

**Incorporating
SCANNERS**

HRT

HAM RADIO TODAY

APRIL 1994 £1.70

LONDON SHOW GUIDE ISSUE!

Latest
Handhelds
Featured

Standard
C-406
'credit card'
sized 70cm
rig reviewed

Kenwood
TH-22E
2m handheld
reviewed

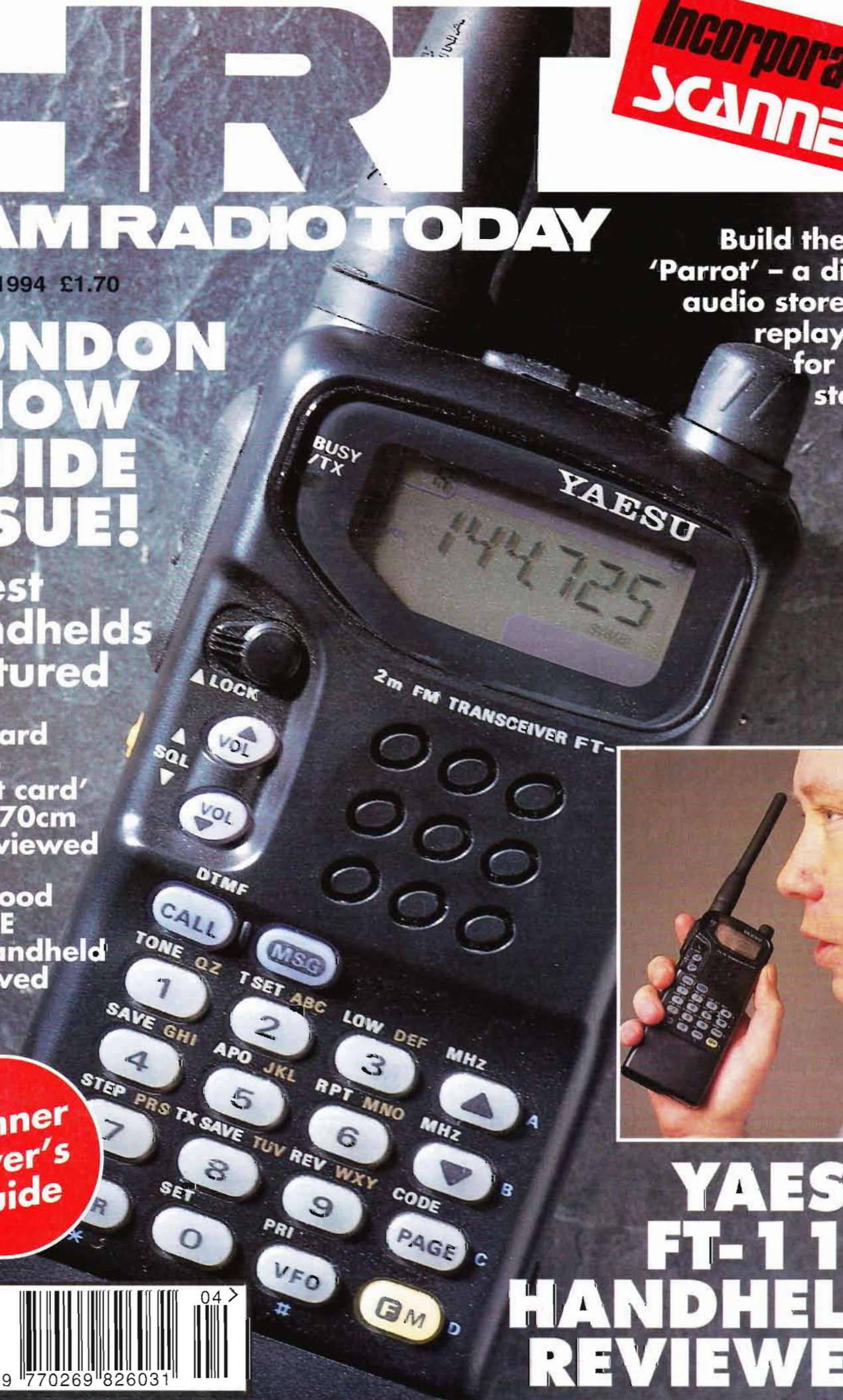
Build the HRT
'Parrot' - a digital
audio store and
replay unit
for your
station

**Scanner
Buyer's
Guide**

BEST VALUE
Argus
SPECIALIST
PUBLICATION



NOVICE • PACKET • REVIEWS • PROJECTS • SATELLITES



YAESU FT-11R HANDHELD REVIEWED

HAM RADIO TODAY

VOLUME 12 NO.4 APR 1994

REGULAR COLUMNS

| | |
|---|----|
| QRP CORNER | 13 |
| Dick Pascoe G0BPS constructs a simple CW HF rig complete with a 'zero cost' side tone | |
| FROM MY NOTEBOOK | 40 |
| Geoff Arnold G3GSR gives readers a Sure-Start on voltage regulators | |
| PACKET RADIO ROUNDUP | 42 |
| Chris Lorek G4HCL gets linked in between HF and VHF | |
| VHF/UHF MESSAGE | 44 |
| Geoff Brown GJ4ICD describes the new United European Time which replaces GMT and UTC | |
| HF HAPPENINGS | 46 |
| Don Field G3XTT reports good conditions on the lower bands | |
| SATELLITE RENDEZVOUS | 48 |
| Richard Limebear G3RWL with this month's AMSAT-UK news | |
| FREE READERS ADS | 53 |
| Helplines, For Sale, Exchange and Wanted, published free | |

REVIEWS

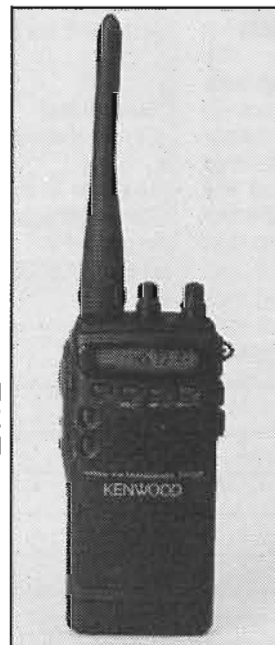
| | |
|--|----|
| YAESU FT-11R REVIEWED | 15 |
| G4HCL marvels at Yaesu's fully-featured tiny powerhouse | |
| KENWOOD TH-22E REVIEWED | 20 |
| Chris Lorek thinks "It's a Small World" with Kenwood's smart new handheld | |
| STANDARD C408 REVIEWED | 23 |
| Standard's latest 70cm portable gets compared with a credit card, and we find the card is larger | |
| HAM RADIO V3.2 CD-ROM REVIEW | 33 |
| Many long hours spent can be spent looking through the vast amount of information contained on the Ham Radio V3.2 CD-ROM | |

PROJECT

| | |
|--|----|
| THE HRT 'PARROT' | 26 |
| Paul Lovell G3YMP builds a speech 'store and replay' module for your shack | |



The HRT Parrot



Kenwood TH-22E Reviewed

Standard C408 Reviewed



FEATURES

| | |
|--|----|
| FREE COMPETITION | 4 |
| Your chance to win a Optoelectronics 2.8GHz MiniCounter! | |
| 1994 LONDON SHOW GUIDE | 30 |
| SCANNERS INTERNATIONAL | 35 |
| Scanner Buyer's Guide, scan news, scan ads and more | |

NEWS AND VIEWS

| | |
|--|-------|
| CQ de G8IYA EDITORIAL | 5 |
| What are SSL up to? | |
| LETTERS | 6 |
| HRT readers have their say | |
| RADIO TODAY | 8 |
| RSGB Presidential installation, Solihull Club celebrates 25th Anniversary, new Icom HF and 6m rig, and lots more | |
| CLUB NEWS | 50 |
| Dynamic go-ahead clubs and voluntarily-run RAE course contact details. Is your club listed? If not, why not! | |
| NATIONAL SOCIETIES AND ORGANISATIONS | 52 |
| Contact details for the RSGB, Radiocommunications Agency, SSL, ISWL, and many more national organisations | |
| HRT SUBSCRIPTION OFFER | 39/58 |
| Make sure you get your HRT each month right through your letter box | |
| CLASSIFIED ADVERTISEMENTS | 56 |
| Your local dealers, component and kit suppliers, and RAE courses | |
| ADVERTISERS INDEX | 43 |

All reasonable care is taken in the preparation of the magazine contents, but the publishers, nor the Editor, cannot be held legally responsible for errors in the contents of this magazine, or for any loss however, arising from such errors, including loss resulting from the negligence of our staff. Reliance is placed upon the contents of this magazine at readers' own risk.

CQ de G8IYA

Editorial

What are SSL up to?

Hardly a day goes by without either my Tech Ed or I hearing about yet another problem that a radio amateur has had with their licence renewal. Readers call us with their tales of woe, write to us with their tales of woe, and of course we hear and read a lot of tales of woe 'on the grapevine'. A large number of amateurs also like to let the rest of the UK know about their tales of woe via national bulletins on the packet radio network (what a superb way of disseminating information!).

Get Your Licence Here

I suppose one of the 'classics', which I mentioned in my CQ de G8IYA

Editorial in the February 1994 issue, was when SSL sent a Citizens Band Licence Validation Document, complete with the licensee's Class A amateur callsign on it, to a UK amateur. This was Ernie G4LUE, and it was a copy of his validation document in my hand in the Editorial photo in that issue. I didn't feel correct in showing this in more detail to readers at the time, but Ernie contacted me to suggest that I reproduce the relevant bit of the document in these pages. No, I haven't forgotten that this is the April issue.

But the main 'grief' being aired by amateurs is that SSL, who handle licence issues and renewals on behalf of the RA, are (now apparently notori-

ously) inefficient at sending out renewals and in return sending out validation documents in time to amateurs. I've heard many tales of SSL having denied receiving amateur's renewal cheques, after reportedly having cashed them, after amateurs have phoned (paid) to complain, sometimes then sending out replacement cheques (paying more postage) and cancelling their last cheques (and paying significant bank charges do do so). Recently, SSL took it into their heads to start informing amateurs, via a printed letter, that if their licence lapsed due to not having been renewed in time they must formally re-apply with complete supporting documentation as if it were a new licence application, such as a City and Guild's RAE pass slip, Morse test pass slip, etc. Worries of 'you might not get your original callsign back' certainly disturbed amateurs, many of whom don't even have their original pass slips (if they ever took these tests in the first place, which of course is another subject altogether).

The Good News

But the good news is, that, despite what SSL would have you believe, the RA tell us SSL are not allowed to demand original pass slips. Indeed, the current RA information sheet "Amateur Radio Call Signs" (RA 182 (REV 5) Sept 1993 ISBN 185569 1027, free from the RA), says "Anyone who once held a full UK amateur licence may apply for its re-issue no matter what qualifications were used to obtain that licence in the first place. The only requirement being that the amateur must be able to identify the callsign accurately, provide some proof that they originally held the licence (eg. an old Valuation Document showing the callsign), and provide some proof that they are who they claim to be (eg. a photocopy of their birth certificate)". End of quote, and the "Valuation" is deliberate, that's what it says, although I guess they mean "Validation".

Everyone makes mistakes. Like the RA, SSL, the RSGB, like the HRT Editor. But it's the number of mistakes made, and the effect these have on people, that get people's 'backs up'. I understand the Radiocommunications Agency (who are the people who issue us with our licences, and who subcontract SSL to do this administrative section of their work) are performing an investigation of SSL's efficiency. You'll find contact details for the RA and SSL in the 'Contacts' section following 'Club News' in each issue of HRT. They're the people to write to (don't spend too much money phoning them!), as they're the people who can sort your problems out. Well, maybe.

Ernie G4LUE's Amateur Radio Validation Document. No prizes for spotting the deliberate mistake!

| Validation Document Document de validation Gültigkeitsklärung | | RA RADIOCOMMUNICATIONS AGENCY | |
|--|---|--|--|
| United Kingdom of Great Britain and Northern Ireland, the Channel Islands and the Isle of Man Royaume-Uni de Grande Bretagne et d'Irlande du Nord, les îles Anglo-Normandes et l'île de Man Für das Vereinigte Königreich von Großbritannien und Nordirland, die Kanalinseln und die Isle of Man | | | |
| Wireless Telegraphy Act 1949 Loi sur la télégraphie sans fil de 1949 Gesetz über drahtlose Telegrafie von 1949 | | | |
| Citizens' Band Licence Licence pour bande CB CB-Funklizenz | | | |
| No. | 35434-L/60426 | | |
| Licensee's Name: | MR E BAILEY | Nom du titulaire Name des Inhabers | |
| | G4 LUE | | |
| Mailing Address: | 8 HILD AVENUE CUDWORTH BARNSELY SOUTH YORKSHIRE S72 8RN | Adresse postale Postanschrift | |
| | 8 HILD AVENUE CUDWORTH BARNSELY SOUTH YORKSHIRE | | |
| Date for Renewal: | 30-AUG-1994 | Date de renouvellement Erneuerungsdatum | |
| This licence (the "Licence") granted on 31-AUG-1988 ("Date of Issue") by the Secretary of State for Trade and Industry ("The Secretary of State") to the Licensee named above, authorises, for the purposes of section 1 of the Wireless Telegraphy Act 1949 ("The Act"), the establishment and use of the stations for wireless telegraphy in accordance with the Terms, Provisions and Limitations Booklet which is incorporated into and forms a part of this Licence. | | | |
| La présente licence (la "Licence") accordée le ("Date d'émission") par le Ministre du Commerce et de l'Industrie au titulaire nommé ci-dessus en application de la section 1 de la Loi de 1949 sur la Télégraphie sans fil autorise le titulaire à établir, installer et utiliser un appareil d'émission et de réception pour la Télégraphie sans fil à la station [d'être au paragraphe 1(10)] conformément au Recueil des Conditions, Dispositions et Limitations qui est incorporé dans la présente licence et en fait partie intégrante. | | | |
| Diese Lizenz (die "Lizenz"), die dem vorstehend genannten Lizenzinhaber aufgrund des Abschnitts 1 des Gesetzes über drahtlose Telegrafie von 1949 am ("Datum der Erteilung") von dem Minister für Handel und Industrie erteilt wurde, berechtigt den Inhaber zur Einrichtung, Installation und Verwendung von Sende- und Empfangsgeräten für drahtlose Telegrafie an der [in Unterklausel 1(10) definierten] Station im Einklang mit der Broschüre über Bedingungen, Vorschriften und Einschränkungen, die in diese Genehmigung einbezogen ist und einen Bestandteil hiervon bildet. | | | |
| The Licence also authorises the Licensee to operate equipment in countries which have implemented CEPT recommendations T/R 20-02 and 20-07. Such equipment must be type-approved to either MPT 1333 or ETS 300 135 and must clearly be marked with either "PR 27 GB" or "CEPT PR 27 GB". Licence for the use of a 27 MHz transmitter-receiver (PR 27 equipment). | | | |
| La Licence autorise également le titulaire à se servir de son matériel dans les pays qui ont donné suite aux recommandations du CEPT T/R 20-02 et 20-07. Un tel appareil doit être homologué d'après MPT 1333 ou ETS 300 135 et doit porter les marques visibles "PR 27 GB" ou "CEPT PR 27 GB". Licence pour l'utilisation d'un appareil d'émission et de réception de 27 MHz (matériel PR 27). | | | |
| Die Lizenz autorisiert den Lizenzinhaber dazu, Ausrichtungen in Ländern zu betreiben, die die CEPT-Empfehlung T/R 20-02 und 20-07 eingeführt haben. Die Ausrüstung muß entweder nach MPT 1333 oder nach ETS 300 135 typengenehmigt sein. Außerdem muß eine deutliche Markierung mit entweder "PR 27 GB" oder "CEPT PR 27 GB" vorhanden sein. Lizenz für die Benutzung eines 27 MHz Sende-Empfängers (PR 27 Ausrüstung). | | | |
| Issued on behalf of the Secretary of State for Trade and Industry | | | |
| The Validation Document is issued upon receipt of the current licence fee. | | | |
| Délivré au nom du Ministre du Commerce et de l'Industrie | | | |
| Le document de validation est délivré contre réception des droits de licence appropriés en vigueur. | | | |
| Im Namen des Ministers für Handel und Industrie erteilt | | | |
| Die Gültigkeitsklärung wird nach Erhalt den jeweils vorgeschriebenen Gebühren erteilt. | | | |
| The equipment may be used temporarily in the following countries: | | | |
| L'appareil peut être utilisé à titre temporaire dans les pays suivants: | | | |
| Die folgenden Ausrichtungen können zeitweilig in den folgenden Ländern benutzt werden: | | | |
| A B C H D DK E F FL GR H I IRL L MC N NL S SF TCH | | | |
| For guidance see note 11 to Terms, Provisions and Limitations Booklet. | | | |
| Pour tous renseignements complémentaires, consulter l'avis No 11 du Recueil des Conditions, Dispositions et Limitations. | | | |
| Weitere Hinweise sind der Broschüre über Bedingungen, Vorschriften und Einschränkungen unter Bestimmung 11 zu entnehmen. | | | |
| J&L RACIBORG New York | | | |
| The Radiocommunications Agency is an Executive Agency of the Department of Trade and Industry. | | | |

LETTERS

Letter of the month

Dear HRT,

I would like to draw your attention to the unacceptable actions of Subscription Services Ltd. and one of its staff.

On the 4th January 94 I received my renewal notice for my licence due on the 2nd February 94. As this only allowed me just over four weeks instead of the six claimed by SSL, I immediately obtained a postal order for the amount required, so that there was no question of waiting for a cheque to clear, and posted it before 11am on the same day. The previous year the delay was so great that the validation document arrived over three weeks late, meaning that I could not lawfully use my station for that period of time.

By the 12th January the document had not arrived, so I phoned up to find out why and was told that it had been posted to me on the previous afternoon. As it had still not arrived on the 14th I again phoned and asked them what they were playing at, as I did not like being lied to by one of their staff, re; the posting. I was then told that no one on their staff would lie but that they would post me a duplicate,

which needless to say I have not yet received.

I would welcome your opinion on this and the comments of any of your readers, as I personally do not think that under these circumstances and in view of their performance up to date, this organization should hold the running of this service. After all there weren't these sort of problems when it was run from Chesterfield.

C. F. Cooper, G1WUQ.

Editorial comment:

I hear much worse stories than this, and I know hundreds of other amateurs do also, almost every day. Regarding lying, well SSL certainly did overstep the mark in giving written 'demands' for licence renewals which appeared to suit just themselves, rather than what the RA deem to be appropriate (see this month's CO de G8IYA Editorial), as well as reportedly denying several cases of not having received cheques after having cashed them. I wonder which type of licence Validation Document you'll get back? Would other readers like to share their experiences of licence renewals? Maybe I should give a HRT T-shirt to the worse one!

greater penalty than an unlicensed operation subsequently accorded a licence. Nothing undermines regulation quicker than appearance of unfairness and anyone who knows more about all this should tell us, as a matter of public interest.

As an RSGB member I can extract no assurance of support against vexation. That could, for example, have arisen from my recent failure to obtain from SSL a validation document until five weeks after the due date despite a direct debit authorization. I resumed limited operation after a telephone OK from a very helpful gentleman in RA HQ. Somewhat dubiously, for had some other person seen fit to be awkward it might have been expensive to justify in court. I beg to remain, with G6CRX, concerned.
Sandy, GM0IRZ

Dear HRT,

Having read the Editorial in the February 94 HRT, there are a few errors which I feel should be corrected, as well as a few additional observations to be made. I am Chief VE (Volunteer Examiner - Ed) for the Darley Amateur Radio Club, which is a joint US/UK club in the Harrogate area, operating under the ARRL VEC.

Firstly, the cost is now \$5.95, and this is per session, not per examination. The candidate can take as many examinations as he/she likes per session for the one fee. The Novice examination is free.

In order to qualify for a reciprocal licence, it is necessary to pass the Novice, Technician and General examinations, plus the 13 wpm code test. Pass rate for all examinations is 70%. Additionally it is necessary for all candidates to have a good US address in order for the licence to be mailed to them. A US Ham licensee known to the candidate may offer to act as US address, this is quite acceptable to the FCC.

Retests are possible at the same session at the discretion of the VE team, i.e. if a candidate fails by 4 or 5 questions, a resit of a different paper may produce a pass, if, however the failure is by 10 or more a resit would not be recommended, as the

Dear HRT,

"Good grief!" I thought in my wide-eyed innocence "now I've passed my exams I can send off my money and look forward with mounting anticipation to receiving my licence and callsign from the RA!". This was done and soon after I received a note of acknowledgement telling me not to contact them as my application was being dealt with and would be processed in about 14 days. This was rapidly followed by my returned record of achievements.

It was then that things started to go a bit 'pear shaped'. After about a week I was sent a CB licence renewal - well not quite, the address was correct but the name wasn't, and there has never been a CB radio here, nor have I owned one. A quick phone call soon sorted things out and I have

now spent a further three weeks or so eagerly awaiting the illustrious documents. Now, horror of horrors, those awfully nice RA people have sent me (perfectly correct address again) someone else's *final* reminder for their amateur radio licence sub! Wouldn't have minded so much if it hadn't been an English callsign!

Is this really a typical example or am I being particularly lucky? On the other hand is this just another hoop one has to jump through on the road to a licence? In other words, is this a record?

Derrick Warrner, GM???

Dear HRT,

Of the Hitchcock affair, published reports did not show why licensed if irregular operation 'deserved' loss of licence, with an over twentyfold

£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 0703 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.

candidate is obviously not sufficiently prepared for the examination.

In the editorial the suggestion is made, although not directly, that this method is an alternative to the UK licensing system. Speaking for my VE team, it is not our policy to replace the UK Ham exam, we have neither the time nor the capacity to do this, however, judging from the number of queries we get from surrounding clubs the demand exists. Our purpose is to process potential amateurs among the US community living within our service area, and offer a limited service to UK amateurs who wish to obtain a US license for visiting the US or obtaining a reciprocal license where this is easier with a US licence.

We have, from time to time, taken candidates from the surrounding communities who, for one reason or another, have had difficulties in following the UK trail to a Ham licence, and also offer examinations at the Northern Mobile Rally and the White Rose Rally. If anyone wishes to take examinations at these events we will examine them on a first come, first served basis, but we will only accept candidates who have a good US address.

I hope that the above has made the situation clearer, from our point of view the fees charged here are exorbitant and the system requires looking at, our hobby is supposed to be for all, not a privileged few. We would like to be able to do more, however, with a small number of VEs (V meaning voluntary and unpaid), all of whom have to work for a living, taking large numbers of candidates at widely spaced venues is neither practical nor possible.

Happy New Year to you and the readers, Mike Parker, G4IUF/N6SVL

Editorial comment;

Thanks for the information Mike, we remember what you said in your letter to our Tech Ed "We have had a lot of enquiries from clubs recently, and have found out why, apparently UK exam fees are now £32 + £20 if not a recognised centre, so we are somewhat cheaper!! The SSL are now issuing full UK licences against a General Class US in about 3 weeks, so its also a lot quicker, just shows the way we Brits are rooked by the system. A US licence is also free and lasts ten years, and is also useful in obtaining reciprocals in the Pacific area". We have also had quite a response to that editorial, many people asking who they should contact for more details of the ARRL exams. With many US HRT readers

interested in getting a licence for use 'back home', and many UK readers interested in getting a US licence we've been literally 'swamped'! Well the people to contact are the ARRL, who's address is 225 Main St, Newington, CT 06111, USA, Tel. 010 1 203 666 1541. They should be able to give you the local contact person if they know of a Volunteer Examination team in your area. We featured the ARRL examination manuals which give details of the exams in the December 93 HRT, (there is one for each licence level) these are available in the UK from SMC Ltd. or direct from the ARRL in the USA. A packet bulletin, to our Tech Ed via Andy G4MYS, from Mr. Yves Remedios G4UDT regarding the US exam sessions he is involved with in London says; "The session dates are set according to demand and cost you about £5 per session. The exam structure is progressive and all takes place on one evening, you attempt the paper for each successive level until you fail a paper. Almost everyone attending achieves a pass at some level, some even succeed in being awarded the Extra Class pass at the first session". If anyone is interested in the exam sessions which take place in the London area and would like more details, you can contact G4UDT @ GB7BST.#32.GBR.EU, or post at 44 Kingsway, Wembley, Middlesex, HA9 7QR (please note this is for the London area only and as this is all unpaid voluntary work, please enclose an SAE for reply - Ed). Our HF Happenings columnist, Don Field G3XTT, is also a Volunteer Examiner and has helped run US exam sessions in the UK. HRT would be pleased to publish the contact details for other areas in HRT, if you let us know the details. So, Volunteer Examiners and Co-ordinators, let us know! We believe from Mike's letter there is a VE team in Kent and to contact; Civita, 1 Cross Way, Lewes, East Sussex.

Dear HRT,

Colin Mills G7EVT (Letters Feb 94 issue) is most certainly on the right track, as the RSGB has all the information. As regards callsign holders it would be the most logical thing to do, but how about those operators who are at loggerheads over the RSGB's handling the court case whereby they were accused of deformation of character and the person involved was reimbursed his fine and damages. This should never happen, once a person has been convicted of offenses of which he is charged, whether he be a millionaire or not, does not give him the right to abuse the radio bands of which he is licensed for. But Colin there are many excuses not to join the RSGB too varied to name, his idea is very sound but the price a little too low, lets say £20 and I would wholeheartedly agree.

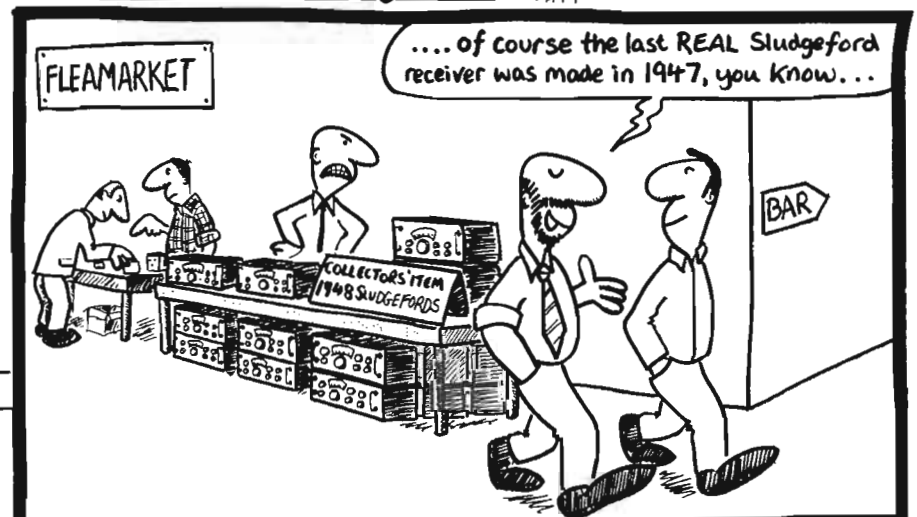
The ARRL Volunteer Examination Centre in the UK, and only £3.40 for the written and Morse exam takes some believing. What is the cost to join the ARRL and besides why not have an RSGB examination Centre in the USA? I am against short cuts, what's worth having is worth working for.

J.H. Clifton, G7IOU

Editorial comment;

The ARRL exams are not a short cut, you still need to know your stuff, they are just a different way of doing things by using a volunteer structure (like the RSGB does with Morse tests in the UK), which makes things a lot cheaper. Hams helping Hams. With both systems, the technical standards are arguably very similar between the US General licence and the UK Class A licence. But with the US system, you know your results straight away, and as Mike Parker has told us, if you failed by a narrow margin, you can sit the exam again in the same session. Maybe the UK could have a similar system one day.

"TONE" BURST



Coastal Communications

Your 'Local' Independent East Coast Dealer

YAESU
FT11R



RRP
£299

POCKET SIZE POWER PACKS

FULL
RANGE
OF
ACCESSORIES

SEE THE
REVIEWS
IN THIS
ISSUE



KENWOOD
TH22E

RRP
£239

★ FREE SOFT CASE ★
CHOOSING WHICH ONE TO
BUY IS THE HARDEST CHOICE

SUBJECT TO STATUS. NO DEPOSIT INTEREST FREE FINANCE IS AVAILABLE ON GOODS
OVER £250.00 (THIS MAY INCLUDE ACCESSORIES)



19 Cambridge Road, Clacton-On-Sea, Essex CO15 3QJ. Tel. 0255 474292.

Copyright of Argus

small speaker but I would prefer to stick to the 'phones.

The simple PI network on the output will provide some harmonic filtering. The inductor is a T50/2, for 80m try 20 turns of 28SWG wire (one turn equals one time through the hole) the matching capacitors are 820pF. Other bands will work I would think but I have only tried 80m, although I am told that 40m would require 14 turns. The output from this filter provides a 50 Ohm match to your aerial.

This is a transceiver in its simplest form and there is no transmit or receive offset, so you will be receiving at or near to your transmit frequency. One way to offset this is to fit a small variable capacitor in series with the crystal and 'tune for signals on receive'. The circuit can be modified in many ways, RIT may be fitted by perhaps switching in a small capacitor. The unit described is a basic type without any frills or additions, I intend to make my MkII version with RIT, true offset and with real sidetone. Regular readers will know of my penchant for fitting small rigs like this into various containers. This one will fit inside a cigarette packet (10s) easily. Perhaps using a micro-switch as the key, or something very similar. I do have some other ideas and will report back with photographs later.

Construction

Having made a PCB, or obtained a 'Blob Board' (this is a PCB without holes, just a selection of pads of various sizes, ideal for the experimenter) the components must be identified and their placement checked. Firstly fit all the resistors to the board and then fit the diode making sure it goes the right way round. The capacitors may then be fitted, and then the IC. The simple RF choke (L1) on the collector of TR2 is made up of six turns of 32SWG wire on a small ferrite bead such as the FX1115. The last to go in should be the transistors.

As with any construction project there are two more things to do before power is applied. Firstly check for solder bridges and then for dry joints. Readers would be amazed at the number of construction projects that I see that don't work. I would say that a good 75% of them are due to poor soldering, the main fault being solder bridges. (Now that's a good idea for the next column!) Dry joints usually show up as a different colour to the good joints.

Assuming that all the joints are good and that all components are in the right place, power may be applied to

the unit. At switch on, a hiss will be heard in the 'phones. Couple up an aerial and signals should be heard. Turn your small variable capacitor next to the crystal to change the resonant frequency by a few hertz. After fitting a power meter at the output the key may be depressed and the output power measured. It should be in the region of 250mW (1/4 watt) anything more than this should be thought of as a bonus! Harmonics at the output of the PI filter were measured at about -20dB which, whilst not being perfect should be enough when an ATU is also used. The aerial used may be any type that is fairly resonant for the band.

I have not yet put my original on the air for any length of time, but intend to have given the MkII version an airing during the G-QRP club's Winter Sports. I shall report back later on the results. This type of circuit is, to me what the hobby is all about, fun with a capital 'F'. So do build one if you can and let me know how you get on with it. I expect that many will be built over the next year or two.

As usual news, views and ideas to me via HRT Editorial, via GB7RMS or direct to Seaview House, Crete Road East, Folkestone CT18 7EG (please enclose an SAE if you need a reply - Ed).
72 de Dick.

Yaesu FT-11R Review

Chris Lorek G4HCL marvels at Yaesu's fully-featured tiny powerhouse



It's not often that I get wildly enthusiastic about 'yet another' 2m handheld. But after I'd been using the FT-11R for a few days, this feeling started creeping up on me. After a week of using the set, I sincerely felt I didn't want to give it back. In my opinion, this set is superb.

Size

The size of many handhelds nowadays is often limited by the batteries, rather than most other factors. If you want a few watts out from a handheld, you need to supply the PA module with seven or eight volts. My FT-811 needs a 7.2V battery to give 1.5W out. But the FT-11R, and its 70cm FT41R 'twin brother', use an FET PA rather than bipolar affair, each giving 1.5W output from a tiny 4.8V battery. Increase this to a 9.6V battery and you

get 5W out. That's a lot of power from a tiny set. Combined with the set's sensitive receiver, you get a lots of QSOs from a small package.

With the 4.8V battery, the set measures 57mm x 102mm x 25.5mm, smaller than virtually any other 1.5W handheld I've come across, and weighs around 280g. The size doesn't mean it's lacking on features either, as you'll see.

Memories

You get 148 memories, plus two digital VFOs, plus two 'upper' and two 'lower' scan edge memories, plus a quick-access 'call' channel. The set can even put an automatic -600kHz repeater shift in for you when you're in the repeater portion of 2m. All the memory channels are also 'tuneable' so you can have a listen either side of these, and if you can't remember what you've stored in all those channels, the set has an answer. By decreasing the memories available to 75 channels on 'startup', you can if you wish tune through your local 2m chat channels, repeaters, and so on by *name*, not frequency. For example, after I've programmed the set, if I want to QSY to my semi-local 2m repeater GB3PC, I just need to twist the click-step channel knob until 'GB3PC' comes up on the LCD. Likewise with GB3SC, and GB3SN, and S20, and so on.

What's this? It's early evening and the XYL's just called me while I was in

the office but on the phone, and left me a message on the FT-11R. It says 'Dinner' on the LCD. I suppose I'd better go and eat, I'll just press a button to send her a 'Coming' text message. Talk about 'bells and whistles'.

Versatility

Yaesu must have been doing their 'homework' well when designing the set, and were probably also looking at handheld cellphone styling as well as the needs of amateurs, as a number of features of the set and its accessories seem quite similar to the latest models of these. Like the size and shape of the set, easy to hold, and very 'thin' to slip into your top pocket without much of a bulge. The set's translucent keypad lights up superbly in the dark, and a mobile adaptor at £79 RRP is available which the set slips into, the keypad lighting when this is in use. There's even a small fan built into the adaptor to keep the tiny set's PA cool on long mobile 'overs'!

Battery Life

To extend battery life when you're using the FT-11R portable, the set has three 'low power' settings as well as 'high' power, and an 'intelligent' automatic battery saver keeps track of the usage of the set and adjusts the on/off economizer time ratio to suit your operating habits. You can, of course, switch



this off if you want, although with it enabled I found I never, ever, had a flat battery throughout the review period. On transmit, a selectable 'TX save' feature can even automatically reduce your transmit power when you've no modulation and the received signal strength is S9+.

A 4.8V 600mAh nicad and plug-in AC mains charger comes with the set, the DC lead from this plugging into a desktop CA-9 'pod' in which you stand the set, or your battery, in. Spare battery packs are available in 4.8V 600mAh (as supplied), 4.8V 1200mAh, 7.2V 900mAh and 9.6V 600mAh sizes, and an optional desktop rapid charger is available for quick 'top-ups'.

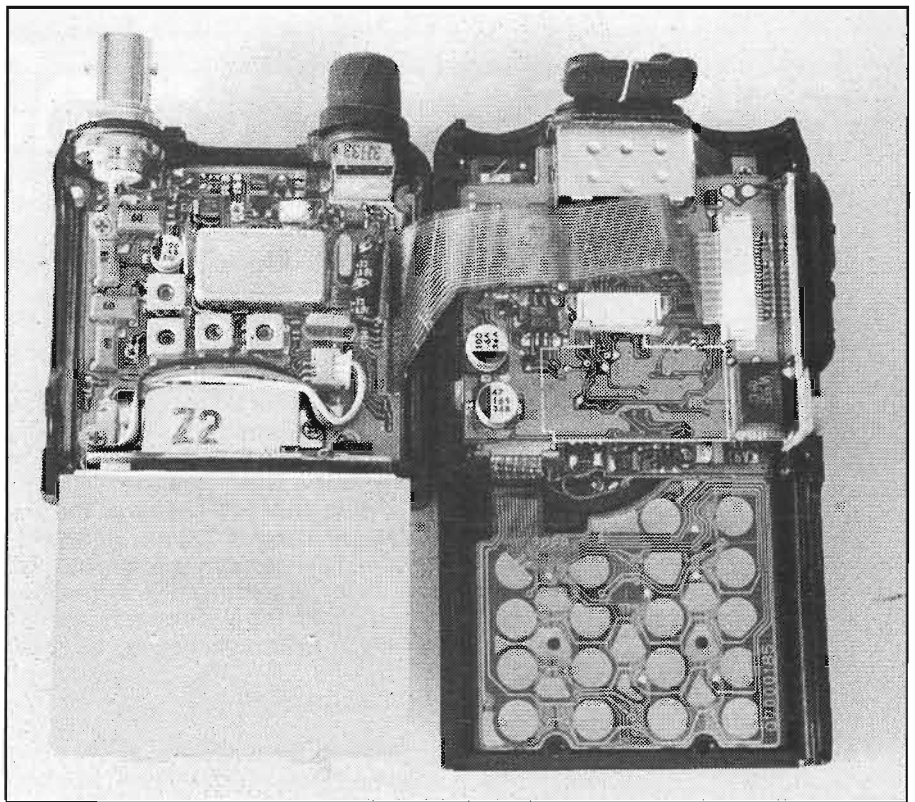
Buttons With Everything

One thing there *isn't* on the set, and that's any volume or squelch knobs, just a rotary click-step channel change knob. Well, not exactly, as although up/down buttons are used for volume and squelch control, you can instead use the main knob for these if you want to. Even the on/off switch is an orange 'software' switch on the side of the set, you just keep this pressed for more and half a second to switch the set on or off. If you've also enabled the 'auto power-off' facility to save your batteries, the set will automatically switch itself off after a preset time, giving you an audible warning first, useful if you tend to leave your set switched in on accidentally overnight.

Selective Calling

The FT-11R gives the 'now usual' 3 digit DTMF selective calling and paging facilities, which have been well documented in earlier issues of HRT. Together with these, up to ten alphanumeric messages of up to six letters/digits can be sent and received with the set, to and from other similarly equipped stations. Like the 'Dinner' and 'Coming' messages I referred to. The set stores the last ten alphanumeric messages received, which can have a few useful applications, like noting the callsigns of the last few stations who called you. This facility uses DTMF tones as well, so it should work OK through repeaters as well as on simplex channels, the set even has selectable tone 'start-up' times to cope with repeater squelch rise time delays.

For more 'normal' use, a CTCSS encoder for repeater access is built in as well as a 1750Hz toneburst, and an optional CTCSS unit is available at £34 RRP for CTCSS encode/decode use. If you're not keen on 'buttons with everything', the set can be placed in a 'simple to use' mode for on-air use, the



main knob cycling through your programmed channels and just one keypad button enabled which is used for low/high transmit power switching.

On The Air

Although I was 'up and running' with the set on my local repeater almost immediately after it had arrived, I must

confess that reading through the manual, and then getting the grasp of the many possible modes, did take me a couple of evenings. But it was worth it. The more I read, the more interested I became. Eventually, I had programmed all the 2m repeaters in my county (and neighbouring counties) by name, the 'S' channels by their numbers, and locally used chat channels at the bottom end of the band as 'LOCAL1', 'LOCAL2' and so on. The 144.650MHz packet BBS channel simply became 'PACKET'. What could be easier?

In walking around, often in the dark in the evenings, I found the backlight illumination to be very good indeed, this being switched on by a bar below the PTT switch. Together with the easy-to-read display, this always showed me exactly what the set was doing without my needing to fumble around with buttons and the like.

The receiver was exceptionally sensitive, and although I found the minimum 'digitally selected' squelch threshold level to be a bit higher than I'd have liked I never missed any signals I could get back to. The small speaker did unfortunately suffer from rattles and distortion when I turned the volume up high, I needed to plug in an external speaker for use in the car.

When fitted with the additional 9.6V nicad supplied for review (optionally available at £59 RRP), the transmitter's 5W put a good signal into my 'not so local' 2m repeaters. If these had been a bit nearer to me (i.e., capable of being accessed with 1.5W) I'd certainly have found the set fitted with the tiny 4.8V battery a useful hand-sized companion. When in 'listening' mode around



the house throughout evenings and weekends, I invariably had this small battery fitted. This lasted very well in use, giving me several days of listening without ever going flat.

With the set coupled to my rooftop colinear, the receiver certainly showed its talents, with excellent sensitivity combined with very good rejection of adjacent channels, even from the very strong adjacent-band signals from my local fire brigade transmitters. The only unwanted signals I occasionally received were 2nd image (2 x 455kHz) signals from my very local packet radio node, which completely wipes out some signals around S22 on my 'usual' 2m base rig due to the same 2nd image limitation. During long overs on transmit using 5W, I found the set's rear panel was starting to get quite hot, again not surprisingly, but it does show the limitations with a small case size.

Laboratory Tests

The measured results of these on receive quite simply reflected the excellent results I'd found on air. The adjacent channel rejection, particularly of 12.5kHz spaced signals, was extremely good. On transmit, there were adequate power levels combined with good harmonic suppression, although the transmitter peak deviation was a little 'over the top' of the 5kHz maximum for 25kHz channel spacing use.

Conclusions

I was very impressed with the set. As well as being able to use it in 'fully functional' mode, after suitable pro-

gramming and a few button presses I could lock it into 'easy to operate' mode, with just the rotary channel knob switching between the alphanumerically displayed channels, such as simplex channel numbers and the callsigns of locally used repeaters. The technical performance was extremely good, making me even more impressed. I'm seriously considering purchasing a couple of the virtually identical FT-41R 70cm handhelds for my licensed XYL and I to use. The FT11R's 'recommended' price is £299 complete with 4.8V nicad and charger (although look out for discounts from dealers).

My thanks go to Yaesu UK for the loan of the review sample.

Adjacent Channel Selectivity;

Measured as increase in level of interfering signal, modulated with 400Hz at 1.5kHz deviation, above 12dB SINAD ref. level to cause 6dB degradation in 12dB on-channel signal;

| | |
|-----------|--------|
| +12.5kHz; | 62.9dB |
| -12.5kHz; | 53.7dB |
| +25kHz; | 72.8dB |
| -25kHz; | 70.3dB |

Blocking;

Increase over 12dB SINAD level of interfering signal modulated with 400Hz at 1.5kHz deviation to cause 6dB degradation in 12dB SINAD on-channel signal;

| | |
|----------|--------|
| +100kHz; | 80.5dB |
| +1MHz; | 93.2dB |
| +10MHz; | 96.7dB |

Intermodulation Rejection;

Increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation product;

| | |
|--------------------|--------|
| 25/50kHz spacing; | 71.3dB |
| 50/100kHz spacing; | 67.7dB |

Image Rejection;

Increase in level of signal at 1st and 2nd image frequencies, over level of on-channel signal, to give identical 12dB SINAD signal;

| | |
|-----------------------|--------|
| 1st Image (-35.4MHz); | 64.2dB |
| 2nd Image (-910kHz); | 65.7dB |

Maximum Audio Output;

Measured at 1kHz on the onset of clipping (10% distortion), 8ohm load;

578mW RMS

S-Meter Level

| Reading | Sig. Level | Rel. Level |
|---------|------------|------------|
| S1 | 0.27µV pd | -17.2dB |
| S2 | 0.34µV pd | -15.0dB |
| S3 | 0.43µV pd | -13.1dB |
| S4 | 0.54µV pd | -11.0dB |
| S5 | 0.70µV pd | -8.8dB |
| S6 | 0.89µV pd | -6.7dB |
| S7 | 1.14µV pd | -4.5dB |
| S8 | 1.48µV pd | -2.3dB |
| S9 | 1.92µV pd | 0dB ref. |
| S9+ | 2.31µV pd | +1.2dB |
| S9++ | 2.86µV pd | +3.5dB |

TRANSMITTER

TX Power Output;

Measured using fully charged nicad packs, as indicated.

| Freq. | Power | FNB-31 (4.8V) | FNB-38 (9.6V) |
|-------------|-------|------------------|------------------|
| 144MHz High | High | 1.71W | 4.95W |
| | Low 3 | 1.71W | 2.80W |
| | Low 2 | 1.53W | 1.53W |
| | Low 1 | 300mW | 300mW |
| 145MHz High | High | 1.78W | 4.90W |
| | Low 3 | 1.78W | 2.75W |
| | Low 2 | 1.51W | 1.51W |
| | Low 1 | 300mW | 300mW |
| 146MHz High | High | 1.86W | 4.80W |
| | Low 3 | 1.86W | 2.75W |
| | Low 2 | 1.48W | 1.51W |
| | Low 1 | 290mW | 300mW |

Harmonics;

| | |
|---------------|---------|
| 2nd Harmonic; | <-85dBc |
| 3rd Harmonic; | -79dBc |
| 4th Harmonic; | <-85dBc |
| 5th Harmonic; | -83dBc |
| 6th Harmonic; | <-85dBc |
| 7th Harmonic; | <-85dBc |

Peak Deviation;

5.69kHz

Toneburst Deviation;

2.94kHz

Frequency Accuracy;

-392Hz

LABORATORY RESULTS:

All measurements taken on 145MHz with fully charged FNB-38 battery, high power TX, otherwise stated.

RECEIVER;

Sensitivity;

Input level required to give 12dB SINAD;

| | |
|---------|------------|
| 144MHz; | 0.135µV pd |
| 145MHz; | 0.130µV pd |
| 146MHz; | 0.125µV pd |

Squelch Sensitivity;

Threshold; 0.12µV pd (9dB SINAD)
Maximum; 0.18µV pd (15dB SINAD)

It looks like there's a 'new breed' of 2m and 70cm handportables out now. Small, slim, and streamlined. Kenwood's TH-22E 2m handheld was first revealed in 'prototype' form by a few dealers at last year's Leicester show. I almost walked away with a review sample then, but in all fairness it wouldn't have been a representative sample, would it? (pity—Ed!). However, after badgering Kenwood (UK) virtually every week since then, they must have thought they'd better 'shut me up', and a review sample arrived just in time for inclusion in this issue.

FET Transmitter Power Amplifier

With its MOS FET PA, the set doesn't need a high voltage to deliver watts of power. The TH-22E comes with a 6V 600mAh battery as standard, and with this it's specified at putting out around 3W of power on 2m. If you want more power, a larger optional 9.6V battery is available, and in case micro-size portability is important, a 4.8V nicad is also available.

Offerings

The set comes as a nice slim unit, measuring 56mm (W) x 116.5 (H) x 28mm (D), and weighs 290g with the supplied PB-32 nicad. It comes with 'easy to use' controls, indeed you'd probably be able to have your first contact a few seconds after first switching the set on without needing to read the instruction book. You don't even need to select a repeater shift (unless you want to) when you tune to the repeater section of 2m – the set does it for you, automatically.

The set covers the usual 2m band, the click-step knob on the top panel tuning between frequencies in your pre-



('sub-tone') for repeater access, the set can be programmed to send this instead, automatically, along with your transmission. If you'd like CTCSS decode as well, an optional plug-in board at £32.95 lets you do this – you don't even need to open the set's case up to install it, a 'nice' touch on Kenwood's behalf.

Configuration

The TH-22E has a 'Menu' mode, accessed by holding the 'call' button down and then switching the set on. This controls 14 of the transceiver's internal functions, such as battery saver on/off, time operated or carrier operated scan resume, and so on. One of these functions is selection of transmitter 'time out', where you can limit the set's maximum transmit time to 30, 60, 90, 180, or the maximum of 900 seconds (although you can't switch the time-out timer off). This should be quite handy, especially for users of mobile microphones with 'locking' PTT switches that so often get knocked and forgotten about!

Transmit Power

The set is specified at putting out around 3W with the supplied PB-32 nicad pack, and a side-mounted 'DC in' lets you connect any external voltage between 5V and 16V to power the set with – 13.8V being specified at giving around 5W transmit output. In each case, 'Low' and 'E. Low' power levels, of around 500mW and 30mW respectively, can be selected to let your batteries last that bit longer for local contacts.

Optional Keypad

It doesn't stop there. If you're a 'gadget freak' (like me) and you'd like

Kenwood TH-22E Review

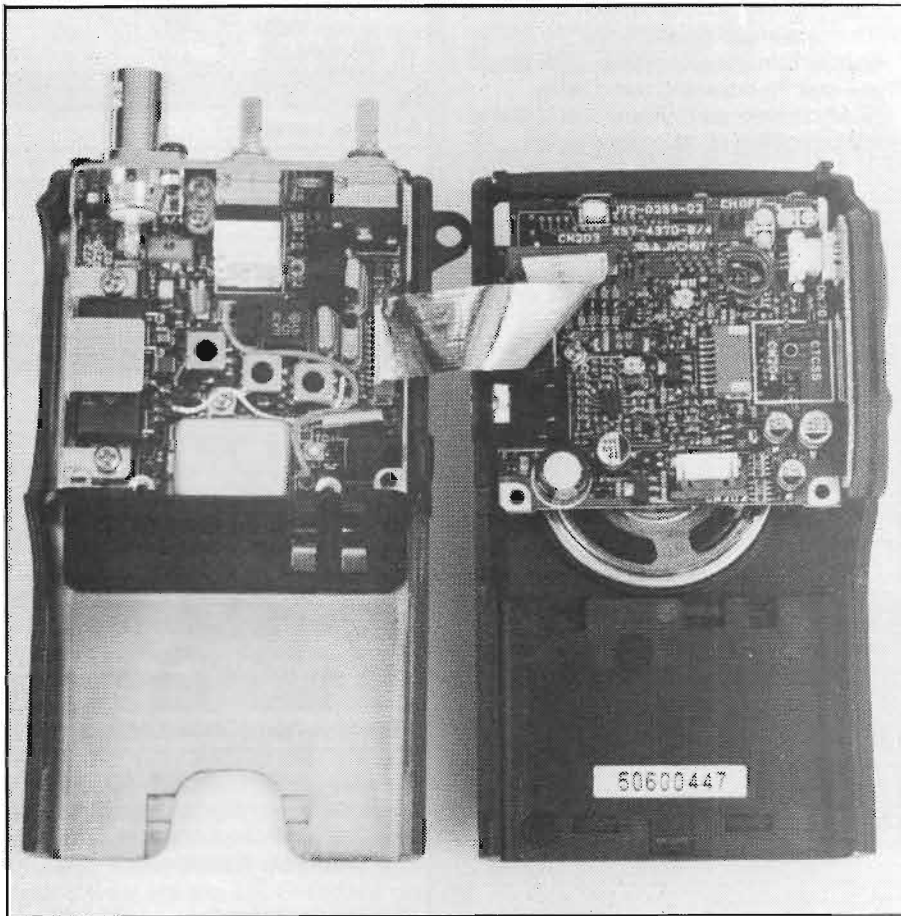
*Chris Lorek G4HCL thinks "Its a Small World" with
Kenwood's smart new handheld*

set channel steps (the 'default' is 12.5kHz). After you've read the instruction book you'll probably also be able to make use of the set's 40 memory channels, it also comes equipped with a quick-access 'call' channel for you to store your favorite operating frequencies in.

Repeater Access

Pressing the 'T/CT' button on the front panel while you're transmitting sends out a 1750Hz repeater access tone. For those in areas covered by a repeater which can also accept CTCSS

all manner of 'bells and whistles', such as direct frequency entry, DTMF tone transmission, paging, and selective calling, the set has the capability of being 'upgraded' for this. I've been reliably told that Kenwood's DTP-2 keypad for the set, this fitting onto the front



panel, is one of the most popular options added. At just £14.95 more, I'm not surprised, as I imagine this could really 'open up' the set's capabilities.

As well as the PB-32 6V 600mAh nicad, the TH-22E comes supplied with a plug-in BC-17 wall charger (which has a 'real' UK moulded-on plug rather than one of the 'two-pin' varieties we used to find!), a belt clip and wrist cord, set-top helical, and a user manual complete with circuit diagrams. Apart from the battery-related accessories, the TH-22E uses 'standard' accessories from the rest of the Kenwood handheld range, such as the optional SMC-33 remote control microphone and so on. As further 'nice touch' is that the user manual gives complete interconnection information for external accessories, such as details of the three-function remote control wiring, packet radio interconnection, including details of Kenwood's 'unique' (i.e., completely different from, and totally incompatible with, nearly every other recent amateur handheld) use of stereo 2.5mm and 3.5mm connectors for external mic and speaker connections.

On The Air

After unpacking the set, my first

thoughts were how easy and comfortable it felt in my hand. True to form, I was quickly listening to one of my semi-local 2m repeaters within seconds of switching on – who needs the instruction book? Well, I did, at least to work out how to program the memory channels, and how to start the set scanning. The latter was, in fact, quite simple. To scan the band in 'VFO' mode, all I needed to do was to keep the 'VFO' button pressed for a second or so, likewise with the 'MR' button in 'memory channel' mode. Repeater operation with the set was exceptionally easy, and the sensibly-placed 'Rev' button gave a useful 'listen on input' facility. I did however have to get used to pressing the PTT and T/CT buttons at the same time before I could do this one-handed!

The knobs on top of the set were at first, to myself at least, a little deceiving. They look like dual concentric controls, but they're not, despite their 'stepped' appearance. The one on the left is the on/off/volume knob, that on the right is the tuning knob, which is also used to step through various functions whenever you need to change them. There's no squelch control on the set, however a tiny 'moni' button near to the PTT opens the squelch as a

'quick check' for weak signals, or indeed just to check the volume setting. The set's receiver squelch threshold is controlled digitally in 10 preset steps, the actual level being accessed and changed by a double-button push. Likewise, further double-button pushes allowed me to quickly select Low or E. Low transmit power.

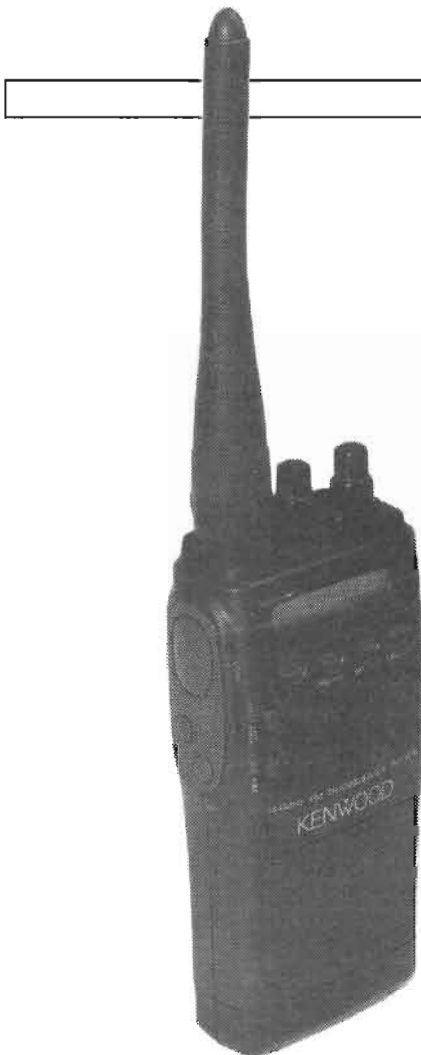
For night time use, a further tiny button next to the PTT provides an LCD backlight, which I found illuminated the set's LCD very well. It didn't, unfortunately, illuminate any of the other controls whatsoever, which was a pity, so I had to get used to the positions of the for 'fumble' use at night when walking out and about.

I found the receive audio from the set was very clear, and there was plenty of it, although at volume setting of over 50% or so of maximum the tiny speaker did tend to 'rattle' and subsequently distort peaks of received audio. My transmit audio was described as very 'punchy', and the supplied helical seems quite efficient at accessing distant repeaters. At home, with the set coupled to my rooftop coliner, the receiver gave a reasonable account of itself, although it did tend to 'block' quite frequently from other strong signals in the same band, such as those from my local packet node.

One handy facility that I found the set had, was that of 'channel' mode. Here, using the 'menu' facility I could program the set to just access the memory channels, with no access to VFO mode, repeater shift, or the like, just a large 'channel' number on the display. This I found was very useful for mobile operation as well as nighttime use!

Laboratory Tests

The transmitter gave a very impressive amount of power when fed with an external 13.2V supply. When this was 'dropped' to 6.00V, the output was just over 2W, no doubt due to voltage protection and the like inside the DC connector circuitry of the set. A quick check with a fully charged nicad showed the set gave just under 3W output at 145MHz. In all cases the transmitter harmonics were very well suppressed, and the frequency accuracy was excellent. The transmit deviation was 'over the top' of the 5kHz maximum deviation (the 6kHz plus occurred at 800Hz, although the deviation was accurately set at around 5kHz at 1kHz audio frequency). On receive, the set gave a reasonable performance, although possibly not surprising with such a small set the strong signal handling could cause the odd problem when the set is connected to an out-



dously, although this wasn't supplied with the sample tested here.

It certainly looks like we're seeing a 'new age' in compact handhelds.

My thanks go to Kenwood (UK) for the loan of the review transceiver.

LABORATORY RESULTS:

All measurements taken on 145MHz, high power TX, using fully charged PB-32 nicad, unless otherwise stated.

RECEIVER:

Sensitivity;

Input level required to give 12dB SINAD;

| | |
|---------|------------|
| 144MHz; | 0.134µV pd |
| 145MHz; | 0.134µV pd |
| 146MHz; | 0.135µV pd |

Squelch Sensitivity;

Threshold; <0.05µV pd (<2dB SINAD)
Maximum; 0.141µV pd (14dB SINAD)

Image Rejection;

Increase in level of signal at 1st and 2nd image frequencies, over level of on-channel signal, to give identical 12dB SINAD signal;

| | |
|-----------------------|--------|
| 1st Image (-35.4MHz); | 78.2dB |
| 2nd Image (-910kHz); | <110dB |

Current Consumption

| | |
|---------------------|-------|
| Standby, no signal; | 43mA |
| Receive, mid vol; | 79mA |
| Receive, max vol; | 126mA |

TRANSMITTER

TX Power Output;

Power output and current consumption, measured using external stabilized 6.00V and 13.20V power supply, as indicated.

| Freq. | Power | 6.00V | 13.20V |
|--------|--------|-------------|-------------|
| 144MHz | High | 2.15W/980mA | 6.50W/1.31A |
| | Low | 530mW/410mA | 580mW/400mA |
| | E. Low | 112mW/230mA | 112mW/205mA |
| 145MHz | High | 2.25W/980mA | 6.40W/1.31A |
| | Low | 530mW/410mA | 570mW/400mA |
| | E. Low | 210mW/230mA | 109mW/230mA |
| 146MHz | High | 2.22W/970mA | 6.40W/1.32A |
| | Low | 530mW/420mA | 560mW/400mA |
| | E. Low | 109mW/220mA | 109mW/225mA |

Maximum Audio Output;

Measured from ext. SP socket, at 1kHz on the onset of clipping (10% distortion), 8 ohm load;

17.1mW RMS

S-Meter Level

| Reading | Sig. Level | Rel. Level |
|---------|------------|------------|
| 2 | 0.24µV pd | -9.3dB |
| 4 | 0.29µV pd | -7.6dB |
| 6 | 0.37µV pd | -5.5dB |
| 8 | 0.48µV pd | -3.2dB |
| 9 | 0.70µV pd | 0dB ref. |

Blocking;

Increase over 12dB SINAD level of interfering signal modulated with 400Hz at 1.5kHz deviation to cause 6dB degradation in 12dB SINAD on-channel signal;

| | |
|----------|--------|
| +100kHz; | 75.3dB |
| +1MHz; | 89.6dB |
| +10MHz; | 93.7dB |

Intermodulation Rejection;

Increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation product;

| | |
|--------------------|--------|
| 25/50kHz spacing; | 66.0dB |
| 50/100kHz spacing; | 65.0dB |

Adjacent Channel Selectivity;

Measured as increase in level of interfering signal, modulated with 400Hz at 1.5kHz deviation, above 12dB SINAD ref. level to cause 6dB degradation in 12dB on-channel signal;

| | |
|-----------|--------|
| +12.5kHz; | 3.2dB |
| -12.5kHz; | 30.5dB |
| +25kHz; | 61.1dB |
| -25kHz; | 60.1dB |

Harmonics;

| | |
|---------------|---------|
| 2nd Harmonic; | -68dBc |
| 3rd Harmonic; | <-85dBc |
| 4th Harmonic; | -78dBc |
| 5th Harmonic; | <-85dBc |
| 6th Harmonic; | <-85dBc |
| 7th Harmonic; | <-85dBc |

Frequency Accuracy;

-41Hz

Peak Deviation;

6.04kHz

Toneburst Deviation;

3.37kHz

door aerial (as I found on air) or otherwise used in RF congested areas.

Conclusions

Kenwood's TH-22E is smart, slim, light, and easy to use. It's isn't as expensive as I'd have thought either, at £239.95 for the 'basic' set. A 70cm version, the TH-42E, is also available with similar features (with 2.5W on transmit with the supplied nicad) at £269.95. The possibility of adding the optional keypad at £14.95 would, in my opinion, 'open up' either set tremen-

Standard C-408 Review

G4HCL compares the size of Standard's latest 70cm portable with a credit card, and finds the card is larger

I've been using Standard's tiny 70cm handheld almost daily for over a year now, the set being the virtually identical C-401 model to the C-408. I was extremely impressed with it when I first used it, and after a year I continue to be impressed – it certainly isn't a 'toy'. The C-408 'European version' was launched at this year's Friedrichshafen show, the difference being in the software and the addition of a 1750Hz toneburst rather than a CTCSS tone for repeater access. Take a look at the September 1993 issue of HRT, page 27, and you'll see where UK amateurs read about this rig first! At that time I hoped it would reach UK shores. True to form it did, and it's available from Lee Electronics who are the UK Standard distributors. I was very pleased indeed to be able to have a 'play' with the European C-408, and to prepare this review on the set.

Tiny

Yes, it's small, as you can see from the photo. In fact, it's just a shade smaller in panel area than a credit card, measuring 80mm (H) x 56mm (W) x 23mm (D) and just 17mm (D) at the sides of the case. Yet it's a full-blown 70cm handheld, albeit at a relatively low fixed transmit power level of around 200mW. You can equate this to, say, using your normal 70cm handheld on its 'low power' setting. As such, the battery requirements are far less than you'd otherwise need, in the case of the C-408 you'll just need two AA sized cells to power the set from. Yes, that's 3V, or just around 2.4V if you're using nicads! The set has an internal DC-DC converter to raise this to the various voltages required by the circuits, but even so many of these run on just 3v, which must have required quite a bit of design thought on Standard's behalf!

What it does

The set gives you complete transceiver coverage of 430- 440MHz in the usual selectable 5, 10, 12.5, 20, 25 and 50kHz steps, as well as 'extended' re-



ceiver coverage over a much wider UHF range if you wish. As well as the click-step tuned VFO, twenty memory channels let you store channel frequencies along with and any repeater shift. Further 'L' and 'H' memory channels allow storage of lower and upper VFO scan limits, and a quick-access 'Call' memory channel is also provided, which you can access by a single button push.

As well as scanning between your programmed frequency limits, you can scan any 1MHz range of the VFO, scan your memory channels with individual channels programmed 'in' or 'out' of the scan as you wish, or a 'dual watch' where the set briefly sample a given channel any few seconds for activity while you're listening to a different frequency or channel.

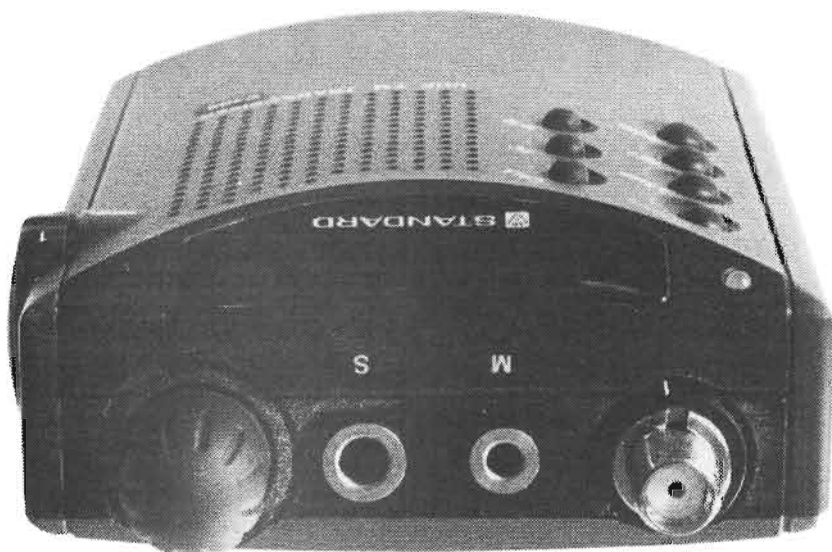
To let your batteries last that bit longer, a programmable receive economizer is fitted, together with a selectable 'auto-power-off' which

switches the set off shortly after giving you an audible warning, if no signals have been received for the last 30 minutes.

A small LCD panel shows you your operating frequency and memory channel number, and in memory mode that can be changed to instead display just a large channel number readout instead of the operating frequency. 'APO' is indicated in 'auto-power-off' mode. A backlight is provided for night time use, activated by a front panel button.

Controls

An edgewise volume control is provided, along with the click-step rotary tuning knob. The receiver squelch is preset, with a further front-panel 'Moni' button to open the squelch when needed, which you can set to either 'low' or 'high' open level. You can if you



wish also automatically select reverse repeater 'listen on input' mode when the 'Moni' button is pressed. The transceiver's 'Set' mode controls these and many other of the set's occasionally-used functions, such as channel step, memory programming, busy/pause scan delay, repeater shift and offset frequency, reverse repeater, key lock and PTT lock, auto power off mode, and economizer on/off ratio in five different steps, dual watch on/off and so on.

Connectors

The top panel of the transceiver has the usual 2.5mm and 3.5mm jack sockets for external mic and speaker, with a rubber protective cover to guard against rain. With the set's tiny size, you probably would only rarely want to

plug an external speaker mic in! (although the optional VOX headset available from Standard could be useful). The set's aerial connector is an SMA type rather than the more usual BNC, so you'll probably need an adapter lead to use the set with an external aerial system. To be quite fair a BNC would be very 'over the top' in term of size on this rig! It's also interesting to note that Icom's latest handheld launched in Japan also uses an SMA aerial connector.

On The Air

As I mentioned, I've been using this set for some time, so it's certainly had a very thorough 'air test'. If you saw me walking around at last year's Leicester exhibition apparently 'talking

into my cupped hand', you'll now know what I was doing!

Overall, I found the set was very easy to use, and I rarely found the lower-than-usual power output was a limitation for local use. The tiny aerial supplied seemed remarkably efficient for its size, and I could normally hear everything on this set than I could with my much larger 'usual' 70cm handheld. I often used the set, placed in my shirt top pocket, to keep an 'ear out' when I was around the house and shack, purely because of its tremendously handy size and light weight.

The transmit audio was often described as a little 'harsh' if I spoke too close to the microphone, backing off improved this no end. Although I found an ample level of audio from the set on receive, possibly not surprisingly this gave rather a 'nasal' type of audio from the tiny internal speaker, which also distorted on high volume settings. But then, this really *is* to be expected from such a minute rig.

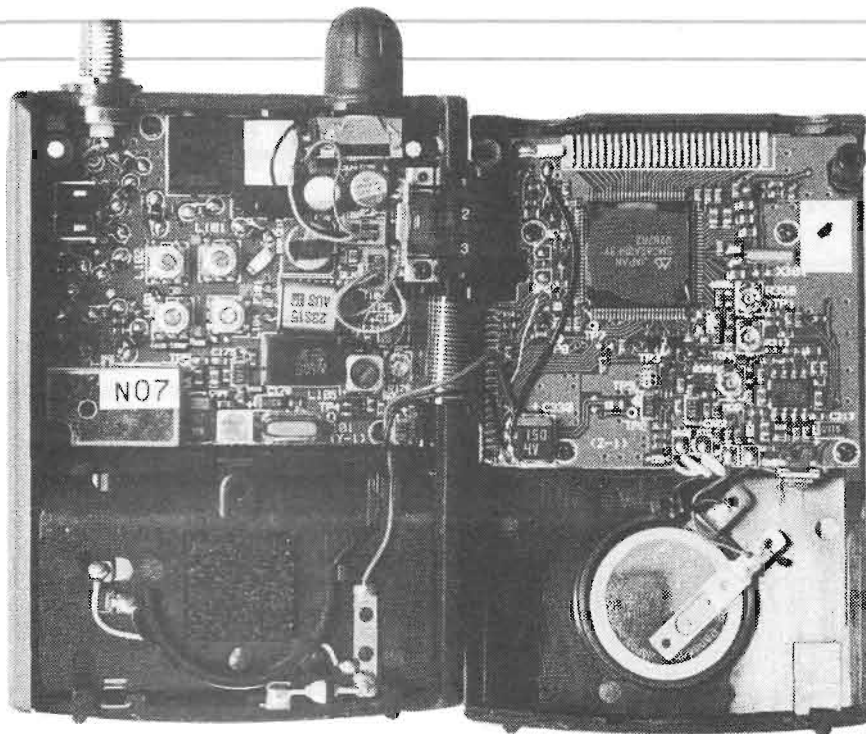
On transmit, the C-408 doubles up the 'Call' button for the 1750Hz repeater access tone, access tone, and I found that (after a little practice) that I could operate this quite easily one-handed along with the PTT, but only if I used the thumb of my right hand do to so! Talking of controls and buttons, I often found that if I placed the set into a 'tight' pocket, the front panel buttons would sometimes activate unless I enabled the 'key lock' mode, although fortunately this could be set to allow the rotary channel knob to be enabled whilst disabling the VFO/memory switching and so on. It never accidentally switched itself off though, due to what appeared to be a recessed power on/off button, which needs to be kept pressed for a third of a second to switch the set off or on. However when the batteries went flat, the set merrily switched itself off, then back on again, then off again – I often had to remove one of the nicads to stop it bleeping!

Insides

Opening up the set reveals very little inside – just two small Pubs interlinked via a ribbon cable. You can remove these boards and get at both sides of them for easy servicing, a welcome fact in these days of 'cram everything in' sets where repair down to component level is virtually impossible.

Lab Tests

The set gave a reasonable performance when subjected to the rigours of my test equipment, I did honestly expect rather mediocre performance



from its tiny size. Again, this confirms it certainly isn't a 'toy'. The receiver side tended to suffer a little in terms of strong signal handling, no doubt due to the physically small space available for signal filtering, but this never proved a problem over the past year in my location when used in handheld mode on air. On transmit the frequency and peak deviation were accurately set, and with a 3V supply the transmitter always gave over a quarter of a watt output with a surprisingly low current drain.

Conclusions

You'll have read that I used the set 'almost' every day. Why didn't I use it every day, and why compare it with my larger, 'usual' 70cm handheld? That's because my licensed XYL grabbed it and uses it as her favourite handheld! The set provides a unique degree of portability, it'll fit into your pocket without you most likely noticing, and I absolutely love to use it out and about for listening around and having the odd chat. When my local 70cm repeater comes on air, I'll be fighting the XYL for its use!

The C-408 currently retails at £229, and my thanks go to UK C-408 distributors, Lee Electronics, for their help in the preparation of this review.

LABORATORY RESULTS:

All measurements taken on 435MHz with fully charged AA nicads fitted, unless otherwise stated.

RECEIVER;

Sensitivity;

Input level required to give 12dB SINAD;

| | |
|---------|------------|
| 430MHz; | 0.178µV pd |
| 435MHz; | 0.152µV pd |
| 440MHz; | 0.159µV pd |

Squelch Sensitivity;

| | |
|-------|-------------------------|
| Low; | 0.177µV pd (14dB SINAD) |
| High; | 0.278µV pd (21dB SINAD) |

TRANSMITTER

TX Power Output;

Power output and current consumption, measured into 50 ohm load using stabilized power supply giving 2.40V (i.e. two nicads) and 3.00V (i.e. two AA dry cells).

| Freq. | 2.4V supply | 3.0V supply |
|--------|-------------|-------------|
| 430MHz | 190mW/170mA | 273mW/195mA |
| 435MHz | 190mW/175mA | 287mW/200mA |
| 440MHz | 190mW/175mA | 285mW/200mA |

Adjacent Channel Selectivity;

Measured as increase in level of interfering signal, modulated with 400Hz at 1.5kHz deviation, above 12dB SINAD ref. level to cause 6dB degradation in 12dB on-channel signal;

| | |
|-----------|--------|
| +12.5kHz; | 33.3dB |
| -12.5kHz; | 37.2dB |
| +25kHz; | 58.1dB |
| -25kHz; | 57.9dB |

Blocking;

Increase over 12dB SINAD level of interfering signal modulated with 400Hz at 1.5kHz deviation to cause 6dB degradation in 12dB SINAD on-channel signal;

| | |
|----------|--------|
| +100kHz; | 86.4dB |
| +10MHz; | 93.7dB |

Intermodulation Rejection;

Increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation product;

| | |
|--------------------|--------|
| 25/50kHz spacing; | 45.5dB |
| 50/100kHz spacing; | 55.3dB |

Maximum Audio Output;

Measured at 1kHz on the onset of clipping (10% distortion), 8 ohm load;

311mW RMS

Image Rejection;

Increase in level of signal at 1st and 2nd image frequencies, over level of on-channel signal, to give identical 12dB SINAD signal;

| | |
|-----------------------|--------|
| 1st Image (-46.1MHz); | 47.0dB |
| 2nd Image (+900kHz); | 53.1dB |

Harmonics;

| | |
|----------------|-------|
| 2nd Harmonic;- | 65dBc |
| 3rd Harmonic;- | 68dBc |
| 4th Harmonic;- | 62dBc |

Peak Deviation;

4.98kHz

Frequency Accuracy;

+52Hz

The HRT 'Parrot'

Paul Lovell G3YMP builds a digital speech 'store and

replay' module for your shack



"Sorry old man, could you repeat the name? . . . and I didn't quite catch the QTH . . . Oh yes, and please could you give my report again!" Sounds familiar? Well, what you need is the HRT Parrot speech recorder.

A suggestion by Chris, HRT's Technical Ed, at last year's Leicester Show got me thinking about digitized speech, and the result is this little project, which

construction project, and I'll mention a few other uses later, but let's start with a look at how it works. No tapes or even digital memories are required - all the clever stuff is done with a sophisticated chip from ISD Inc. of the USA. Fig. 1 shows the different stages which make up the device, and they are all contained

tivity and will pick up sounds from the far side of a large room.

Sampling of the voice waveform takes place at 8kHz, and sharp filters ensure that only frequencies below about 3.4kHz are reproduced. The low frequency cut-off is determined by external circuit values, especially C2, C4 and C9 in the design featured here. An audio amplifier is incorporated in the ISD1016A, and the output from the SP+ terminal (pin 14) can be coupled to an external circuit via a capacitor. Try a value of 0.22µF for impedances of 10k or more.

Repeat Performance

The signal from the crystal microphone is amplified by TR1, and applied to the input of the AGC controlled amplifier in the ISD1016A. An internal clock places samples of the incoming waveform into the analogue array via an antialiasing filter. The frequency of this clock is preset at about 1MHz, and doesn't need to be set externally. When the storage array is full, a pulse is output from the EOM pin which enters IC2. This 4011B quad NAND gate has two functions. Firstly, it inverts the pulse, and secondly it provides a short delay to ensure correct timing for the next record sequence.

Thus a fast power-down sequence is applied to the circuit every 16 seconds. This ensures that recording is always taking place, and new sounds being picked up by the microphone are overwriting speech recorded 16 seconds previously. When SW1 is switched to its centre-off position, the Parrot is powered down and consumes no battery power at all. But remember that it's retained everything in the 16 seconds prior to this!

Voltage regulator IC3 works with inputs down to less than 7V, and provides the preamplifier stages with a stable 5V supply. The inclusion of capacitor C5 and resistor R3 means that CE is the last of the digital inputs to go low. If these components were not included, the speech chip would always revert to 'play' mode on power up.

Action Replay

Now switch to the 'Play' position

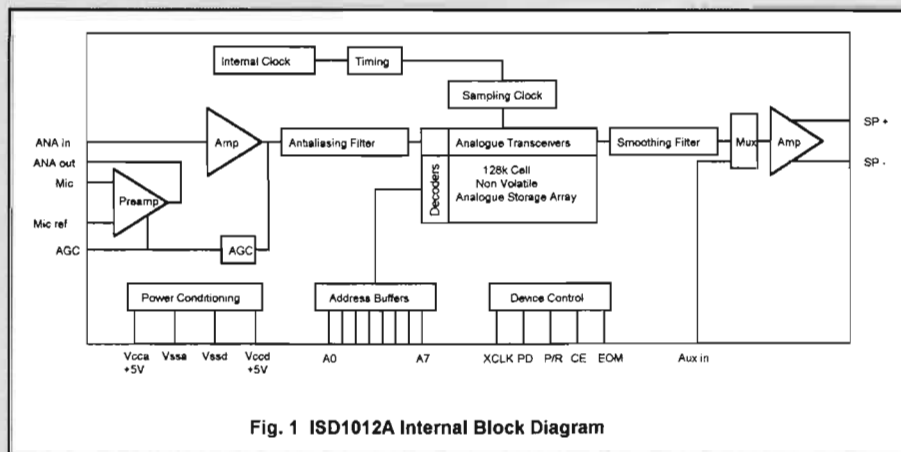


Fig. 1 ISD1012A Internal Block Diagram

sits next to your rig and listens to everything going on. If you miss something important during the QSO, just switch the Parrot off. It will retain everything that was said during the last 16 seconds and you can play it back at your leisure. This can be hours or even years later, and the messages can be repeated over and over again while you fill in the log book.

Analogue Technology

The Parrot is an ideal weekend

in a neat 28-pin DIL package. The 128k cell, analogue storage array is non-volatile, which means that speech information is retained even when the power is switched off.

Although the chip is a little expensive, it does save a whole board full of ICs, and nothing more than a simple multimeter is required to test the circuit. The HRT Parrot was built on a prototype board, of the type available from a number of component suppliers such as Maplin Components. The complete circuit (see Fig. 2) has excellent sensi-

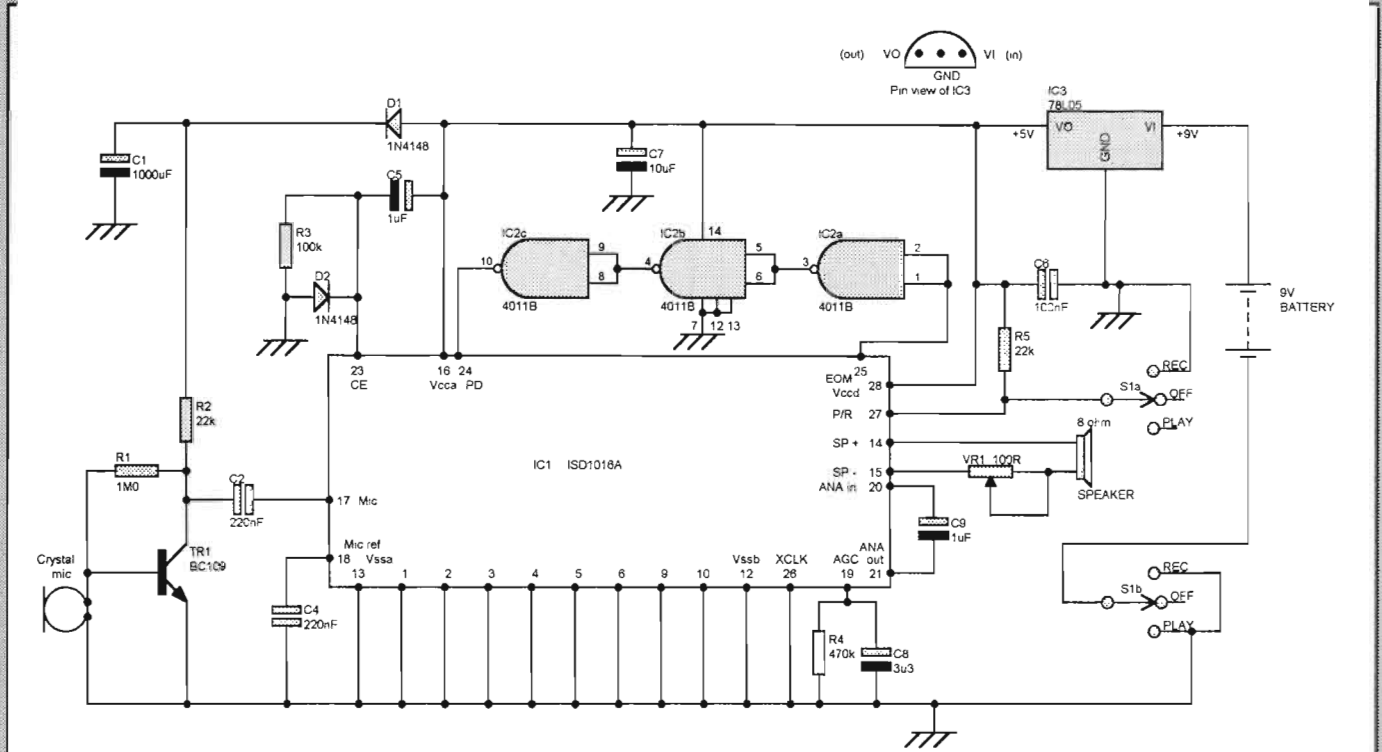
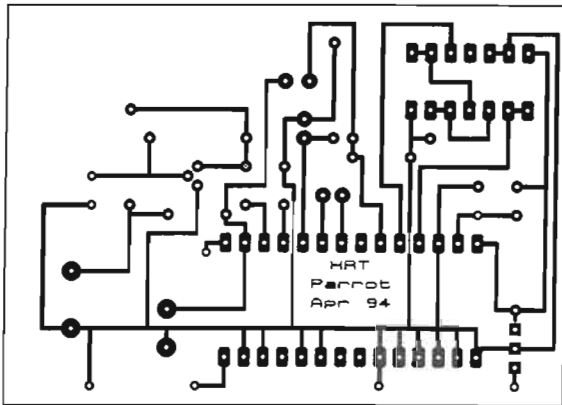
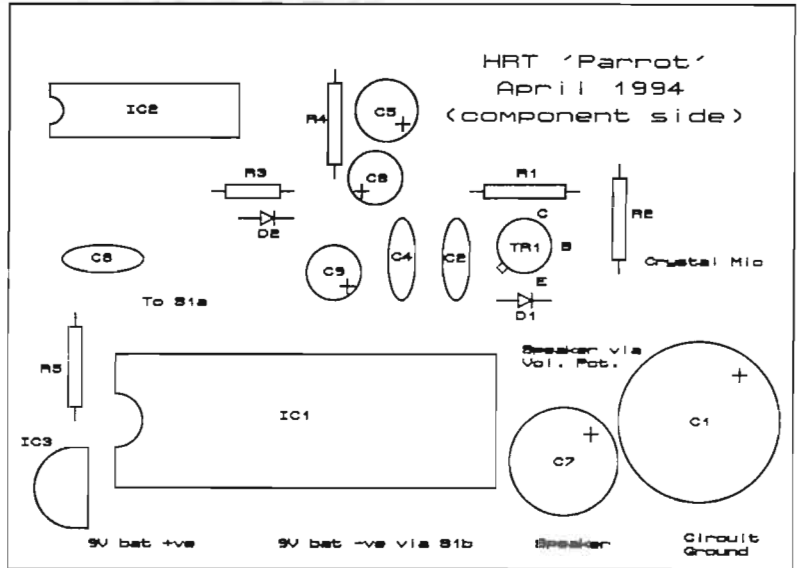


Fig. 2 Circuit Diagram



Suggested PCB pattern (track side, full size) source - HRT magazine



and adjust the volume control for a comfortable listening level. You'll hear everything faithfully recorded and played back in a continuous sequence. If the speech is distorted due to the microphone input overloading, the value of resistor R1 can be decreased – no problems were experienced with the prototype however. If you now switch off, then back to 'Record' the whole sequence will start again. Note that R4 and C8 affect the AGC time constant, and some constructors may like to experiment with the value of these components for best results.

Decoupling capacitors should be connected as close to the IC as possible for best signal to noise ratio. The prototype Parrot had very short microphone leads, and these should be screened if you plan to make them longer than a few cm or so. The speaker impedance should not be less than 8 ohms, and it is important to make sure

these pins are not shorted to ground or the 5V supply. Before plugging in the ISD1016A, power up the rest of the circuit and check the voltages on pins 16 and 28 of the 28-pin IC socket. They should both be at 5V – any more than 6V and you're likely to have a dead Parrot on your hands!

Useful Experiments

Already, you may have thought of a number of other uses for your Parrot – HRT readers are a very inventive bunch (or should I say flock!). If you time a message to be just under 16 seconds, you have an automatic CQ machine. Good speech quality means that the Parrot is handy for testing SSB/FM transmitters under more realistic conditions than a single tone, and with a few modifications, the unit has obvious

attractions for repeater groups. If a single message is required, then IC2 can be disconnected, and the PD input (pin 24) replaced by a 10k resistor to ground, with a switch to give a positive going pulse from the 5 volt supply.

Message playback can be triggered from a switch or relay wired into the 9V battery supply line. Whilst on the subject of power supplies, it's interesting to hear what happens when the battery voltage gets very low. The speech starts to get slurred, and it sounds like the Parrot is about to fall off its perch! This is presumably because the internal clock slows down, and on replacing the battery the speech is quite normal. Even so, for extended operation, a 9V mains unit or nicads might be a good idea.

Readers may have noticed that the block diagram shows 8 address input lines. This is because the storage area

MX294 Conversion Update

A couple of 'gremlins' got into the typical 'code tables' given in last month's ex-PMR conversion. The 2m codes aren't all correct (the channels are 'shifted up' by 15), and the codes given for 4m are switched between TX and RX, i.e., those shown for TX are for RX. But the conversion text, and the method of calculating the codes for various reference frequencies, is totally correct, and readers following the text information should have had no problems. However, here's an updated list for your convenience:

| 2m PROM Codes | | | 145.200 | 7205 | CB04 |
|---------------|--|--|---------|------|------|
| | | | 145.225 | 7245 | CB44 |
| | | | 145.250 | 7285 | CB84 |
| | | | 145.275 | 72C5 | CBC4 |
| | | | 145.300 | 8205 | DB04 |
| | | | 145.325 | 8245 | DB44 |
| | | | 145.350 | 8285 | DB84 |
| | | | 145.375 | 82C5 | DBC4 |
| | | | 145.400 | 9205 | EB04 |
| | | | 145.425 | 9245 | EB44 |
| | | | 145.450 | 9285 | EB84 |
| | | | 145.475 | 92C5 | EBC4 |
| | | | 145.500 | A205 | FB04 |
| | | | 145.525 | A245 | FB44 |
| | | | 145.550 | A285 | FB84 |
| | | | 145.575 | A2C5 | FBC4 |
| | | | 145.600 | B205 | OC04 |
| | | | 145.625 | B245 | OC44 |
| | | | 145.650 | B285 | OC84 |
| | | | 145.675 | B2C5 | OC04 |
| | | | 145.700 | C205 | 1C04 |
| | | | 145.725 | C245 | 1C44 |
| | | | 145.750 | C285 | 1C84 |
| | | | 145.775 | C2C5 | 1CC4 |
| | | | 145.800 | D205 | 2C04 |
| | | | 145.825 | D245 | 2C44 |
| | | | 145.850 | D285 | 2C84 |
| | | | 145.875 | D2C5 | 2CC4 |
| | | | 145.900 | E205 | 3C04 |
| | | | 145.925 | E245 | 3C44 |
| | | | 145.950 | E285 | 3C84 |
| | | | 145.975 | E2C5 | 3CC4 |
| | | | 146.000 | F205 | 4C04 |

Quantek Electronics

NEW

QUANTEK FC2000

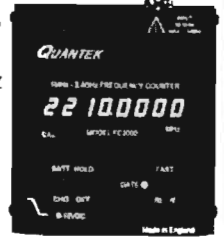
Ultra High Sensitivity Frequency Counter/Finder

- ★ 1MHz - 2.4GHz
- ★ Sensitivity less than 1mV to 800MHz
- ★ 2 gate times
- ★ Hold switch
- ★ Display hold & charge LEDs
- ★ 700mAh Ni-Cad Batteries
- ★ Made in the UK

Supplied with Charger & Antenna

Special Offer £109 + £5p&p

Regular Price £119



SCANNER VOX SWITCH

Connects to and works with any receiver which has an 'ear' socket and squelch control. Simply plug the AUTO-VOX into the 'ear' socket of the receiver, then plug the output leads from the AUTO-VOX into the microphone and remote sockets of a tape recorder. The AUTO-VOX will then automatically switch the tape recorder on when a signal is received and off when there is no signal present - result a tape full of all the action!

Kit £15.95 assembled £24.95 incl p&p

SCANNERS RECEIVERS

| | |
|-------------------------|------|
| YUPITERU MVT 7100 | £379 |
| YUPITERU MVT 7000 | £315 |
| YUPITERU MVT 8000 | £335 |
| YUPITERU VT 225 | £249 |
| FAIRMATE HP2000 | £289 |
| AOR 1500EX | £329 |

Please add £5 p&p

SAVE £10 on scanning receiver prices when ordered with a FC2000



Quantek Electronics

3 Houldey Road, Birmingham, B31 3HL

CREDIT CARD ORDERS

Tel: 021 411 1821 • Fax: 021 411 2355



is divided into 160 sectors, each 100 milliseconds long. It's possible to select individual areas, so that a number of shorter messages may be recorded instead of one long one. With appropriate interfacing, the ISD1016A could thus give audible readout of frequency or receiver signal strength.

Final thoughts

I've constructed many projects over the years but the HRT Parrot is one I can truly describe as 'Fun for all the family'. Perhaps analogue rather than digital techniques are the shape, or rather the sound, of things to come. Speech circuits such as this have obvious benefits for the blind, many of whom make a great contribution to our hobby of amateur radio.

Availability of the components should pose no problems, and any small signal silicon transistor should be suitable for TR1. The ISD1016A speech recorder chip is available from ISD distributors or direct from PAL Technology, 18 The Lindens Estate, London N12 9DJ, the fully inclusive price to HRT readers is £19.95 from the above supplier. Queries relating to this project may be addressed to the project author Paul Lovell, c/o the HRT Editor at the HRT address.

Components List

Resistors all 0.25W 5%

- R1, R4 470k
- R2, R5 22k
- R3 100k
- VR1 100R variable (linear)

Capacitors

- C1 1000µF 6.3V electrolytic
- C2, C4 0.22µF polyester (or polly-ester?)
- C3, C6 100n ceramic
- C5, C9 1µF 10V electrolytic
- C7 10µF 10V electrolytic
- C8 3µF 10V electrolytic

Semiconductors

- D1, D2 1N4148 silicon diodes
- IC1 ISD1016A Analogue speech
- IC2 CMOS 4011B quad NAND gate IC
- IC3 78L05 5V voltage regulator

Additional items

- SW1 2 pole 2 way switch with centre-off position
- Mic Crystal microphone or insert (high impedance)
- LS1 Speaker (8 ohms or greater impedance)
- Case Plastic case approx 200 x 130 x 70mm
- Prototype circuit board to fit case
- Volume control knob
- PP3 Battery connector and 9V battery

SCANNERS

From The Editor's Desk

Who's Listening to Whom?

There's much 'hype' going around about 'tapping into' cordless phones. Well the other day I was at home, happily chatting away on one of the two cordless domestic phones I run, when 'squeal', 'squish', 'squeal' came through on my earpiece rather than the person I was talking to. You've guessed it, someone else was using another phone in the neighbourhood, operating on the same frequency. Terminating my call caused the other person, a lady, to come through extremely clearly, and the rather personal nature of her conversation obviously showed that she thought her conversation was totally private.

UK 'CT1' (i.e., the 'usual' domestic cordless) phones operate on one of only eight frequency pairs, nationwide, in the range 47.450MHz to 47.550MHz, paired with 1.642MHz to 1.782MHz. With the rapid growth of portable phone use, the chances of one of your neighbours having the same channel as you are fairly high. Tuning around the 'lower frequency' end, (i.e. 1.642-1.742MHz which is just above medium wave), one evening with my HF receiver switched to FM mode, showed

every single channel to be filled with at least one cordless phone user. This end is used by the cordless phone 'base', and with the sidetone normally retransmitted to the portable phone this means that both ends of the conversation are transmitted by the base end.

Cordless phone instruction book do often warn users that others may be using the same channel. But do they warn the users that their conversations can so easily be overheard by their next door neighbours? Who's listening to who?

Airscan 6 - Yours Free

This is the airband scanner database PC program I was hoping to 'fit in' last month's issue, but unfortunately space didn't allow this due to our 'hot' review of the very latest Netsat base scanner to hit the high streets! The program has been released as 'Public Domain' by the UK author, which means it may be freely copied, distributed, and used. It provides a complete 'database' facility for Civil and Military airband frequencies, i.e. tower, radar, etc., with powerful 'search' facilities, and comes with some 'introductory' frequency/

location etc. details which you can add your favourite frequencies to.

If you'd like a copy, just send a blank, formatted PC disk preferably 3.5in, either high or low density (but we can handle high and low density 5.25in disks if required), with a self-addressed return mailer with sufficient postage, and you'll have one in the post back to you pronto!. As an 'added bonus', 3.5in disks will also be filled with a few other scanner related programs, to keep you happily occupied! Please remember though, no addressed, stamped, return mailer, no returned disk, be warned! (overseas readers please send a sufficient amount of IRCs). Send to; Editorial Disk Offer, Editor, Scanners/HRT, Argus Specialist Publications, Argus House, Boundary Way, Hemel Hempstead, Herts, HP2 7ST.

Over To You

Would another 'free software distribution' covering different programs be of interest to readers in the future? Should I 'search out' some more goodies for you? Please let me know what you'd like in these pages. Reader's letters for publication on topical issues are also most welcome. Write in with your views, to Sheila Lorek, Editor *Scanners/HRT*, ASP, Argus House, Boundary Way, Hemel Hempstead, Herts HP2 7ST.

ScanNews

Bill Robertson with the latest scanning news

UFO Hoax Yet Again!

As I write this in January, the amateur radio packet system has only just stopped 'buzzing' with the 'hot news' about the police sending a false message about a UFO crash-landing in a field, and then lying in wait to 'nab' inquisitive eavesdroppers who came to see the UFO. This reportedly occurred on Christmas day, with a news report about the event being nationally transmitted on the TV teletext service. Investigations back from this led to the news item apparently coming from a report in the police in-house publication 'law and order', with the police knowing nothing about the 'Christmas day' event (one officer said that they wouldn't have done it on Christmas day anyway due to the extra overtime payments needed!).

I wonder if someone, somewhere, was reading my 'ScanNews' in the June 1993 issue of this magazine? Here I detailed that exactly the same thing had occurred in Appleton, near Warrington, with five eager 'alien spotters' greeted by a police squad and reported for

telecommunication offenses. It's looking like this story is 'doing the rounds' again!

US Restricts It's People's "Freedom"

That well known UK scanner dealer, Javiation, has been 'blocked' by the US in selling it's Yupiteru MVT-7100 scanners to US Citizens. Javiation has already been prevented by the US in advertising the MVT-7100 in the US scanning magazine 'Monitoring Times', and from April 26th this year US citizens will no longer be allowed to privately import the set by purchasing from abroad by mail order. Talk about 'big brother'. Are the tables turning? Now then, according to an official response to Javiation, "it will be unlawful for Americans to import such devices" - that's *Americans*. 'Nuff said.

Radio Privacy?

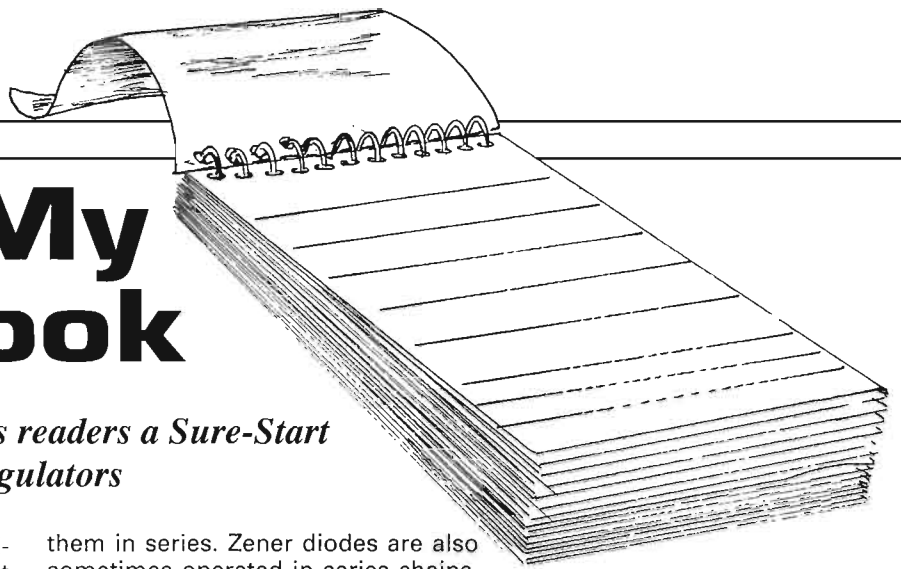
You don't need a scanner to listen into 900MHz cellphone conversations. There's a

reported growing 'trend' amongst an element of the population who have handheld cellphones, in tapping in the numeric 'engineering code' on the set's keypad to 'open up' the handset as a receiver. These numbers *do* get around, you know, my friend's Mobira Talkman transportable cellphone worked well like this after the addition of a wire link in the handset - tap the 'code' in and it turned into an open receiver. At a business meeting, the Director of Sun Microsystems, John Gage, told his assembled subcommittee that "every cellular phone is a scanner". He then tapped a few buttons on a cellphone, held the cellphone earphone to his PA microphone, and let his audience hear half a dozen different conversations! He added that "A lot of kids do it, it's more fun than a Super Soaker water pistol".

Secret Signals on Radio 4?

Did you know that the Radio 4 carrier has encoded PSK (Phase Shift Keying) data on it? It's been reported that the UK government denied all knowledge of this for some time, but it now accepts that the signals are there! Surely they can't be using it, 24 hr/day, just for switching people on and off 'Economy 7' twice a day? What an excellent way to send secret messages to your government agents around Europe! So who's going to be first to crack the code?

From My Notebook



Geoff Arnold G3GSR gives readers a Sure-Start on voltage regulators

Continuing my ramblings about 'hidden parameters', which I began last month, I'd like to return to a topic which I talked about in my very first 'Notebook', back in 1990. That topic is the Zener diode.

On that occasion I assumed that, once the Zener was in its reverse-conducting state, that voltage across it would remain constant even if the current through it varied, providing a minimum 'maintaining' current always flowed through the diode. In fact, a Zener has a certain slope resistance, which means that the voltage drop across it will vary with the current passing through it. The slope resistance is quoted in manufacturers' data at a particular specified current (typically 5mA). It varies from type to type according to the working voltage and the power rating. Small (500mW) devices would range from 10 to 250 ohms, larger ones (1.3W) from 3 to 125 ohms, and so on up the scale of ratings. If the Zener current is allowed to fall below the point where the 'knee' of the characteristic is reached (Fig. 1), the slope resistance increases rapidly (perhaps by a factor of 10 by the time I_z has dropped to 0.5mA).

Other hidden parameters of a Zener diode are its self-capacitance (in parallel with the junction) which will slightly improve its 'smoothing' effect as the frequency of any ripple in the applied voltage rises, and its self inductance, which will cause output ripple to increase at very much higher frequencies.

Sure-Start

Last month, I talked about the need to make sure that reverse voltage was shared equally among individual rectifier diodes when you operate a string of

them in series. Zener diodes are also sometimes operated in series chains. Most handbooks on power supplies show the 'typical' circuit with two or three Zeners in series, acting as a voltage divider to provide intermediate voltage tapings across a DC supply (see Fig. 2, for example).

A variation on this idea is to use a series string of Zeners simply as a means of producing a higher regulated voltage, without taking any current from the intermediate tapings. What I've never seen any textbook discuss is the question of getting all the series-connected Zeners safely into their 'reverse breakdown' state each time the circuit is switched on, so that they will actually regulate the equipment supply as intended.

It can happen that such a chain may not come fully into conduction. The result is that an excessive voltage will be applied to the equipment, with current flow limited only by the usual regulator resistor. The result could be expensive!

I must admit to finding some difficulty in arguing this problem through logically. At switch-on, the chain of Zeners will pass only a small leakage current, limited by the sum of their reverse resistances. Presumably the leakage current-flow each Zener re-

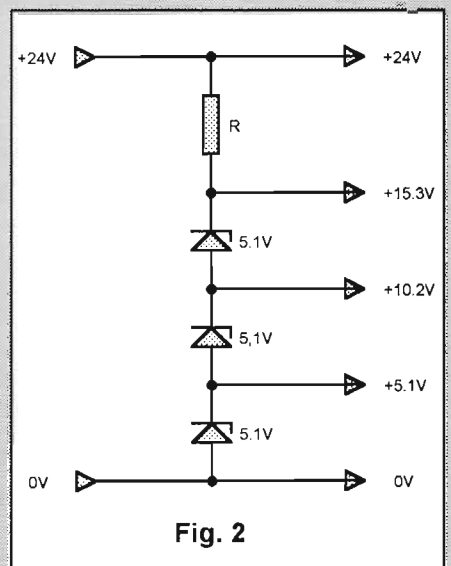


Fig. 2

quires to trigger its reverse breakdown will be different, and if the highest current required is never reached, the chain will effectively stay 'open-circuit'.

I encountered this problem some years ago, where several prototypes of a new piece of equipment were found to perform erratically at switch-on. The cure was to add 'priming' resistors for each Zener as shown in Fig. 3. The resistor values were calculated to provide 5mA to each of the lower two diodes. The effect on the stabilising action of such high-value resistors in parallel with the slope resistance of the Zeners is negligible, so regulation is not impaired. An alternative approach would be to add a parallel resistor across each Zener, but the 'wasted' power in the potential divider formed by the resistors would be greater.

Why is this problem not mentioned in the reference books? Presumably because they concentrate solely on Zener chains with intermediate voltage tapping points. The load connected to each tapping point will do exactly the same 'priming' job as the added resistors in Fig. 3, the only difference being that the circuit has effectively been turned upside-down (Fig. 4).

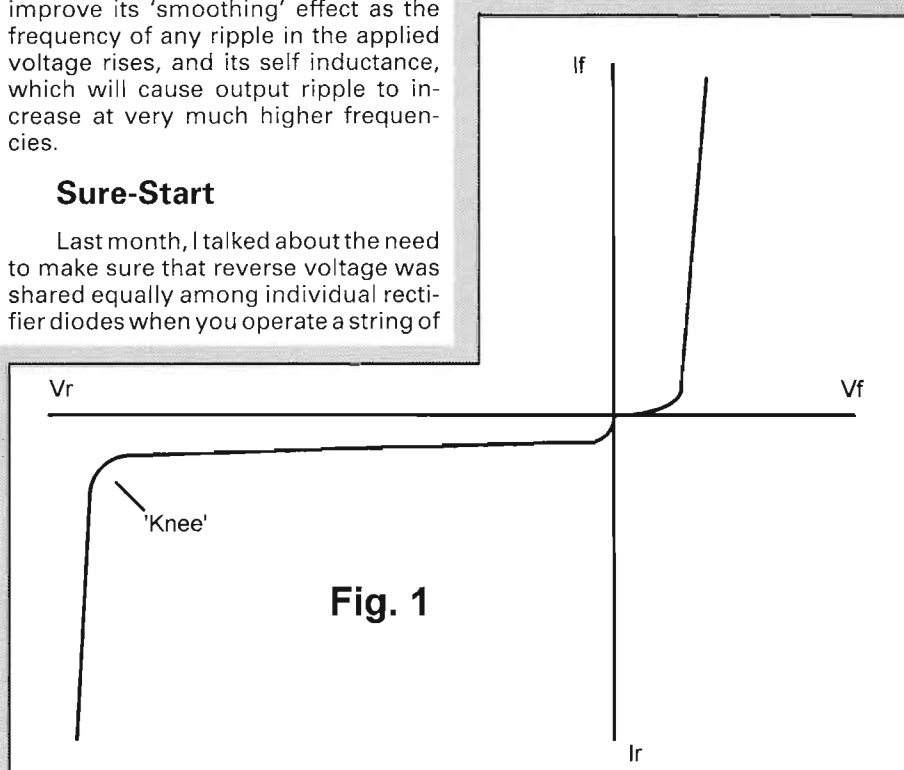


Fig. 1

Voltage Regulators

In the valve days, gas-filled voltage regulators - such types as VR150/30 or OD3 - were of course used in much the same way as we now use Zener diodes.

In fact, they are still used where stabilised HT lines are needed for oscillators

in valved equipment.

These regulator tubes are sometimes connected in series chains to provide intermediate HT voltage taps

in valved equipment.

Zeners, they require a certain minimum

maintaining current to keep them conducting once they have struck. However,

they have a couple of other problems,

the main one being the difference between the stabilised running voltage

and the voltage needed to make them

strike at switch-on.

Depending on the tube type and

voltage, the striking voltage can be

anything from 10 to 50 per cent higher

than the running voltage. If you draw

too much current from the stabilised

line, the current through the tube may

drop below its holding value and the

tube would then 'go out'. If the load on

the stabilised line falls again, its voltage

would then rise towards the value of

the un-stabilised supply line. If you are

lucky, it will reach the striking voltage

of the tube once more, and the line will

re-stabilise itself. Otherwise...

This 'backlash' between striking

and running voltages means that a gas-

filled regulator tube can be turned into

a sawtooth oscillator by connecting a

large capacitor across it - a factor to be

borne in mind when selecting a

smoothing capacitor for a regulated

supply line.

I said there were a couple of prob-

lems associated with gas-filled regula-

tors. The other one is that, with some

early types, the value of the striking

voltage was affected by light falling on

the tube. I recall one shipboard HF

communications receiver with such a

regulator on the HT supply to the local

oscillator and BFO. If the mains supply

was on the low side of normal, the set

would work perfectly well when out of

its cabinet, but start warbling all over

the place when you pushed it back in.

That regulator just did not like the dark.

The cure was to remove the

screening cans from the regulator tube,

a QST/20, and the neighbouring audio

valves, whereupon the light from their

heaters was sufficient to spur it into

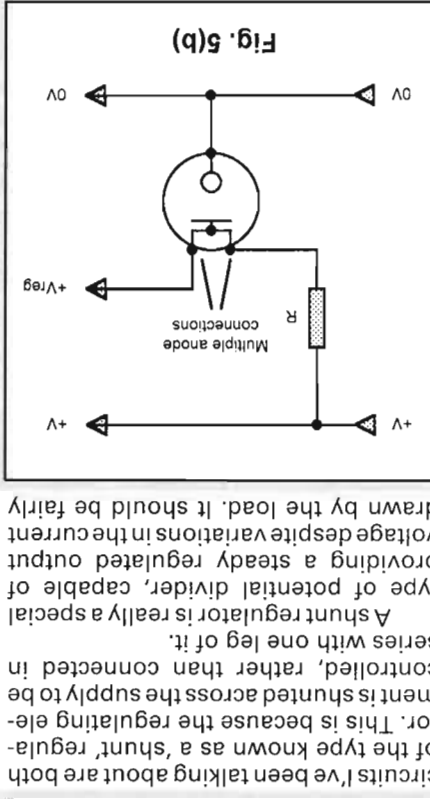
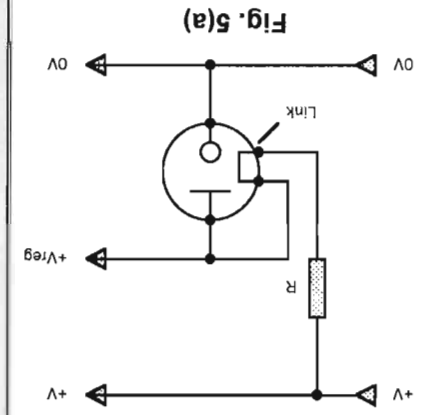
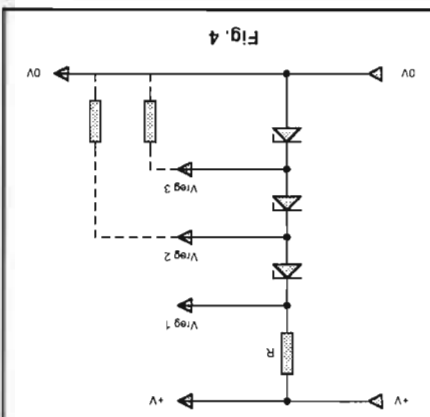
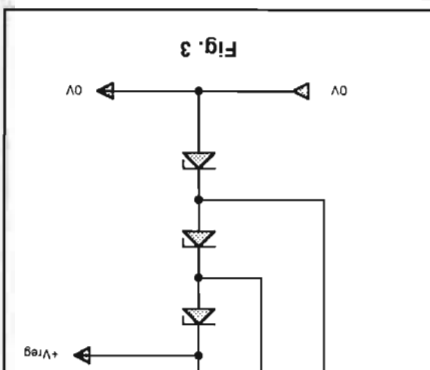
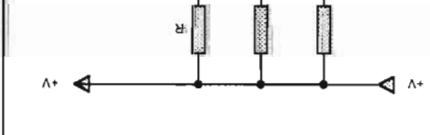
action!

Safe Running

To round off this month's column,

a brief diversion into hidden parameters. The

Zener diode and voltage regulator tube



obvious that the regulating element must be intact and working if the voltage on the line it's controlling is not to soar up towards the value of the un-regulated supply.

In that communications receiver I

told you about, the effect of the regulator

tube not conducting was that the oscil-

lators started to wander about in fre-

quency. The relatively small amount of

excess voltage (105 volts instead of 75

volts) was not likely to do any damage.

That's not always the case, though. It

was not too unusual to find a 150V

regulator circuit strung across a 300V

supply, or perhaps a 105V one across a

250V supply. On a lower scale of volts,

the same can apply to Zener-stabilised

circuits too.

I've mentioned it before, but I can-

not stress too highly the importance of

the bottom element of **any** potential

divider chain being adequately rated

and properly installed. The most cata-

strophic failure of a potential divider

I've ever seen was in the metering cir-

cuits of a valved transmitter. The EHT

supply to the final amplifier was 3kV,

and this was 'potted-down' in a resis-

tive divider to around 75mV to be

monitored on a front-panel meter which

could also be switched to read supplies

and currents in other stages. The poor

little water switch concerned did not

take kindly to being presented with the

full 3kV on one of its contacts when the

bottom resistor of the EHT divider went

open circuit. A very expensive rebuild

job!

You can cause a similar problem

(though hopefully not quite on the same

scale) by pulling a voltage regulator

tube out of its socket with the equip-

ment switched on. Once again, this

action removes the bottom element of

a potential divider chain.

This possibility was foreseen by

the tube manufacturers, who built con-

necting links into the tube itself, in-

tended to be wired in series with the

supply from the HT rail to the stabiliser.

That way, if the tube was pulled out of

its socket, the supply was removed

entirely from the regulator circuit, and

providing a steady regulated output

from the load which it would normally

supply. In early tubes, such as the VR75

in American

terminology, the link was separate from

any other tube connections (Fig. 5a). In

later tubes, the anode and/or cathode

electrodes were brought out to multiple

pins; providing the supply and load

circuit connections are taken to differ-

ent pins, the effect is the same (Fig. 5b).

I would welcome ideas from read-

ers on topics that I might tackle in future

'Notebooks'.

Your suggestions, please, to Geoff

Arnold, 9 Wetherby Close, Broadstone,

Dorset BH18 8JB.



Packet Radio -Roundup-

Our Packet SysOp Chris Lorek G4HCL gets linked in between HF and VHF

A recent bulletin from Tom G1YAA, on behalf of the Data Communications Committee of the RSGB of whom Tom is the Chairman, announced the long awaited addition of available frequencies for BBS NoVs (Notices of Variation) on 70cm. This means that the 'usual' frequencies available for unattended personal and node use on 70cm (432.625, 432.650, 432.675, 433.625, 433.650 and 433.675MHz), are now also available for use by BBS and DX Clusters under NoV on one spot frequency, without the lengthy 'site clearance' formalities previously needed. As well as this, frequencies in the 430MHz and 439MHz ranges have also been released, these being planned for inter-BBS linking use with no user access (note that unattended nodes may not use these 430/439MHz allocations without site clearance). Hopefully, these linking allocations may 'free' 432/433MHz channels as little in congested areas!

International Wormholes

The short packet 'Wormhole' feature and map in the Feb 94 Packet Radio Roundup certainly roused a lot of interest! The supplier of the map in that feature, Kevin G0KJL @ GB7BEV.#16.GBR.EU says that on returning from a trip to Canada his PMS

was filled with messages on this, and how to use them! Fred G1TDQ @ GB7XJZ recently contacted me asking for more details. From whichever country you're in, you need to get to your local or semi-local 'wormhole' node, for example in the UK this is 'LONNY' in London. From there, just issue a connect in the usual manner to the node you wish to connect to. Have fun, and my thanks to Kevin for the updated map shown here - he says a further map will follow with routes to Australia, so watch either this space or of course the packet network.

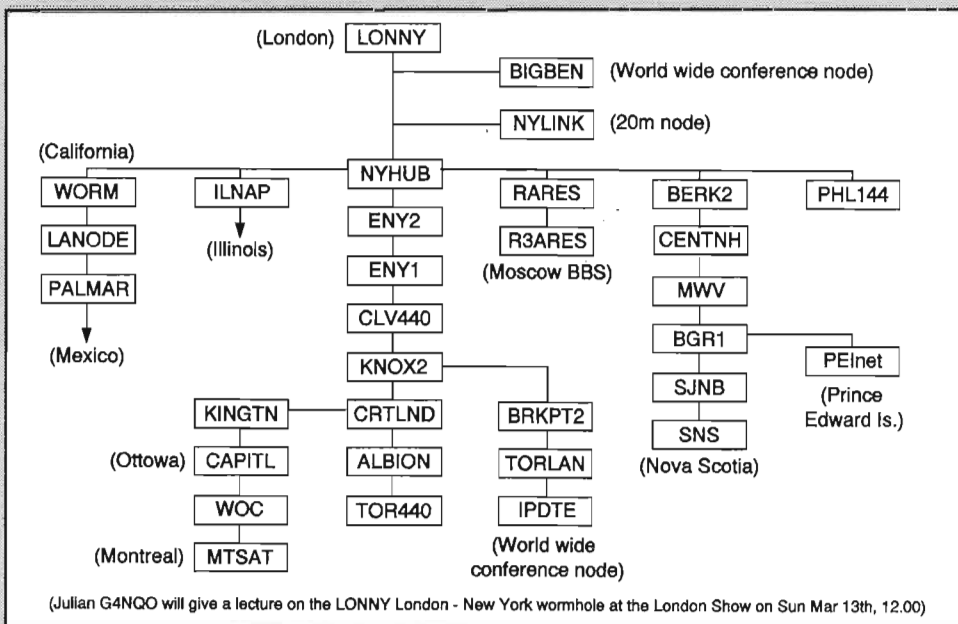
Roy 2E1AUD @ GB7SPV.#33.GBR.EU asked me whether Novices are allowed to use international 'wormholes'? The answer, Roy, is that as long as you *only* operate *your* station on the frequencies, powers etc. that *you're* allowed, then all is OK under the terms of the UK licence. It's the operating privileges of the other station, which is licensed to relay your incoming signals, that are in use at the 'distant' end. In the same way, it's quite OK for Novices to go into their local multi-port node on 70cm, and out on 2m or whatever, likewise Class B amateurs can use a HF packet gateway by going 'in' on VHF/UHF and 'out' on HF.

HF Gateways

Talking of these, many readers may not be aware that a number of amateurs operate HF packet 'gateway' nodes. One local to me (just north of Southampton) is run by Phil G3WEG, linking 144.650MHz to 14.0957MHz, with callsign and alias G3WEG-8:HFLINK. Phil says he's in HF contact with LA3SHA, EA3FOD, EA5BTQ, IK4LZH, 9A2OH, CT1AFT-5 and several other HF gateways and BBSs, and suggests that you give it a try. Connect first to HFGATE on 2m, then enter MH 2 to list the heard stations on HF, which is port 2. To connect to a station on HF, enter C 2 followed by the station callsign. Remember that propagation *does* vary on HF, and that HF packet usually has a much slower 'throughput' than VHF. Alternatively, if you're coming in on HF, try working someone in the south of England by linking to 2m! Phil runs the gateway nearly every weekend, and asks potential users to let him know whether the gateway is of interest. You can send him a message to G3WEG @ GB7XJZ.#48.GBR.EU

You should be able to get into the GB7SMC DX Cluster from G3WEG-8 (it's only around 400m away), but HF packet operators may like to know that ZS6WGH, the DX Packet Cluster in Pretoria, has opened a 300 baud HF port on 21.1089MHz LSB. SysOp Bill ZS6WGH @ ZS6AI invites DXers in Africa, Europe, and the Indian Ocean to connect and report DX stations heard/worked and QSL routes. He adds that the DX Node also hosts the North American Callbook (Hamcall) database and the W6GO QSL Manager Database, and future plans included a 30m port to serve other areas within the Southern Africa region.

Revised Wormhole Map of International Packet Links



'Cluster Duster'

This excellent quarterly publication, which is the newsletter of the UK Cluster Working Group, has now been tirelessly edited for over three years by Maurice G3XKD. He says it's time for someone else to 'have a go'! The Group



Chairman, John G4PDQ, has been asked to see if he can find a volunteer to carry on the work, if you're interested you can contact G4PDQ via a message on the UK Cluster network.

East Lancs Packet Group

ELPG Committed Member Walter G4WXI @ GB7WRC tells me this group has just been formed, covering the East

Lancashire area of approximately Burnley, Nelson, Colne, and Blackburn. They extend a welcome to all amateurs to come along to their meetings (the last was on February 8th). If you're interested in the group, you contact either Walter G4WXI, their Chairman Howard G3RXH, Secretary G3INL, or Treasurer G3TRK, all @ GB7WRC in Burnley.

Packet Guides

The most common question I'm asked concerning this column is "are there any good introductory books on packet?". A good start would be a look at the economically priced guides from the BARTG (British Amateur Radio Teledata Group). Their Secretary Ian G4EAN @ GB7BAD.#23.GBR.EU tells me they're currently reworking their guides, here's a selection of their offerings;

BARTG Guide to Packet; This is in stock and available from BARTG's Publications Manager.

BARTG Guide to RTTY; This is due to be available any time now.

BARTG Guide to AMTOR; This book, which replaces the Beginner's Guide to AMTOR (now out of print), is being prepared and they hope to publish it shortly.

BARTG Guide to PACTOR and BARTG Guide to TCP/IP; Work is progressing on these two books but the group are not ready to announce a scheduled publication date.

If you're interested in any of the above, send an SAE to the BARTG's Publications Manager, Mark Ashby G6WRB, 47, Ryton Close, Luton, Bedfordshire, LU1 5SR, or you can phone him on 0582 36094. Membership of the BARTG remains at just £10.00 a year, you'll find their details each month following the 'Club News' section of HRT.

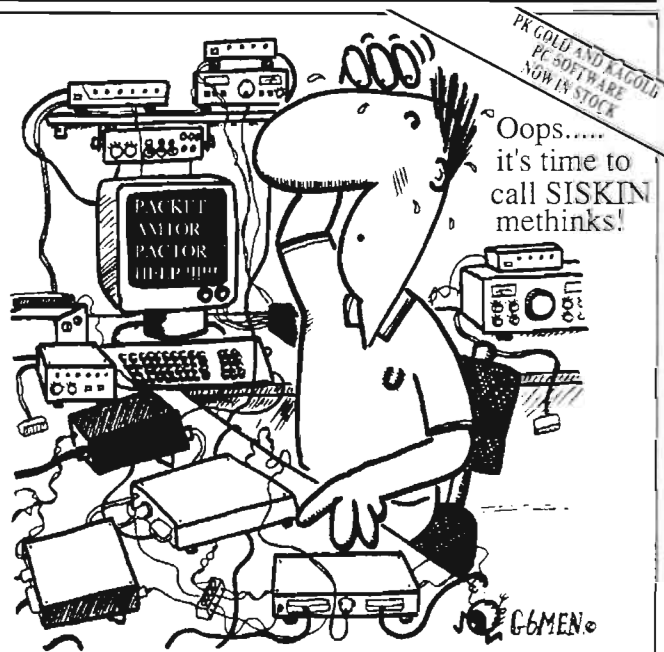
CTRL-Z, End of Message

Edward 2E1BZK sent me a message from the GX8ZKE club station at King Edward's School in Edgbaston, Birmingham, telling me the club consists of over 30 Novices. That's extremely good going Edward! I'm sure the club would like to hear from other *Packet Radio Roundup* readers also. So why not drop them a quick message, sent to GX8ZKE @ GB7BHM.#29.GBR.EU.

Until next month, 73 from Chris G4HCL GB7XJZ.#48.GBR.EU, or by post c/o HRT Editor, Argus Specialist Publications, Argus House, Boundary Way, Hemel Hempstead, Herts, HP2 7ST.

ADVERTISERS INDEX

| | |
|--------------------------------|-------|
| AOR | 34 |
| Art Creative Partnership | IBC |
| ASK | 29 |
| BATC | 34 |
| Chevet Supplies | 34 |
| Cirkit | IBC |
| Coastal Communications | 14 |
| Disc Trader | 34 |
| Electrovalve | 29 |
| GWM Radio | 29 |
| Haydon Communications | IFC |
| HRT Subscription Offer | 39/58 |
| Icom | OBC |
| Interproducts | IBC |
| Nevada | 10 |
| Quantek | 28 |
| RAS | 29 |
| RSGB | 39 |
| Siskin Electronics | 43 |
| SMC | 18 |



Poor old RF Byrne is wondering where to start with Digital Radio...he should have phoned Siskin of course! Our latest Digital Radio catalogue has just rolled off the press and it's packed with the up to the minute product news for Packet Radio, PACTOR, AMTOR, RTTY, Automatic CW, Navtex and FAX for just about any home computer available today.

We are the official importer for Interflex, PacComm, BayCom & Symek Packet Radio products and authorised dealers for Kantronics, AEA & ICS. Our *only* business is Digital Radio so whether you are just starting out or a seasoned 'Pro' debating whether to update why not give us a call today?



Siskin Electronics Ltd.
PC House, 2 South Street,
Hythe, Southampton SO4 6EB.

Tel: 0703 207155/207587
(8am to 8pm)
Fax: 0703 847754



VHF/UHF Message

Geoff Brown GJ4ICD describes the new United European Time which replaces GMT and UTC

You may recall in last month's HRT I released the basic details of the 50MHz Jordanian DX-pedition to take place this year. Well here is the story:

UKSMG Brings JY Onto 50MHz

Initially Chris G3WOS (the UK Six Metre Group Secretary) wrote to Robin Bellerby G3ZYE who co-ordinates many trips to Jordan, and was instrumental in organising the interview with H.R.H. King Hussein, JY1, that appeared in Radio Communication last year. The request was to operate a 50MHz station (and other HF stations) from the latter end of May to the end of June during the summer 'ES' peak. This time was chosen because of the many openings during the past few years to 5B4, 4X4, 9K, OD5 etc.

On December the 1st, a fax was received from the Private Office of His Majesty The King in Amman stating that permission had been granted to operate a 50MHz station by the Royal Jordanian Amateur Radio Society.

An agreement to leave a 50MHz radio or transverter, aerial, and beacon has been made, and already donations have been received from G3OIL and GD0TEP of 50MHz aeriels which will stay in Jordan after the DXpedition.

SMC Ltd. in Southampton have also been very helpful in that they have provided a Yaesu FT650 transceiver on loan for the entire expedition, of which the UKSMG are extremely thankful for (we promise we won't leave it there!). Nevada UK in Portsmouth have also stepped in with the offer of equipment, more later.

The schedule looks something like this, but there may be changes as this article is being written some months ahead and flights may change, plus the Middle East situation may also change forcing us to cancel everything: Neil G0JHC and myself GJ4ICD will leave the UK for the Marriot Hotel in Amman (locator KM71wx) on or around May 26th or 27th. Neil will return in early June and I will be joined by the second crew Thomas DL7AV and Nick G3KOX, I should be returning back to the UK around the 11 June. Nick and Thomas will leave on the 18th as Chris G3WOS,

EEC 1995 CALENDER

JANUARY

| S | M | T | W | T | F | S | S | M | T |
|----|----|----|----|----|----|----|----|----|----|
| | | | | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | | | | | |

MARCH

| S | M | T | W | T | F | S | S | M | T |
|----|----|----|----|----|----|----|----|----|----|
| | | | | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | | | | | |

APRIL

| S | M | T | W | T | F | S | S | M | T |
|----|----|----|----|----|----|----|----|----|----|
| | | | | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | | | | | |

MAY

| S | M | T | W | T | F | S | S | M | T |
|----|----|----|----|----|----|----|----|----|----|
| | | | | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | | | | | |

JUNE

| S | M | T | W | T | F | S | S | M | T |
|----|----|----|----|----|----|----|----|----|----|
| | | | | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | | | | | |

JULY

| S | M | T | W | T | F | S | S | M | T |
|----|----|----|----|----|----|----|----|----|----|
| | | | | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | | | | |

AUGUST

| S | M | T | W | T | F | S | S | M | T |
|----|----|----|----|----|----|----|----|----|----|
| | | | | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | | | | |

SEPTEMBER

| S | M | T | W | T | F | S | S | M | T |
|----|----|----|----|----|----|----|----|----|----|
| | | | | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | | | | |

OCTOBER

| S | M | T | W | T | F | S | S | M | T |
|----|----|----|----|----|----|----|----|----|----|
| | | | | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | | | | |

DECEMBER

| S | M | T | W | T | F | S | S | M | T |
|----|----|----|----|----|----|----|----|----|----|
| | | | | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | | | | |

Mike G3SED, and Paul G4CCZ arrive for the final two weeks of June. At present the equipment plans seem to be an FT650 (for 50MHz operations) plus a 6 element on a 7.3m boom and backup Yaesu FT690, plus a further Yaesu rig for HF and 28.885MHz talkback.

All the above operators have attained DXCC on 50MHz, so you really do have the cream operators going to Jordan. It's also hoped that, as we are splitting the schedule up, that some of the operators will also work JY as well.

We know that propagation does exist to this part of the world from the UK, as a few years ago a JA station was in Jordan with a 50MHz converter and dipole, both Neil G0JHC (Lancs) and myself were heard at S9+ in the months of June/July.

Another of the UKSMG committee members is also very involved in this expedition. His name is Byron G6HCV who was the first Class B licensee in the UK to attain ARRL DXCC on 50MHz. Byron has taken on the responsibility of fund raising as expeditions of this type are very costly, and so it goes without saying that if you can spare a few bob or whatever then please send it to him at 2 Slade Gardens, Codsall, Wolverhampton, Staffs, WV8 1BJ, cheques made payable to UKSMG. More news next month !

more universal throughout Europe, it had to come! The following is what has been decided for 1995.

Starting in January 1995 there will be 30 hours in each day, each week will have 10 days and there will be 3 weeks in each month. Two winter months will be omitted, that's November and February, and so will constitute a ten month metric year.

Taking the above into consideration, previously there were 8760 hours in a year. However, under the new Brussels regulations there will be an increase of some 240 extra hours and so totalling 9000 hours in the European yearly calendar.

There are going to be many advantages and disadvantages in this new system. Firstly you will notice that Fridays will fall on the 1st, 11th and 21st days of each month and so no Friday the 13th at last! Likewise Saturdays will also follow the similar pattern in only having the 2nd, 12th and the 22nd assigned to them. Another advantage will be not having to remember if the month contains 30 or 31 days. For those who have birthdays on the missing two months please read on for conversion data and your new birthday.

Some of the main problems that I can see so far is having to renew all clocks and wristwatches. But again the

Another example is August 13th at 3am (Perseid peak) old day 225 + 3 hours = 5403 hours divided by 30 = Day 180.1 = August 1st and 1st hour should be the peak in 1995. Once you get used to it, it's not too bad.

Band Conditions

Things have been poor again on the VHF bands, although a little 'ES' has been reported in Nov/Dec on the 50MHz band. Mike, G3MY (South Yorks) reported the band open to YU and S5 on the 11th, and Alan GW3LDH had lots of MS into SP, YU, OH, YO etc. on the 12th from 1600z. But was it MS?

EI8HZ in Co Donegal did well on the 12th via 'ES' with DL7QY, PA3GAN, F1DOF, F8ZW, DJ9KG, SP3VCA, OK1MAC, SP6JW, PA0ERA, G8BQX, F1BAB, ON4AVT, DJ3TF, OK1DDW and others, but had to close down at 1710z due to TVI, all signals were S9+!

Meanwhile down-under, the 'ES' season is well under way. On 19/11/93, a 50MHz World first took place, Steve VK3OT had the first World contact with Antarctica, at 1209z on SSB, the station was VK0AQ at Casey Base. A couple of other VKs also made contact, congratulations to all who worked the 'Seventh' continent.

Sporadic 'E' was prevalent during the latter part of December, stations reported heard on 50MHz were from the Azores and Morocco.

Panoramic Displays for VHF

In the January issue of HRT I mentioned that readers may like to try the UNIOHM service agents to see if the recent reviewed panoramic display units were still available. Well I was given (in good faith) two phone numbers and addresses of a company called Advid Electronics, unfortunately these were very much out of date and even I received a call from the estate agents of the properties stating that they had never been heard of! Sorry for any problems caused, however one company that *do* stock such items is Alban Electronics Ltd., Tel 0727-832266, although they may be only able to supply colour units. They do have a model called an MC-477d. Does anyone know of Advid Electronics, as their service sticker is on my Uniohm EP-738b analyzer ?

Thanks for all the news and reports, even though things are a bit thin on the ground this time of year. Reports etc. to: Geoff Brown, TV Shop, Belmont Rd, St. Helier, Jersey, C.I. or phone/fax 0534-77067 (please enclose an SAE if you need a reply - Ed).



The 1995 United Europe Calender

Here's some VHF'ers radio dates to remember. As I mentioned a few months ago I have at last obtained a copy of the new 1995 EEC calendar, and I have managed to make a very simple formula that will convert between the old system and the new system, making predictions for sporadic 'E' and meteor scatter maximum times possible, otherwise I'm sure it would be a nightmare. Firstly, how does the calendar work?

In 1991 the European Commission in Brussels for United European Time was formed. It was suggested that Greenwich Mean Time should be scrapped and replaced with something

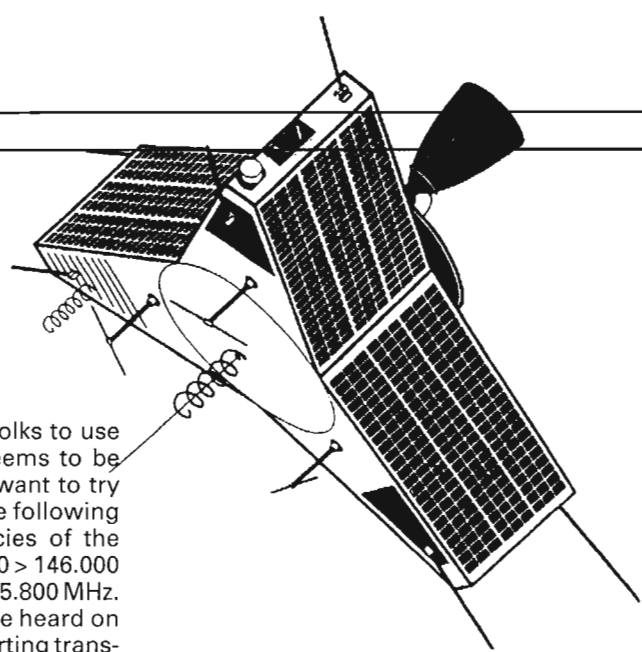
EEC directive have taken this one into account by offering a subsidy of at least 75% towards renewals.

As far as amateur radio goes, there are great problems for the VHF DXer in finding the new day/hour for various peaks in propagation. However, I have managed to convert times from GMT to UET (United European Time) for many of the main meteor showers (list available) and major predicted sporadic 'E' openings based on figures from 1993. This task alone took me three days and so it should be of great value to readers (IRC + SAE if you would like one).

Formula: Day of old year (e.g., Jan 10th) = 10 multiply by 24 (hours) = 240 hours, divide this figure by the new hours in each day (30) = Day 8, and so Jan 10th now becomes Jan 8th.

Satellite Rendezvous

AMSAT-UK News for this month collated by
Richard Limebear G3RWL



Following a series of meetings both in the United States and Germany, work on construction of Phase-3D is moving forward at an accelerated pace. On December 11th and 12th last year, AMSAT-DL hosted a key meeting of the project's international participants near Munich. I am glad to report that all phases of the project are 'on track' for the expected launch in 1996. Each country's team is performing their assigned tasks very well and they're really pulling together as an international group. It now looks like we'll have some superb cameras, some really 'hot' receivers and some very powerful transmitters on Phase 3-D when it's launched in 1996.

Oscar 13

G3RUH has been preparing the future Oscar 13 schedule over the Christmas period. You'll see the **provisional** table here, although please note this is a provisional schedule. As usual, continuous up to date information about AO-13 operations is always available on the beacons, 145.812 MHz and 2400.646 MHz in CW, RTTY and 400 bps PSK.

G3RUH reported that because of the extended solar eclipses in late 1993 that AO-13 experienced, they were forced to severely curtail operations. Some of the eclipses have been as long as 2 hours. Battery voltage had become so low that the net affect has been that there has been no battery charging from orbit to orbit. The safety threshold on the battery is currently set 12.6V and when it drops below this the computer shuts down the beacon and brings all subsystems to a low-power state where the total consumption is around 1A.

It should be noted that AO-13's batteries are now five years old and the Command Team may feel it necessary to adjust the battery charging algorithms to see if they need to be adjusted for the age of the batteries.

Fuji-OSCAR 20

Fuji-OSCAR 20 has changed its digital/analog operating schedule. The modes now alternate on a weekly basis until further notice, change day is Wednesdays.

By providing a full week of analog transponder time, the command team

hopes to encourage more folks to use this mode, and this aim seems to be successful. For those who want to try working the voice mode, the following are the passband frequencies of the transponder: *Uplink*: 145.900 > 146.000 MHz. *Downlink*: 435.900 > 435.800 MHz. The telemetry beacon can be heard on 435.795 MHz. This is an inverting transponder so remember to use LSB on the uplink to get USB on the downlink.

With FO-20 in analog mode for the week 1st to 8th of December, G6HMS and G0NKA experimented at passing FAX pictures through the transponder. Once the delicate technique of holding the picture by following the Doppler shift on the downlink was mastered, the plan worked well. Unlike voice transmissions, where the ear can compensate for tonal frequency shift, computers decoding Fax signals are far more critical.

By 6th December they had the best yet black and white picture throughput. They then switched to full colour transmissions and, on 7th December, transmitting using the JV-Fax program and receiving on the shareware version of Microfax, they succeeded in producing full colour throughput with better than 90% resolution.

Russian Satellites

DL2MDE's digital voice memory system has been re-activated on Mir. The voice message repeats every 2 minutes. MSK is, I think, three hours ahead of GMT.

WEFAX compatible images are currently being transmitted from RS-14/Oscar-21, so equipment currently used by ground stations to copy Meteosat and NOAA satellites will work with AO-21 transmissions. Unfortunately there is no camera on board AO-21, so the pictures have to be uploaded first by the AO-21 command station. The 'Multimedia' satellite premiere was activated for the first time on December 24th and some special seasons greetings in voice and picture were transmitted, and on the Thursday morning the WEFAX alternated with a Christmas Carol.

The RUDAK downlink centre frequency is 145.987 MHz. The WEFAX format is like METEOSAT WEFAX Specification (MGCS): FM, 2400 Hz Subcarrier frequency with double

sideband AM modulation, 300 Hz start signal for 3 seconds, 450 stop signal for 5 seconds, 800 x 800 Pixel Image format with 256 grey levels, 4 lines/sec.

After a period of inactivity, the RS-10 robot is active on air again. The downlink is approx 29.403 MHz, and uplink is +/-145.820 MHz. If you are into the robot receiver, your CW will be retransmitted on the robot's fixed frequency. The speed of the CW is not important; it just needs to be steadily and cleanly sent.

Spot Launch

After 45 days of uninterrupted BBS service, IO-26 crashed during a pass over Europe on 8th December and was recovered the next day. The cause of the crash is still unknown; they are working on the memory dumps, but the crash destroyed part of the internal logs kept by the computer. Since the crash happened as one of the Ground Command Stations in Milan was uplinking to the satellite using a new program (which had not yet been fully tested), there is chance that this was the cause of the crash.

The Command Team decided not to turn the BBS on after the reloading of the software, but started some Whole Orbit Data (WOD) collection in order to fully optimise the energy budget on board the satellite. This will let IO-26 run higher power on the downlink.

KITSAT-OSCAR-25

Apparently it will be possible for amateur experimenters to process **colour** images from KO-25! The designer of the KO-25 camera is preparing an article on how to do this.

KO-25 continues transmit strong signals with good modulation quality. The Kitsat team have been very busy

KEPLERS

Objects from the recent launch are 'as received', the set called 1993 061H fits Kitsat-2, the set called POSAT-1 fits IO-26, the sets called Healthsat and ITAMSAT both fit Healthsat, and the set called EYESAT fits PO-28. As for the other two (the real AO-27 and the booster), your guess is still as good as mine (AO-27 is only switched on over eastern USA). Keps are from Amsat-NA, the names from the Spot launch may be different (sets for KO-25 and IO-26 do fit sightings).

| | | | | | | |
|-------|----------------|----------------|----------------|----------------|----------------|----------------|
| SAT: | AO-10 | UO-11 | AO-13 | AO-16 | DO-17 | WO-18 |
| EPOC: | 93329.34450477 | 93352.06493232 | 93356.82690458 | 93353.72330553 | 93353.76501517 | 93353.73726563 |
| INCL: | 27.1217 | 97.7951 | 57.9666 | 98.6110 | 98.6116 | 98.6108 |
| RAAN: | 354.5434 | 10.1968 | 277.5430 | 76.9082 | 77.2143 | 77.1992 |
| ECCN: | 0.6014493 | 0.0012338 | 0.7210696 | 0.0011736 | 0.0011897 | 0.0012470 |
| ARGP: | 132.9243 | 124.9246 | 330.9913 | 2.7801 | 2.5935 | 1.9872 |
| MA: | 298.0909 | 235.3121 | 3.3970 | 357.3445 | 357.5307 | 358.1359 |
| MM: | 2.06477387 | 14.69103843 | 2.09727363 | 14.29867859 | 14.30005317 | 14.29982522 |
| DECY: | 9E-08 | 2.49E-06 | -7.63E-06 | 6.6E-07 | 7.7E-07 | 4.7E-07 |
| REVN: | 7858 | 52371 | 4231 | 20395 | 20397 | 20397 |
| SAT: | LO-19 | FO-20 | AO-21 | UO-22 | KO-23 | KO-25 |
| EPOC: | 93353.72731485 | 93355.44982285 | 93357.16575150 | 93353.75748489 | 93353.94580435 | 93353.71873553 |
| INCL: | 98.6123 | 99.0168 | 82.9459 | 98.4535 | 66.0886 | 98.5706 |
| RAAN: | 77.4062 | 176.0166 | 272.9683 | 66.7225 | 295.2665 | 65.3408 |
| ECCN: | 0.0012815 | 0.0541260 | 0.0033939 | 0.0008505 | 0.0006949 | 0.0011621 |
| ARGP: | 1.5633 | 22.2699 | 213.7252 | 101.5487 | 331.1179 | 348.1932 |
| MA: | 358.5590 | 340.0980 | 146.1744 | 258.6654 | 28.9453 | 11.8974 |
| MM: | 14.30075638 | 12.83222967 | 13.74530786 | 14.36875041 | 12.86282320 | 14.28023309 |
| DECY: | 7.5E-07 | -1.7E-07 | 9.4E-07 | 1.09E-06 | -3.7E-07 | 6.1E-07 |
| REVN: | 20398 | 18133 | 14540 | 12731 | 6373 | 1208 |
| SAT: | IO-26 | AO-27 | POSAT | RS-10/11 | RS-12/13 | MIR |
| EPOC: | 93353.94801570 | 93353.74382815 | 93353.79061720 | 93353.78531717 | 93353.88399174 | 93356.89342327 |
| INCL: | 98.6737 | 98.6733 | 98.6671 | 82.9275 | 82.9202 | 51.6187 |
| RAAN: | 66.4193 | 66.2045 | 66.2636 | 101.4555 | 144.4175 | 351.4352 |
| ECCN: | 0.0009857 | 0.0009172 | 0.0010487 | 0.0012165 | 0.0028238 | 0.0005780 |
| ARGP: | 18.2897 | 18.4935 | 5.2318 | 156.0268 | 247.3749 | 118.8381 |
| MA: | 341.8607 | 341.6577 | 354.8962 | 204.1456 | 112.4421 | 241.3181 |
| MM: | 14.27698719 | 14.27596448 | 14.27991712 | 13.72328016 | 13.74031650 | 15.59225375 |
| DECY: | 2.1E-07 | 4.1E-07 | 9.5E-07 | 3.9E-07 | 2.1E-07 | 1.2771E-04 |
| REVN: | 1211 | 1208 | 1209 | 32530 | 14402 | 44854 |

doing experiments with the various systems on board. It took KAIST five months to commission Kitsat-A; by this reckoning we may see Kitsat-B up and running from about the end of February.

On 22nd December KO-25 stopped transmitting for a while. The problem has been solved now, but KAIST still need to find the exact cause of the incident. It would be much appreciated if those who were monitoring the telemetry near the time of occurrence, send them this data via KO-23.

Forthcoming Shuttle Flights

Flights planned for 1994 that will be visible in the UK include: STS-62: 3rd March, 184 naut miles up, 39 deg incl (14 days), no plans; STS-59: 7th April, 120 naut miles up, 57 deg incl (9 days), Sarex planned; STS-68: 18th August, 120 naut miles up, 57 deg incl (9 days), Sarex maybe; STS-64: 9th September, 140 naut miles up, 57 deg incl (9 days), no plans; STS-66: 27th October, 160 naut miles up, 57 deg incl (10 days), no plans.

Soviet Space Junk Sale!

Do you enjoy the junk sales at your local club? They had one in New York recently to sell Soviet space artifacts. Many of the items were once among the most closely guarded secrets in the Soviet Union. Here's a sample of what was sold; *Cosmonaut (Alexei Leonov's) space suit*; \$255,550, *Space Manne-*

AO-13 Provisional Mode Schedules

Jan 31-Apr 04 1994

Mode-B : MA 0 to MA 90 |
 Mode-BS : MA 90 to MA 120 |
 Mode-S : MA 120 to MA 145 | <- S transponder; B trsp. is OFF
 Mode-S : MA 145 to MA 150 | <- S beacon only
 Mode-BS : MA 150 to MA 180 | Blon/Blat 180/0
 Mode-B : MA 180 to MA 256 |
 Omnis : MA 230 to MA 30 | Move to attitude 240/0, Apr 04

Apr 04-Jul 11 1994

Mode-B : MA 0 to MA 160 | OFF
 Mode-B : MA 160 to MA 220 |
 Mode-S : MA 220 to MA 230 | <- S transponder; B trsp. is OFF
 Mode-BS : MA 230 to MA 250 | Blon/Blat 240/0
 Mode-B : MA 250 to MA 256 |
 Omnis : MA 250 to MA 160 | Move to attitude 180/0, Jul 11

quin (Ivan Ivanovitch); \$190,000, *Yuri Gagarin training Space suit*; \$112,000, *Cache of Moon Rocks*; \$442,500, *Lunokhod-1 lunar surface rover*, *Luna-17 Descent stage* (both units still on the Moon); \$68,500, *First can opener & fork used in space*; \$7,000, *Yuri Gagarin dress uniform*; \$34,000.

The total auction total of 226 lots raised \$6,800,000 with many bids coming from interested parties in Australia, Japan, France, England, Germany and Italy.

Short Bursts

A reminder that the Lambda Amateur Radio Club (a US/international group) are planning a satellite DXpedition to VP2E scheduled for 4th to 11th March 1994, just as this magazine issue appears. About 12 members have signed up so far, and they will also

have HF and Packet. The aim is to conduct Oscar-13 mode B and mode S satellite operation plus HF operation. More details from Don, WB6LYI@K6VE.

AMSAT-KOREA was formed recently; the organisation has its office in Seoul. The members of AMSAT-KOREA are currently in the process of building the central ground station.

AMSAT-UK News

Remember that the 1994 AMSAT Colloquium will be held on the 28th to the 31st of July, further details are available Amsat-UK.

For further information about Amsat-UK contact: AMSAT-UK, c/o Ron Broadbent, G3AAJ, 94 Herongate Rd, London, E12 5EQ. Big SAE gets membership info, SWL's are welcome, and all new joiners get the USAT-P tracking program on 5-1/4 disk.