precision counter timer
TR1 – BC108 or equivalent
BR1 – PW01 bridge rectifier 6A
D1 to D4 – 1N4001
LED1 – 5mm red
LED2 – 5mm orange
2 LED holders

**Miscellaneous;**
T1 – 0-9 0-9 2.7A transformer
SW1 – single pole single throw
SW2 – rotary switch 1 pole 12 way
SW3 – push to make
RL1 – double pole relay 12V coil
Heatsink for IC2
Red terminal post
Black terminal post
Case
1m Ribbon cable 1.4A
1 metre 9 volt battery box PP3 clip
Printed circuit board
Nuts, bolts, hardware etc.

**Table 1**

| **Switch Position** | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| **Resistor** | R2 | R3 | R4 | R5 |
| **Value** | Link | 470R | 1K | 2K2 |
| **Voltage swing** | 1.1-7.0 | 3.4-9.2 | 6.5-12.3 | 13.3-19 |
| **Total pack voltage** | 2.4 | 4.8 | 7.2 | 12 |
| **Final voltage setting** | 3.97 | 7.03 | 10.08 | 16.88 |
| **Designed to charge** | 2 x AA 500mAh | 4 x AA 500mAh | 6 x AA 500mAh | FNB-4 12V 500mAh |

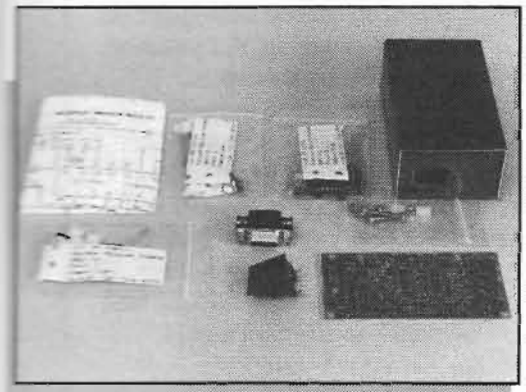
**Note:** No resistor was used for R2, instead it was replaced with a wire link. Final voltage setting was measured when the final charge rate was set, and maybe copied if you plan to charge similar packs.

**Table 2**

| **Pack** | **2 x AA** | **4 x AA** | **6 x AA** | **FNB-4** | **PMR Pack** |
|---|---|---|---|---|---|
| **Pack voltage uncharged** | 2.33 | 4.6 | 7.15 | 10.68 | 4.92 |
| **Trickle Charge Empty pack** | 11mA | 18mA | 22mA | 45mA | 40mA |
| **Charge rate Start** | 600mA | 850mA | 880mA | 1.1A | 870mA |
| **Charge 15 min** | 545mA | 610mA | 620mA | 780mA | 340mA |
| **Charge 30 min** | 500mA | 510mA | 505mA | 545mA | 250mA |
| **Charge 45 min** | 415mA | 375mA | 340mA | 300mA | 192mA |
| **Charge 60 min** | 320mA | 270mA | 260mA | 215mA | 178mA |
| **Pack Full** | 2.84V | 5.68V | 8.53V | 14.2V | 8.45V |
| **Trickle Chg Pack full** | 7mA | 8mA | 9mA | 14mA | 11mA |

# Maxpak Modem Kit Review

*G4HCL tries his hand, and soldering iron, on an easy-to build kit to get you onto packet at low cost*



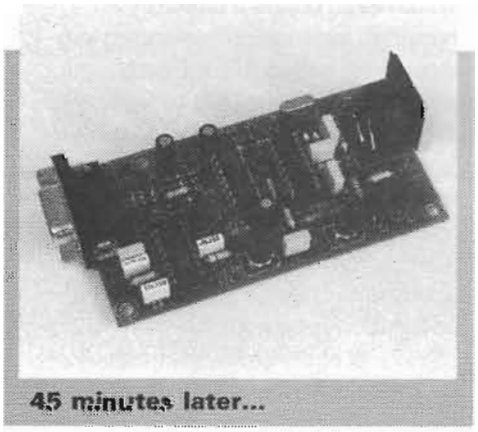
**A neatly presented kit**

If you'd like to get going on packet, with a PC to hand it needn't cost you a fortune. If you use the power of your PC with a suitable program running, for example a shareware offering such as Graphic Packet, Super Packet, or Mubay, all you need a simple modem plugged between your computer's RS232 port and your FM rig.

You can buy these ready-built, such as the Baycom Minipak modem which runs with the superb Baycom software. Alternatively, you can build your own modem, although to date there haven't been many kits around. That active packet group from the Midlands, Maxpak, have 'taken the bull by the horns' and come up with a super packet modem, which usefully also includes additional on-board circuitry for 'open squelch' operation. With this you may, if you wish, run your radio with the squelch open, to save missing any data due to the otherwise possibly slow squelch 'opening time' of your receiver. This used to be a big problem with some sets, particularly handhelds, and I welcome this move by the Maxpak designers.

## What do you get?

The kit comes complete with every single board mounting component you'll need. This includes the 9-way RS232 connector which can plug directly into your computer, and the 5-way DIN socket for connecting to your rig. An extremely well made PCB is supplied, complete with a printed component location overlay, and solder-resist on the track side to prevent shorts after soldering. The components come in small labelled bags, the instructions listing these and even giving the resistor colour codes for the various values.



**45 minutes later...**

The board can be self-powered from your computer's RS232 port, many have this facility although some laptops aren't capable of it. In this case, the modem may be powered from an external 12V DC source via the transceiver connector, with a short wire link (Resistor No. R0) fitted to the board. As an example of Maxpak's 'attention to detail', a suitable wire for this is even provided in the resistor component bag!

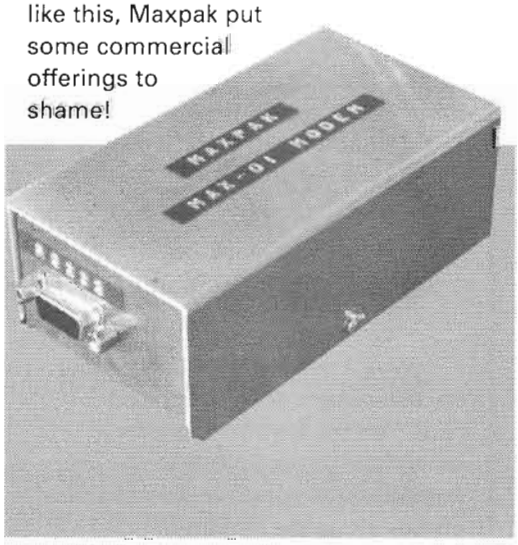
## Construction

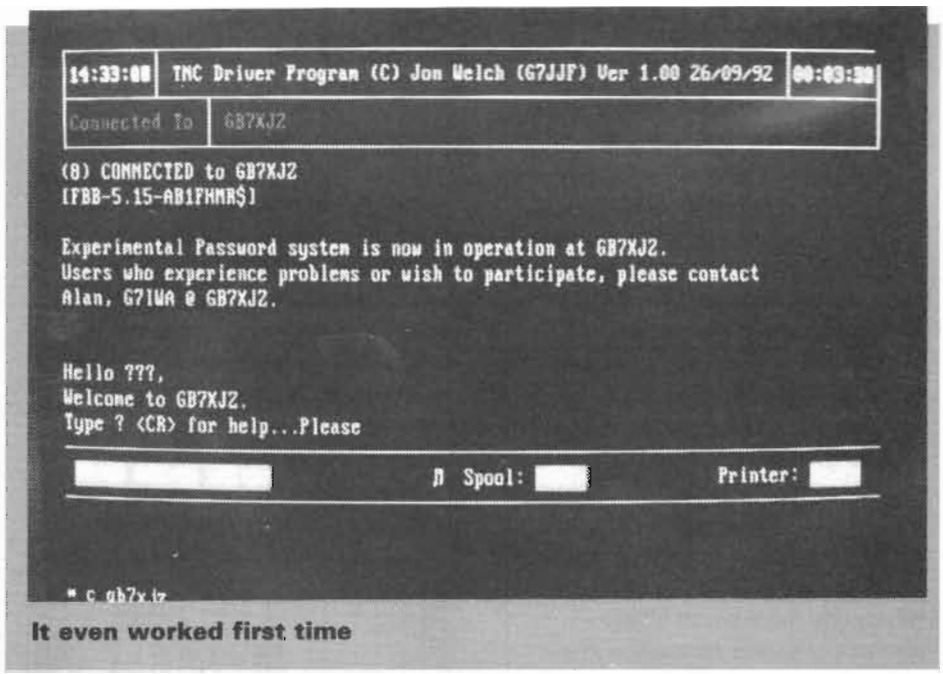
I had the entire modem completed, from opening the bags to being ready to plug in, in less than 45 minutes. Everything fitted precisely with no 'bodges'. The only problem I found was that the three electrolytic capacitors didn't have their polarities marked on the PCB, although a check of the underside in relation to the circuit diagram quickly showed me which side was which. Even so, I really must commend Maxpak on their very professional product, I really wish all the kits I come across are this 'hassle free'. I could certainly relate a number of horror stories with other, commercial, kits I've built!

An optional pre-drilled and punched metal case, complete with rubber feet, is also available for the modem if you'd like to 'smarten it up' a bit. This was supplied with my review kit, and again I found everything fitted, precisely, with none of the hassles of 'chassis bashing' which many amateurs hate!

## Did it work?

Yes, first time. Just like the Maxpak TNC-DL, built some time ago by HRT Editor G8IYA and subsequently reviewed in HRT. Again, I really wish more kits were like this, Maxpak put some commercial offerings to shame!






**It even worked first time**

Within seconds of plugging the modem into COM1 of my computer, running up my registered version of the program Mubay by Jon G7JJF (a full-featured shareware program with just a £10 registration fee to 'open up' the PMS, excellent value and an excellent program) and connecting my 2m handheld, I was logged into my local packet BBS. What more can I say?

Maxpak tell me they can supply the latest versions shareware to use with the module, including Mubay (V1.01), Graphic Packet (V1.52) and Super Packet (V1.61 and 1.62), all with full documentation on disk. Alternatively, they can also supply a pre-registered copy of Baycom V1.50a complete with printed manual, the full registration fee having been paid to the German Baycom team for this.

The Maxpak MAX-01 modem kit is priced at £32.50 plus p/p, with the optional case at just £4.95 extra, from Richard Nicol G1NZZ, 37 Thicknall drive, Stourbridge, West Midlands DY9 0YH, Tel. 0384 373682 (8.00-9.00pm), from whom price details of the optional software are also available. All profits are ploughed right back into helping the amateur radio packet system in their area. My thanks go to Maxpak for the loan of the review kit - so if you want a 'ready-built' unit, they may just be able to oblige if you're quick!

# From My Notebook

*Geoff Arnold G3GSR looks at what capacitance and inductance do when put together*

Interesting things happen when we have both inductance and capacitance together in a circuit. Depending on whether they are connected in series or in parallel, the end effect is different, but in each case it is the exactly opposite phasing of voltage and current in the two components which is responsible. In many ways, the series-connected circuit is easier to understand, and that is the one I shall look at first.

A typical series LC circuit is shown in Fig. 1. Depending on the values of capacitance and inductance, and the frequency of an applied signal (I m assuming it consists of a single unmodulated carrier from a signal generator or other oscillator), C and L will each offer a certain reactance. If drawn on a vector diagram, the arrow representing the

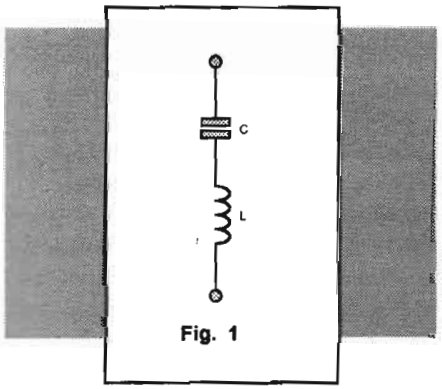
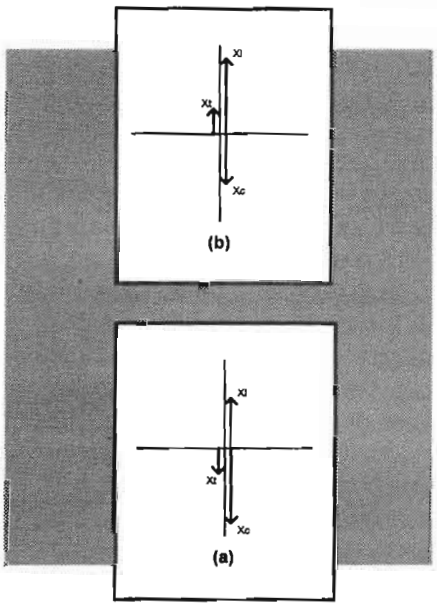


Fig. 1

reactance of the capacitor will point vertically downwards, whilst that representing the inductor will point vertically upwards.

At some low frequency, the reactance of the capacitor will be greater than that of the inductor. On the corresponding vector diagram Fig. 2(a), the arrow $X_C$ (representing the capacitive reactance) is therefore longer than arrow $X_L$ (inductive reactance), and when we do our vector addition, they subtract to leave a short arrow $X_T$ (total reactance) pointing downwards. In other words the incoming signal sees a circuit with only capacitance, and we say that at this frequency the circuit looks capacitive.

At some higher frequency, the position will have been reversed




(Fig. 2(b)); the reactance of the inductor will have got bigger while that of the capacitor has got smaller. The net reactance seen by the incoming signal is now inductive.

For any given combination of values of capacitance and inductance, there will be one frequency at which the two reactances will be exactly equal, and, because they are opposite in phase, they will cancel out so far as the input signal is concerned. The reactance of the circuit will be zero, and maximum current will flow through the circuit at that frequency.

Because all components inherently have some losses – leakage or series resistance in a capacitor; series resistance in an inductor – the overall impedance (combination of reactance and resistance) of the circuit will never actually be zero. These loss resistances limit the current through the circuit.

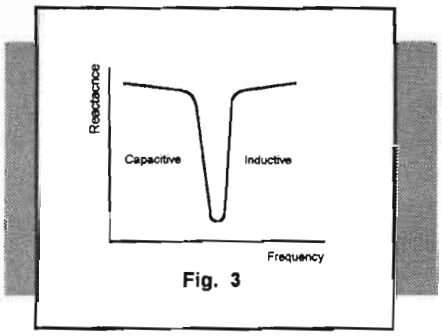


Fig. 3

## Acceptor

The frequency at which the capacitive and inductive reactances are equal is called the resonant frequency. At this frequency the series LC circuit allows the maximum current frequency to flow – it accepts the highest current – and for this reason it is known as an acceptor circuit. If you plot reactance against frequency on a graph, you get a response curve with a minimum or notch in it (Fig. 3).

If you were to take an RF indicator such as a voltmeter or

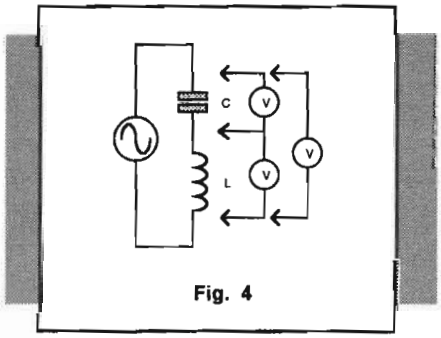


Fig. 4

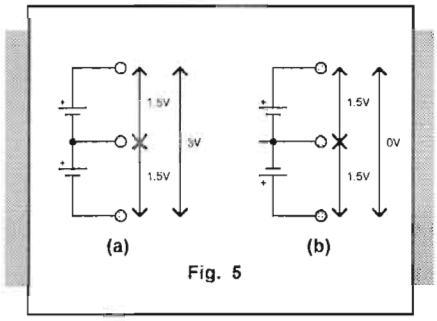


Fig. 5

oscilloscope and connect it to the circuit when handling a signal at its resonant frequency, you would find that the voltage measured across either the capacitor or the inductor is greater than that across the whole circuit (Fig. 4).

On the face of it, the circuit looks like a potential divider, and we might therefore expect the voltage either half of it to be less than the voltage across the whole. But the voltmeter

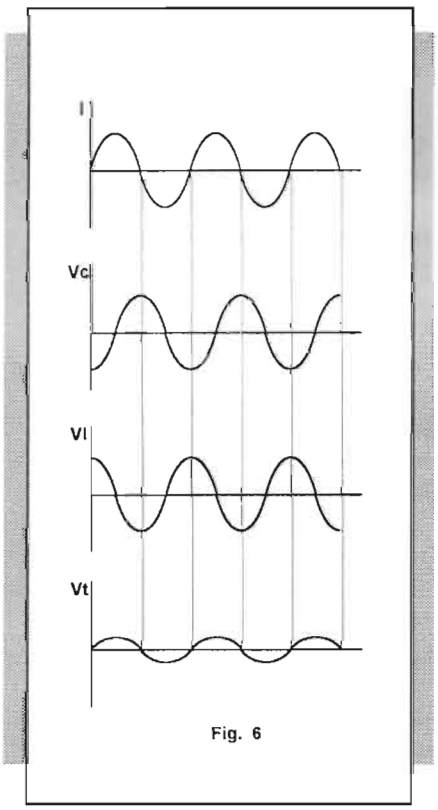


Fig. 6

tells us a different tale. If your brain has trouble coping with the idea that a current flowing through two series-connected components can produce two voltage drops which are each larger than their sum, don t worry, you're in good company!

Perhaps comparison with another circuit arrangement might help the understanding. Look at Fig. 5(a), where we have two 1.5V DC cells connected in series, giving 1.5V at the tapping and 3V at the top of the circuit. But in Fig. 5(b), someone has connected one of the batteries the wrong way round, so that instead of being series-aiding they are series- opposing , and although the voltage from the tapping to either end is still 1.5V, there is zero volts across the whole lot.

When checking voltages in Fig. 5, your DC voltmeter will indicate not only the value but also the polarity of each voltage that you measure. For your RF indicator to do the same in Fig. 4 it would have to be phase-sensitive , and that s a property that most such instruments do not have.

There are different ways of looking at what is going on in the LC circuit at resonance. What you have to remember, though, is that each of the two components has a high reactance, so the current flowing through them will produce a substantial voltage drop across each one. However, as the voltages are opposite in phase, they cancel each other out when added in series, so that at the top of the circuit the net reactance is very small. Therefore the current flowing through it will produce only a small overall voltage drop.

If you are happier with waveforms than with vector diagrams, perhaps Fig. 6 will help.

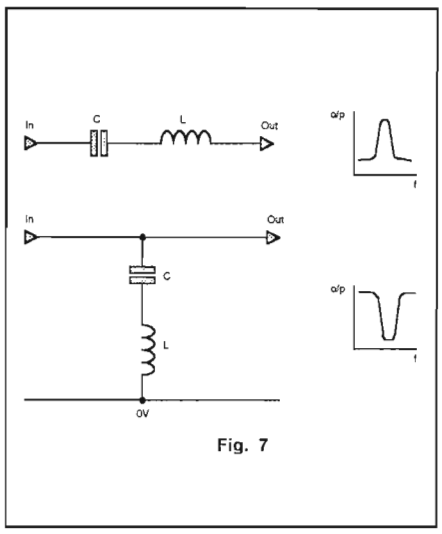


Fig. 7

The signal source is supplying a current **I**, which flows through both components, producing substantial voltages across the capacitor (lagging) and inductor (leading). These cancel out to give zero overall voltage at the

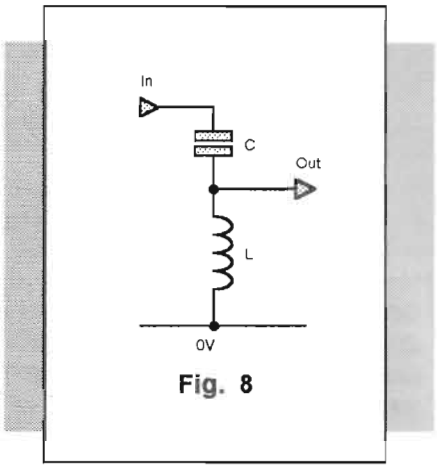


Fig. 8

circuit s resonant frequency. In fact, because of losses I mentioned earlier, there will be a small overall voltage, in phase with the current.

The properties of the acceptor circuit can be used in different ways according to how it is connected into circuit. If connected in series with the signal flow (Fig. 7(a)), it will act as a bandpass filter, allowing signals at its resonant frequency to pass freely, but impeding signals higher or lower in frequency.

If it is connected instead across the circuit (Fig. 7(b)), it will short out signals at its resonant frequency, but at higher and lower frequencies it will have little effect on signal levels.

One rather crafty variation on the arrangement of Fig. 7(b) is shown in Fig. 8. I first encountered this in an early transistorised multi-conversion superhet, where it was being used to filter the output of one of the crystal-controlled local oscillators, getting rid of harmonics and other nasties . The output voltage, taken from across the inductor, is actually larger than the input voltage, and as an added bonus the capacitor also does duty as a DC block, keeping the collector supply of the oscillator stage from upsetting the bias levels of the following buffer stage.

***To be continued next month***

# QRP Corner

*Dick Pascoe G0BPS has tears in his eyes at missing QRP happenings at Dayton this year*

Most dedicated low power men know that the most important part of their station is the aerial. It is at this time of year that I tend to check mine over, make repairs and generally try to improve the system. Like many, I tend to experiment year by year. One of the best aerials I tried was a version of the Windom, called the Carolina Windom, the original being a flat top aerial with a single wire feeder. Supposedly designed by General Windy Windom, but it would appear that it had been in use by others long before he published it. Like the world of Chemistry and Physics, the first to publish gets the credit!

· One of the worst I ever tried was a commercial aerial several years ago. This had a centre capacitive plate of about 30cm square and was made of 1mm household lighting wire, the three cores cut to resonate on the then three upper HF bands. Needless to say, after a few weeks of the prevailing winds here on the south coast, it had gone horribly out of tune. The huge plate at the centre of the doublet also acted as a wonderful sail and wind catcher!

Back to homebrew aerials. There is a wealth of knowledge available to the experimenter. We don't have to try out, and experiment, with every idea that comes to us. There are a huge number of books available for the enthusiast.

Before going any deeper into the books I should discuss the difference between the description "Aerials" and "Antennas". Here at HRT we tend to use the British term "Aerials". Talk to 'Joe Bloggs' in the street and he will happily talk about TV and radio reception from aerials. Of antennas he will think of snails and similar animals (except in France, where snails are classed as a breed of fish! – true, really true!)

My dictionary describes an aerial as.. "of the air, overhead wire of radio set etc,". I think that sums up our dipoles, doublets etc.....

I have over ten books on the shelf dealing solely awith aerials of all types, from the huge "ARRL Antenna Handbook" to the simple but excellent "Practical Wire Antennas by John Heys G3BDQ". Let's look a little more closely at the UK offerings;

From the RSGB we have "HF Antennas for All Locations" by LA Moxon G6XN. This was one of the first books I bought and provided a huge amount of information, I learnt a lot from this book in my early days. Chapters include; Waves and Fields, Feeding the Antenna, Arrays, Long Wires and ground reflections, horizontal beams, invisible arrays and also antenna construction and erection. Half wave dipoles, Centre fed antennas using tuned feeder, end fed long wires, Transmitting loops and a whole chapter dedicated to Antenna matching systems. A must for the homebrewer.

The G-QRP Club Antenna Handbook is a compilation of articles that have appeared in 'Sprat' over the past few years. Put together for the club by Ty, GM0LNQ, it is a hugely successful book and another 'must' for the shelf. The book is separated into six separate sections dealing with; Antenna matching units and test equipment, HF Beams, HF wire antennas, HF Vertical Antennas, HF Loops and restricted site antennas and finally Antennas for the VHF bands.

There may be other British books on the subject but I don't have them. I do however have a large number of books from the USA, mainly from the ARRL and they are great! My suitcase is always heavy with the latest offering on my return each time from the USA.

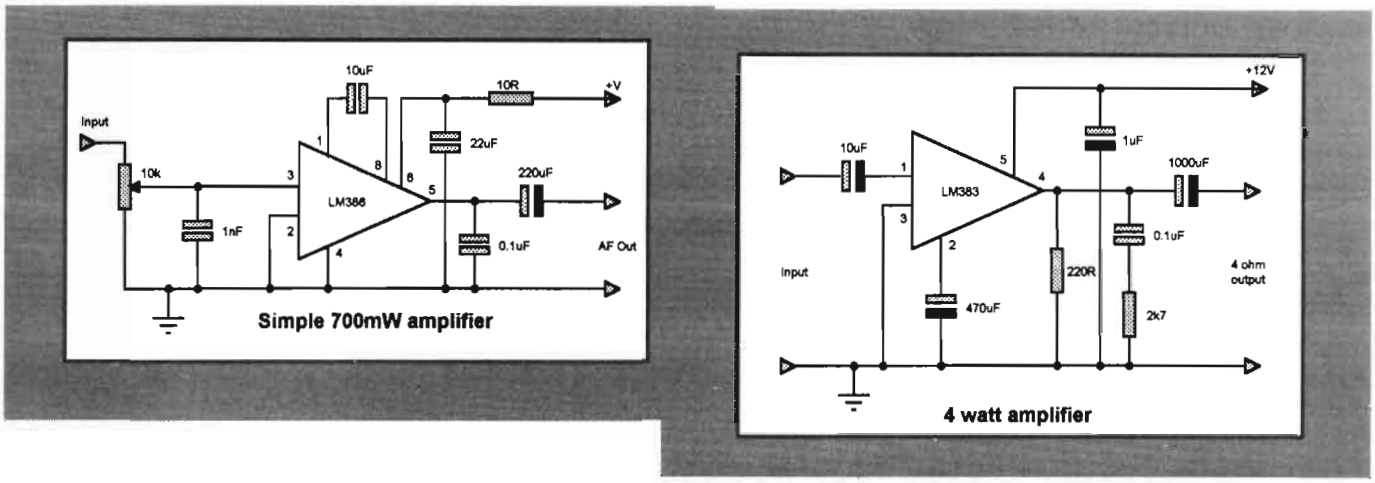
Starting with the main offering from the ARRL themselves is the 'ARRL Antenna Handbook'. Chapters here cover such diverse subjects as; Mobile and Marine antennas, Repeater antenna systems, VHF and UHF antenna systems, Antennas for space communications, antenna materials and accessories, and a great introduction to Smith Chart calculations. This book is about one and a half inches thick and is excellent.

'Easy-up Antennas for Radio Listeners and Hams' is a more laid back book, designed to provide offerings more for the listener. Radio services and an introduction to basics are the first two chapters, with antenna tests and comparisons, plus others of interest to the beginner or less experienced.

One purely aerial book from the USA is the ARRL Antenna Compendium. This is for the more experienced aerial man with in depth discussions on aerials. Here, chapters cover; Verticals, Ground Planes and Slopers, Miniature Trap and Multi-band dipoles, Yagi antennas and many more. This is a well thumbed book in my collection.

William Orr WS6AI and S. Cowan W2LX provide a good selection of pieces about vertical aerials in their book "All about Vertical Antennas", giving information about the theory, design and construction of verticals, with further information on slopers and loading coils and aerial tuners. Another of the simpler books to provide a good read.

The final two books on my shelf do not provide a simple listing of the options to try out. The first, simply named "Reflections" provides that in-depth look at feed lines. Something we tend to forget. Hands up all those who have checked the losses in their feeder lately! W. Maxwell, W2DU, provides a great read about all aspects of feeder. Again, chapters provide an interest starting with "Too low an SWR can kill you!", "Going round in circles to get to a point", "Low SWR for the wrong reasons!" and many other very readably chapters.




My final offering is perhaps the best of the lot for the experimenter. The aptly named 'Antenna Experimenters Guide' is British from the pen of Peter Dodd G3LDO. Peter has become a recognised expert in the field of aerials, and his book is the culmination of several years work. It covers all aspects of aerial experimentation and the required test equipment, and gives guidance through it all. This book is a must for anyone who enjoys trying differing systems.

## Audio Amplification

To finish off this month I offer the following. Many of the simple receivers today need some form of simple audio amplification. One of the favourite integrated circuits in use today is the small LM386, which will provide up to 700mW of audio into an eight ohm speaker. Low cost and modest power consumption are the main benefits. Many of the ICs in this range have huge amounts of amplification in their small package, the LM386 has a stated gain of over 200! The 10 ohm resistor on pin 5 is fitted to discourage self oscillation.

For a higher power output then the LM383 may be of use. This one will give up to 7W of audio at 16V, even 4W at 12V. At this voltage there will be less distortion as the IC is operating at well below its peak.

Well, that's it for this month, News and views to me via HRT editorial, via GB7RMS or direct to Seaview House, Crete Road East, Folkestone, CT18 7EG. 72 de Dick G0BPS

# VHF/UHF Message

*Geoff Brown GJ4ICD offers readers a free copy of a superb VHF/UHF logging program*

**RSGB VHF Convention Trophy Presentation for UKSMG Editors**

As promised in my last column, this month I'm going to take a look at a free logging program, The worldwide locator system is incorporated into this very fine log book program, called *Fastlog* (thanks to the UKSMG), which is designed by Italians with VHFers in mind.

## Overview

Fastlog can run a VHF/UHF contest comfortably, and offers the following options;

*1)* Management of deleted countries and prefixes, e.g., Y2 valid as East Germany until October 1990 and as Germany after this date.

*2)* Option to choose between colour and mono display, this is useful with LCDs to improve shading contrasts.

*3)* Label printing (36mm x 107mm), along with the option to add a comment line to the label.

*4)* Ability to write an ASCII or FASTLOG file to disc, ability to import and export ASCII files.

*5)* Option to exclude the sent and/or received reports in case of incomplete QSOs. The program doesn't count the QSO during search routines.

*6)* Option to add the suffix /B to point out a beacon.

*7)* Management of the following award schemes; DXCC, WAC, EUDXCC, WAIP, WAS, and UK counties. A complete list of US states, Italian provinces and UK counties is provided.

*8)* QSO logging in real time (contest) and dupe check.

*9)* Utility menu. Calculates World Wide Locator from Lat/Long, calculates QRB and QTF between two locators, converts the old five character locator into the Maidenhead system, assigns the DXCC country to any call and shows QSL status, updates prefix and country list, copies one or more QSO from the loaded file to another .LOG file. Erases one or more QSOs in the loaded file, and arranges, by date and time, the QSOs in the loaded file.

*10)* Ability to search for squares, fields, callsigns, best DX, etc.

*11)* On quitting the program you can request a backup copy of .LOG files to be sent to your A: or B: drive.

*12)* Set-up menu, which allows you to set Callsign, Name and address, Locator, File to examine, Port and baud rate, and display mode.

*13)* Easy set-up of parameters for contest working.

*14)* Window for contest writing, showing your data in real time (QRB of QSO, total QRB, worked squares, etc..).

*15)* Window for normal QSO writing. This shows you the status of the worked DXCC country. You are advised if you have already worked that country, on which bands, in which mode, and if it is confirmed or not.

*16)* Option to manually assign the DXCC country (during writing or editing) in case the one assigned by FASTLOG is not correct.

*17)* Packet window and 'world' utilities (see below).

*18)* Help option with all menus.

Two FASTLOG features worthy of further attention are the Packet and World utilities. World.exe is written by Adamo I0AKP, and features full screen, full colour graphical presentations of any part of the world. From the arrow keys you can choose where the display is centred, be it Andorra or Antarctica. When you require more detail, just zoom in with the '+' key. A selection of option keys allows you to overlay each map with its fields and/or grid squares, you can follow this with an option to number each grid and request all worked squares are marked, with those to be confirmed in a different colour. Other features allow you to check time zones, list worked squares in a given field and plot distances from your QTH.

FASTLOG incorporates a packet window, available from anywhere in the program. You can be connected to your local DXcluster and still use any FASTLOG function. For example, you can enter QSOs while connected to your local packet cluster (PCL). If the PCL sends you something (DX spot, Talk, announce, etc..) FASTLOG informs you by ringing a bell (if you've set the bell option to 'yes') and replacing the date, in the upper left hand corner with a flashing "QTC PACKET". At this point it is possible to press the TAB key and enter the packet window at once. Pressing TAB again or escape will allow you to return to the original function. Each time a DX spot hits your screen, a window appears for a few seconds to advise on the DXCC status and on which bands and which modes you have worked that country. Other function keys allow you to verify spots, print, save to disk, scroll buffer and disconnect. FASTLOG will run on a PC compatible with DOS 3.0 or later, at least 500k of conventional memory and 512k of expanded memory. It is recommended to use a 386 33MHz or higher spec. machine for fast results. World.exe requires a VGA graphics card and colour display.

If you would like a free copy then send to me: A 1.4Mb formatted

floppy disk, a return packet (Jiffy bag or similar) and 2 IRC's or $1, *please do not send any UK stamps* as they are not valid in the Channel Isles.

## Reports From Around

Ela, G6HKM reports a little action on the VHF bands. On March 7th she caught the Aurora on 50MHz and 144MHz, on 6m only SM3EQY/JP81 was heard, but, on 144MHz GM7JED, GM4UPL, GM1TGY, and GM4VVX/P were worked, together with LA1ZE in JO28, The 8th brought a little tropo down to Spain, with EA1DHG and EA1DDU being worked.

Ela also comments "As the bands are quiet (again!) she continues to wallpaper the shack with awards". Her latest diplomas are from the UKSMG (these awards are also open to non-members, contact Cliff G1IOV for details), Ela made grade 1 and 2 for 20 and 40 countries worked on 50MHz. Unfortunately she was three countries short for the top award of 60 countries, which believe me, is *very* hard to do.

This new award from the UKSMG is well worth having a go at, and what a beautifully coloured certificate it is. On counting up the European Counties I find no less than 68, but not all have been activated, like 3A2, HA, JW, UA0I, Z31, and Mt Athos. But that still leaves 62 that have at some stage been activated. Good luck, as I know it can be done! Remember also that the old OK (deleted country) still counts if you worked it before the split. I have shown a check list that is good for all ARRL DXCC claims for Europe, although please note that IT9 does not count for DXCC credit, only RSGB VHF awards.

News from Neil G0JHC, who was on holiday in Malta during Easter, was that each night T.E.P. propagation existed to Africa, not just on 50MHZ but also on 144MHz! Neil copied 50MHz beacons Z21SIX and 7Q7SIX using just a dipole, also reported was that Ron 7Q7RM worked Ralph 4X1IF on 144MHz. Ron was using 3W to a three element beam and the QSO was on FM. Wow!

News now from LY. A 50MHz general release has been given to all LY operators from early April. Known to be active are LY2DX and MB. Also, Estonia now allows 400W out on 50MHz, this privilege is given to all amateurs, even visitors!

The first week of April brought more northerly auroras on the VHF bands as things became very disturbed.

## Other News

From January 1st 1994, C31HK (the only 6m permit holder with equipment), can transmit anywhere between 50.0 and 52.0MHz. Previously he could only transmit above 50.2MHz. Fred says "I now look forward to joining the rest of Europe crystal controlled on 50.110MHz!" According to a packet radio bulletin, UU8JJ in the Ukraine has an FT690 and will be on 6m this summer from various portable locations around the Crimea.

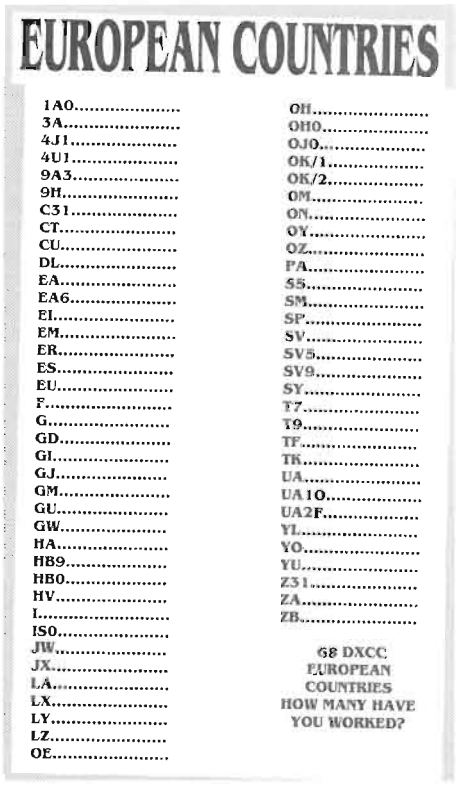
Further information from Pierre ON4PS suggests the new Government in the Ukraine may allow 6m RX/TX during 1994. Alex UR5FEP (KN56) is actively building TX equipment for 6m, and he received a number of European 50MHz beacons last summer. Alex speaks very good English, and his QSL info is via: PO Box 321 (zc) 270000 Odessa, Ukraine.

Per, LA7DFA, will be back on Jan Mayen as JX7DFA from June until April 1995. He plans to take his FT736 with 6m module. It is not yet known if the 6m aerail at the club station has survived the winter storms.

News from Dave OZ3SDL/G3SDL is that from June 29th until July 12th he will be operating from a new square for many people, KM65 near Polis in NW Cyprus. The call is likely to be 5B4/G3SDL. An automatic keyer will run from time to time on 50.093MHz, also QRV on 70.2MHz SSB +/-6.25kHz.

From July 30th until August 5th, look for OZ3SDL/P from the Danish Island of Bornholm and the rare square JO74. Many of you will remember Dave's operation as EH4BG/6 last summer. There was some debate within EA if this operation was legal, Dave writes; "With the excellent co-operation of the Spanish authorities and Antonio Munoz Vilchez EH4BG, many stations will have worked EH4BG/6 last summer from JM08/09 in Ibiza. Despite some packet messages suggesting this operation was illegal or infringed Spanish regulations, documentation can be provided indicating that the Spanish authorities had agreed that I could operate EH4BG's portable station on Ibiza. QSLs for the summer 1993 EH4BG/6 should now be sent via G3SDL at the RSGB bureau or to Dave Court OZ3SDL, Egebakken 18, DK-3520 Farum, Denmark. To those waiting for bureau cards for EH4BG/6 or CT1/G3SDL operations, all outstanding cards were delivered to either the RSGB or EDR during February 1994."

With another month gone again, that's it for now. Thanks to all, especially the UKSMG, for the latest info. News, photos and info please to Geoff Brown, TV Shop, Belmont Rd., St. Helier, Jersey. C.I. or fax/phone 0534 77067 anytime, (Fax after 5:30pm).



# Packet Radio Roundup

***Chris Lorek G4HCL puts a sprint on to get up to high data rates***

Last month I detailed a few offerings for 9600 baud packet, including details where you can get information on how to get going on higher speeds. At that time I mentioned the PacComm 'Sprint' should be available soon. But last week as I write this, I was very surprised, and very pleased, to be handed a pre-production model of a Sprint on loan. This had been hand-carried from PacComm in the USA by the UK distributors, Siskin Electronics.

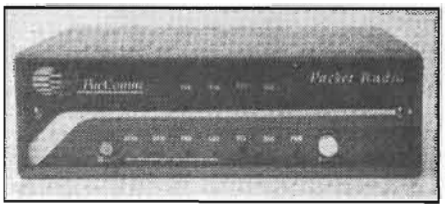
The unit supports radio baud rates from 4.8kb right up to 57.6kb with a 'real' G3RUH modem built-in,

**The PacComm 'Sprint'**

and has two independent modem transmit and receive filter sections to give you jumper selection of two radio baud rates, with optimum transmit and receive filtering for each. So, you can now try your hand at super-fast packet, and node SysOps can have a truly 'off the shelf' high speed TNC! It comes configured for 9600 and 38.4kps, so it does look like high-speed packet 'backbone' links are that much closer to happening.

## Self Contained 70cm Data Radio

Also from PacComm comes their IPR-NB96, which is a 9600 baud TNC and a 2W crystal controlled 70cm transceiver, all in the same box. You get 9600 baud on 70cm, and you can select 1200 baud operation using your existing 2m rig at the push of a button. 'Plug-in and go' high speed packet!



**The PacComm 'Plug in and Go' 9600 baud on 70cm with the IPR-NB96 radio**

## Packet SysOps Awarded

The future GB7ADX DX Cluster SysOp, Tony Jones GW4VEQ, and Martin Vernon GW6HVA, Chairman of the Gogledd Cymru (North Wales) Packet Group, recently attended the Irish Radio Transmitters Society AGM at Balleybofey, Co. Donegal, which was hosted by the Tir Conaill Amateur Radio Society. At the AGM, Paul Healy EI9GL, the IRTS Packet Co-ordinator, chaired a packet liaison meeting between representatives from GI, EI, and GW. I'm told the meeting proved productive in strengthening present links and future proposals for inter-G- GW-EI-GI routes.

**Tony Jones GW4VEQ and Martin Vernon GW6HVA were presented with the Pat Conway Cup for their services to packet radio**

During the AGM awards ceremony, the prestigious Pat Conway Trophy (about the size of the FA Cup!) was awarded to GW4VEQ, GW6HVA and G4PGO (SysOp of the GB7LDX DX Cluster and GB7LI/G0TCB in Bootle) by IRTS President Jim Ryan EI3DP. The award was issued for outstanding services to amateur radio in Ireland.

Over a 12 month period, the award recipients, along with Declan Craig EI6FR, Tony Stack EI2GX, Alan Dean EI5ENB and other dedicated members of the Dublin Digital Radio Group (DDRG) planned, designed and constructed a DX Cluster and TCP/IP route from Liverpool and North Wales to Dublin. This strategic link, which has now been operational for nearly a year, has allowed amateurs in EI and GI to link into the European DX Cluster network. The TCP/IP side of the link has also proved popular and both these facets of digital communications have undoubtedly strengthened cultural links across the Irish Sea.

This was the first time the Pat Conway Cup has been awarded to non Irish Nationals. Projects such as this, prove beyond doubt, the spirit of Ham Radio, and international liaison and co-operation is still prevalent. Well done lads!

## New Maxpak Packet Modem

Many **Packet Radio Roundup** readers use a modem, rather than a TNC, for getting onto packet, with a suitable program on their computer to drive the modem and handle the necessary 'intelligence'. Maxpak, the Midlands AX25 Packet Group, now have at a very reasonable cost what they describe as a "new generation of PC based packet modems". It improves on 'traditional' modems

with new circuitry including open squelch operation using an additional XR221 IC.

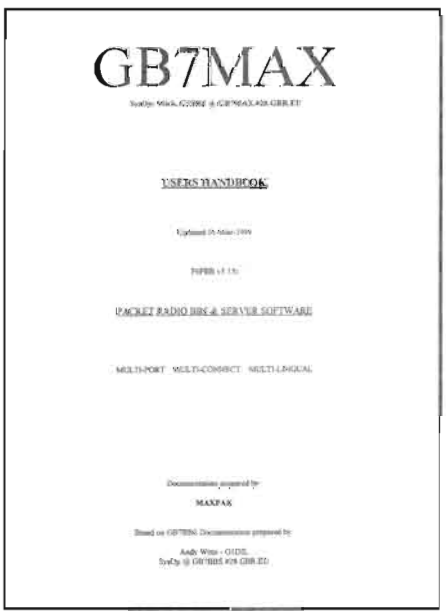
The board is self-powered, this being made possible by using the voltage that is on the active RS-232 line, which is always 'high'. Baycom V1.50a software, available as an option on 3.5in disk, is a fully licensed copy with the official registration fee pre-paid by Maxpak. The modem will also work with versions of GP, SP, and MUBAY shareware software, disks containing these are also available from Maxpak, an optional ready-drilled metal case is also available for the board.

Readers can buy the modem kit for just £32.50 plus p/p, with any profits going right back into helping the packet radio network. For details, contact Richard Nichol G1NZZ on 0384 373682 between 8.00-9.00pm. HRT Editor Sheila G8IYA is currently building one of these right now, and if we can't manage to fit it in this issue, you'll be seeing a full review in next month's HRT.

## Maxpak BBS Guide

Also from Maxpak comes their latest FBB User Guide to the GB7MAX BBS. This guide is a spiral bound 56 page A4 sized offering, giving a wealth of information on the facilities available on the FBB system run on GB7MAX (together with, of course, many other such BBSs in the UK). Yours for £2.50 plus p/p, the contact man again for this is Richard G1NZZ, see above.

**The latest Maxpak BBS guide**



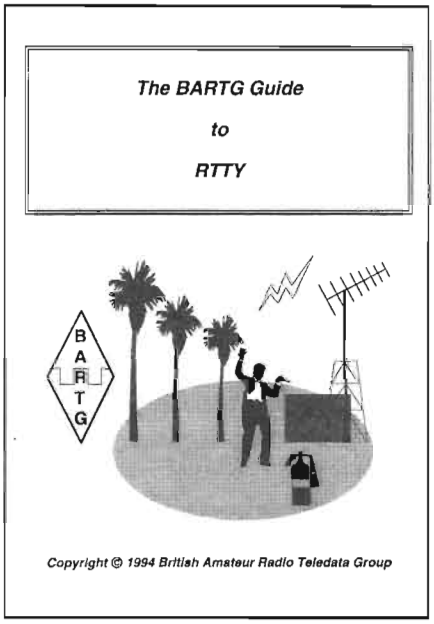

## Are You on G-TOR?

My KAM is now nicely loaded up and operational with Kantronics' V7 software which adds G-TOR capabilities (described previously in HRT), although I haven't yet made enough contacts using the mode to give a truthful assessment of what looks like a very interesting mode. I understand the AMSAT-NA HF BBS, which carries up-to-date news together with the latest Kepler data on amateur satellites, may soon be operational on G-TOR as well as PacTOR, which I'm sure will be a good initial 'boost' to the mode. If you use this BBS, let the SysOp know whether the addition of G-TOR would be of interest to you, as they're looking for such interest at the moment.

In looking around the packet and PacTOR BBS network, I find that Stig SM0BKZ asks "How about activity on G-TOR?". After being active for about one month he's only had one QSO, trying 14.070-14.080MHz, 7.035-7.043MHz, and 3.570-3.595MHz. If you'd like to arrange a sked, or suggest any other frequencies, you can contact Stig SM0BKZ @ SM0ETV.STHLM.AB.SWE.EU. Another bulletin on G-TOR comes from G4YSE, who says that he heard a weak PY6XO calling CQ in G-TOR on 21.0765MHz, but had no luck in obtaining a contact in that mode, although each could hear the other in FEC mode. Switching over to PacTOR however brought an immediate connection, a similar event occurring another day, but with local QRM present rather than a weak signal, with CT4DX on 20m.

## BARTG Guide to RTTY launched

The second in the series of 'The new BARTG Guides to Data Communications' has now been released. These new guides describe




**BARTG Guide to RTTY**

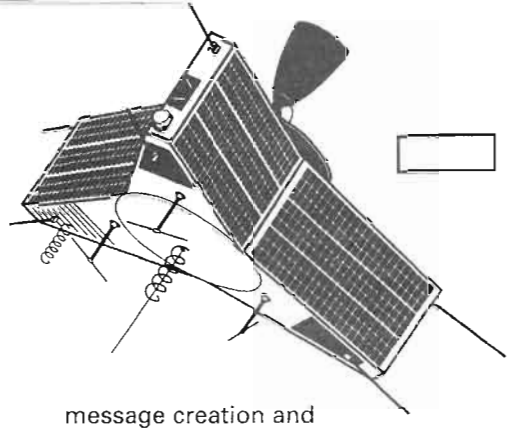
the basics of setting up the various modes of data communication over radio. I found the **BARTG Guide to RTTY** gives an excellent and easily-read guide to the mode, together with plenty of illustrations and diagrams to help along the way. It's ideal for the beginner and newcomer to RTTY, as well as being very interesting and informative reading for the amateur already using RTTY on the air. The guide is available by post from the BARTG's Publication Manager, Mark Ashby G6WRB, 47 Ryton Close, Luton, Beds, LU1 5SR, at just 75p including p/p, cheques should be made payable to BARTG.

For details about BARTG, and how to join, contact Peter Adams G6LZB, BARTG Membership Secretary, 464 Whippendell Rd., Watford, Herts, WD1 7PT, Tel. 0582 7PT, or by packet to G6LZB @ GB7BST.

## CTRL-Z, End of Message

A date for your diary is Sunday 11th September, when the 1994 BARTG Rally will be held at the Sandown Exhibition Centre in Esher, this being considered as 'the' event for packeteers around the UK. I'll be there, will you? Until next month, it's 73 from Chris G4HCL @ GB7XJZ.#48.GBR.EU

# Satellite Rendezvous



*This month's AMSAT-UK News, compiled by Richard Limebear G3RWL*

The ninth Amsat-UK Colloquium will be held this month. It all happens on July 28, 29, 30 & 31 at the University of Surrey in Guildford, Surrey. This year's Colloquium will be divided into four primary topic areas: Spacecraft Engineering, Future Space Missions, Groundstation and Spacecraft Operations and Associated Amateur Space Activities.

The annual Amsat-UK Colloquium is the largest international gathering of amateur satellite enthusiasts and experts in the world and has established a high standard of quality presentations on topics relevant to the amateur satellite community. The organisers welcome all contributions of programme material covering the vast scope of the amateur satellite programme as it exists in 1994. The ninth AMSAT-UK colloquium promises to be the most informative and entertaining event yet. We look forward to your participation in this year's Colloquium. See you in Surrey! This year's Colloquium will be the same price as last year. Contact Ron G3AAJ at Amsat-UK (see below) for details – you'll need to register for attendance due to University regulations if you'd like to come along.

## MicroSats

**AO-27** is now acting as a 'J' mode FM transponder, and is proving very popular in Europe. It has a strong excellent, quality, downlink that can easily be heard on a handheld receiver on 436.800MHz +/- some 10kHz of Doppler shift correction. Its sensitivity is far greater than AO-21. If there are no high power stations on 145.850MHz (+/- some 3kHz of Doppler shift), uplinking using a handheld which can produce 2W ERP is capable of putting a fully quieting signal into the transponder.

## Japanese Satellite 'Fuji Award'

There is now an award available for contacts via Japanese satellites. Applicants are required to make contacts with ten different amateur stations through the satellite; only contacts in CW or SSB mode count, and you need to obtain QSL cards. The "Fuji Award" applies for both FO-12 and FO-20 and costs 8 IRCs or US $4.00 per award. An additional 2 IRCs will be charged for air mail delivery regardless of the number of the awards claimed. If QSL cards are submitted, sufficient funds for return postage will also be required. All correspondences should be sent to: Japan Amateur Radio League -Award Desk, 1-14-2 Sugamo, Toshima, Tokyo 170, Japan.

## Kitsat

There's some new digital satellite software on KO-25 at the moment. It's a replacement for PB/PG for users of Windows and is called WISP. It has six programs that work together to perform a complete groundstation function. The programs are -:

GSC (GroundStation Control). This program provides housekeeping and scheduling functions for the complete groundstation package. Features include file deletion and log processing along with system wide setup functions and satellite tracking, including a graphic map screen.

MSPE (MicroSat Protocol Engine). This program provides all the uploading and downloading functions required to access the satellites.

View-Dir (View Directory). This provides the directory viewing and message viewing/reply functions, along with some message housekeeping functions.

MsgMaker (Message Maker). All message creation and replies are performed through Message Maker. It gives the user a large amount of flexibility when sending messages and binary files whilst still providing a quick, automated function.

ProcMail (Process Mail). Processes received messages as they are downloaded from the satellite, and places them in the required directories for viewing. MsgView (Message Viewer). Views all ASCII messages received from the satellite. Messages can be replied to and deleted.

The programs all interact and advise each other of any events that other programs may need to know. For example, when MsgMaker creates a new file for uploading, if MSPE is currently running, MsgMaker will advise MSPE that a new file is available for uploading.

Breaking the system down into six small programs instead of having one large programs provides flexibility, and also enhances the systems power. You can view many messages at the same time (in different windows), while also having a MsgMaker window open to reply to a message. You can then Cut and Paste text between the different windows.

Messages can be viewed and replied to while uploads and downloads continue in the background. Also, as MSPE downloads a message, it can be processed by ProcMail while MSPE continues to operate. If the message is addressed to your station, it will automatically pop up for viewing using MsgView, again while the other functions continue in the background. GSC includes some basic satellite tracking functions. This includes a graphic map screen with up to five observers allowed.

The system can automatically select a free uplink frequency before

uploading commences. This is presently only available with TrakBox. All documentation is available as online help. It is recommended that before you run the system, you check through the set up options in the help screens.

Wisp has been written by ZL2TPO and all the parts have been put on KO-25; in fact some parts have been rewritten and then uploaded again. If you're not active on KO-25 then I can supply a copy of the latest files to anyone who sends me a high density disk, mailer, and return postage.

## Amsat-UK Contact Details

For further information about Amsat-UK contact: Amsat-UK, c/o Ron Broadbent, G3AAJ, 94 Herongate Rd., London, E12 5EQ. A large SAE gets you full membership info. SWL's as well as licensed amateurs are welcome, and all new joiners get the USAT-P tracking program on 5.25 disk. Maybe you'd like to join at this year's Colloquium?

**KEPLERS**

| SAT: | OSCAR 10 | UoSat 2 | AO-13 | PACSAT |
|---|---|---|---|---|
| EPOC: | 94105.5745596 | 94109.04609251 | 94102.44882606 | 94111.18104805 |
| INCL: | 27.1808 | 97.7897 | 57.8540 | 98.5996 |
| RAAN: | 332.1525 | 136.5360 | 358.2544 | 197.9018 |
| ECCN: | 0.6020888 | 0.0013014 | 0.7212470 | 0.0011731 |
| ARGP: | 170.5875 | 97.3621 | 338.9704 | 3.2480 |
| MA: | 209.8109 | 262.9075 | 2.1469 | 356.8778 |
| MM: | 2.05879123 | 14.69192084 | 2.09725746 | 14.29891814 |
| DECY: | -1.36E-06 | 1.87E-06 | -5.91E-06 | 2.6E-07 |
| REVN: | 5332 | 54162 | 1313 | 22145 |

| SAT: | DO-17 | WO-18 | LO-19 | FO-20 |
|---|---|---|---|---|
| EPOC: | 94110.72112935 | 94111.74497802 | 94111.72692988 | 94111.84518184 |
| INCL: | 98.5998 | 98.6000 | 98.6010 | 99.0301 |
| RAAN: | 197.7505 | 198.7675 | 198.9935 | 274.3363 |
| ECCN: | 0.0011875 | 0.0012534 | 0.0012845 | 0.0541450 |
| ARGP: | 4.5921 | 1.7214 | 1.2975 | 107.0911 |
| MA: | 355.5369 | 358.4010 | 358.8233 | 259.0223 |
| MM: | 14.30031331 | 14.30006389 | 14.30101593 | 12.83224980 |
| DECY: | 5.4E-07 | 5.2E-07 | 5.2E-07 | -4.7E-07 |
| REVN: | 22140 | 22155 | 22156 | 19690 |

| SAT: | AO-21 | UO-22 | KO-23 | KO-25 |
|---|---|---|---|---|
| EPOC: | 94110.16310556 | 94109.2257442 | 94110.23751688 | 94110.70406310 |
| INCL: | 82.9443 | 98.4387 | 66.0880 | 98.5586 |
| RAAN: | 185.6439 | 184.9054 | 41.3145 | 184.9727 |
| ECCN: | 0.0033668 | 0.0008544 | 0.0012900 | 0.0011711 |
| ARGP: | 245.5203 | 102.1158 | 301.7999 | 350.4794 |
| MA: | 114.2440 | 258.0983 | 58.1768 | 9.6158 |
| MM: | 13.74538249 | 14.36908131 | 12.86285337 | 14.28047654 |
| DECY: | 9.3E-07 | 7.3E-07 | -3.7E-07 | 5.4E-07 |
| REVN: | 16161 | 14461 | 7933 | 2949 |

| SAT: | IO-26 | AO-27 | PO-28 | RS-10/11 |
|---|---|---|---|---|
| EPOC: | 94107.73708649 | 94108.17221452 | 94111.68914797 | 94108.21130139 |
| INCL: | 98.6576 | 98.6579 | 98.6536 | 82.9285 |
| RAAN: | 184.1717 | 184.5746 | 188.1049 | 13.1768 |
| ECCN: | 0.0009992 | 0.0009432 | 0.0010695 | 0.0010648 |
| ARGP: | 30.9978 | 28.6059 | 6.7035 | 184.3188 |
| MA: | 329.1789 | 331.5642 | 353.4287 | 175.7885 |
| MM: | 14.27721646 | 14.27618366 | 14.28019657 | 13.72335054 |
| DECY: | 2.7E-07 | 2.1E-07 | 7.2E-07 | 3.8E-07 |
| REVN: | 2906 | 2912 | 2963 | 34168 |

| SAT: | RS-12/13 | Mir |
|---|---|---|
| EPOC: | 94108.30764982 | 94111.47472222 |
| INCL: | 82.9200 | 51.6453 |
| RAAN: | 55.8515 | 110.4252 |
| ECCN: | 0.0027920 | 0.0015330 |
| ARGP: | 277.6170 | 168.4110 |
| MA: | 82.1811 | 196.0636 |
| MM: | 13.74038670 | 15.58725689 |
| DECY: | 2.8E-07 | 5.378E-05 |
| REVN: | 16042 | 46719 |