HRT

Incorporating SCANNERS

HAM RADIO TODAY

NOVEMBER 1992 £1.70

KPC-3 *Getting Started*

Low cost projects for your station

LEICESTER SHOW SPECIAL

Exhibition guide and trader list

Kantronics
RF Data Communication

KANTRONICS KPC-3 PACKET TNC REVIEWED

A world-first 'Beginners TNC'

Kantronics

Power

PacketCommunicator 3

Xmit Rcv Con Sta Mail

COMPREHENSIVE SCANNER BUYERS GUIDE

NOVICE • PACKET • REVIEWS • PROJECTS • SATELLITES

HRT CONTENTS

HAM RADIO TODAY

REGULAR COLUMNS

REVIEWS

PROJECT

FEATURES

NEWS AND VIEWS

Kantronics KPC – 3 Reviewed
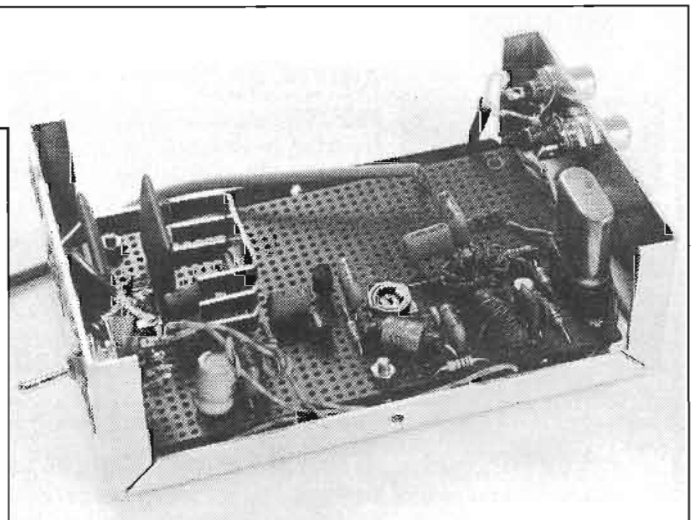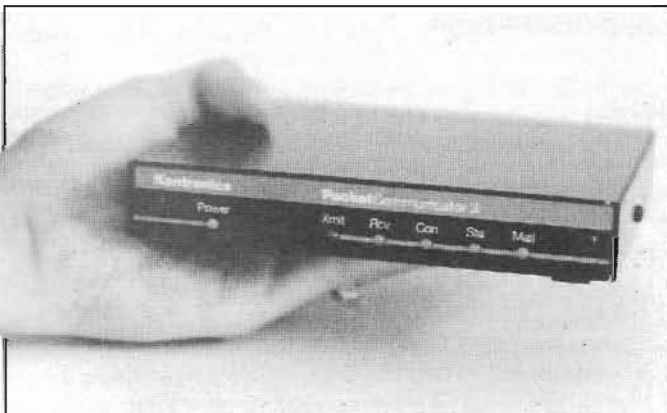
Project – 160m DSB transmitter for the novice

CQ de G8IYA Editorial

Hams, amateurs, and others who think they are
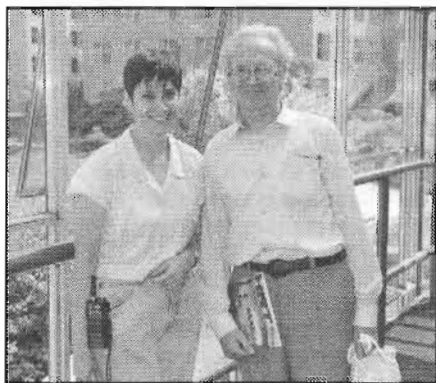
HRT Editor Sheila G8IYA meets one of her readers from around the world, Leo UA3CR

The headline of a recent UK evening paper story sent to me by a concerned Ham Radio Today reader was "Radio ham fined £350", followed by a relatively lengthy story of how an *unlicensed* (we checked with the RIS) radio operator in Northumberland was fined £350 plus £100 costs and had his equipment confiscated after admitting to owning two restricted CBs and three counts of using wireless telegraphy without a licence. The paper published the fact that the "radio ham" said he thought he was doing nothing wrong when he illegally transmitted on civil and military aircraft frequencies, and that he also had log books showing that he'd tuned into police frequencies. The unlicensed (yes, we did take the trouble to check with the RIS) pirate even said "A lot of radio hams are very angry at this prosecution. I was sitting exams this winter but now all that learning has gone out of the window. The worst part of it is that I will lose contact with many of my friends from the EC, Russia, and Australia".

The newspaper in question quickly received a letter from us suggesting their reporter should have got his facts straight. In my Collins Dictionary of the English Language, Second Edition, page 692, it gives the meaning of 'ham' in the radio context as (quote) "a licensed amateur radio operator", followed by a 'modifier' of "a ham licence". Note the repeated reference to being *licensed*. A licensed radio ham would of course know which frequencies he was allowed to transmit on! If publishers don't even bother to use a

dictionary, then what hope do any of us have in showing the public that radio hams, by definition, hold a licence allowing them to communicate, legally. Mind you, some ham (sorry, amateur) radio organisations seem to ignore the common use of 'Ham' in English language also!

Euro-People, Euro-Hams

The phrase 'radio ham' is of course known throughout the world, even the oldest wireless society in existence (the Wireless Institute of Australia) recognise it in their journal. We'll carry on calling our's *Ham Radio Today*, at least it's internationally recognised!

Of late, more and more amateurs seem to have been coming materially closer to each other even though they reside in different countries. We have, of course, been chatting to each other, but have you noticed how popular of late actually meeting other amateurs throughout the world has been. In the UK, we see plenty of foreign visitors, and in our part of the country (Southampton, Winchester, New Forest and the Isle of Wight) there's a few reciprocal EC callsigns to be heard virtually every day in summer on our local repeaters. The recent AMSAT-UK colloquium attracted amateurs from even more countries than last year, and in turn many of us headed off to Friedrichshafen, Dayton, and the like, or if we didn't we probably thought we'd like to. Today's kids think nothing of wanting to go to Euro-Disney or to Florida. Not so ten years ago. We certainly receive plenty of faxes from readers around the world, just today we received one from a Swedish reader asking about a review, another from a German reader telling us how much he enjoyed reading the Friedrichshafen report, another from a Russian reader regarding TNCs, and a packet message from a Spanish amateur asking about 'Packet Radio Roundup'.

Trade barriers are certainly coming down, especially in Europe. Do our European amateurs read HRT for the equipment reviews? There is of course much to be said about 'buying locally', certainly when service and spares

backup are needed for a heavy and complicated transceiver. But many amateurs are investigating the possibility of buying their equipment abroad, either to save on cost or to get a wider choice. It may surprise you, but amateurs in one or two European countries especially buy their gear from the UK, normally by mail order. We buy beer from France, they buy TNCs from the UK. Now I wonder how many European readers know there's an amateur radio shop in the VAT-free Channel Islands?

If you're thinking of buying from abroad, do of course be careful about VHF and UHF rig frequency bands, channel spacings, repeater shifts and the like (and brush up on your Japanese or whatever if you want to read some of the manuals). Some rigs bought from certain countries, the USA for example, don't have the 1750Hz toneburst circuitry fitted that's required to access most repeaters over here. Besides whatever internal links are fitted in the rigs for various frequency coverage changes, the 'A' (American) and 'E' (European) following the rig type number on the front label do have a meaning!

OK to own extended coverage rigs

Not so long ago (like last week as I write this), in the UK it was illegal to have extended coverage on your amateur transceiver, even if this was restricted to receive. In what now appears to be an 'about turn', I have a letter in front of me from the Radiocommunications Agency saying they're OK.

The RA could restrict the sale of such rigs (as they have done in the past), for the purpose of reducing the risk of interference. But they also say that even if widespread interference from such equipment could be proved, such a restriction would certainly not be compatible with their international obligations and would certainly be challenged by our EC partners as a barrier to trade. They add that it would be quite impossible to specify which equipment was restricted because of the multi-varied nature of modern rigs, and they consider this type of problem is best dealt with by concentrating their resources on any illegal use of equipment rather than restricting supply.

So there we are, it looks like it's OK to own rigs in the UK covering whatever you want them to. But beware, the RIS can and do stamp down if you start doing naughty things, like programming non-amateur frequencies. Like the chap above who said he thought he was doing nothing wrong when he transmitted on civil and military aircraft frequencies to talk to his friends.

LETTERS

Letter of the Month

Dear HRT,

As a change from the 'dark forces' of confrontation etc. within our hobby, here is the good news. Have you ever considered the 'bliss factor'?

Do you remember the feeling when you finally received an amateur licence, your first QSO, even if it was just down the road. Perhaps constructing that transceiver, and guess what, it worked. The very first international contact, or being accepted as 'one of the gang' on the local repeater. Boring the XYL, fiancee or girlfriend to death, as you both walked miles and miles in and out of numerous marquees at various rallies searching for the ultimate bargain (I've been searching for 20 years). Last but not least, if the following activity could be described as bliss, salivating uncontrollably whilst contemplating the purchase of Japan's latest miniaturized marvel...Ah.

The point I'm labouring to make is this, does amateur radio still pique your curiosity? If not, why not? Where was the bliss when you first stumbled into our hobby? More importantly, how about now, has the bliss factor been stolen by another interest? Are most QSOs a one-way conversation?

I guess all these words beg the following question, how would you like to see amateur radio evolve over the next decade? What will be your input? You do not need me to remind you, that our greatest strengths are our camaraderie and curiosity, right? After all, wasn't it curiosity that turned the bliss factor on for you?

Your sincerely,
Ray Howes, G4OWY.

Editorial comment;
The first G8IYA contact was on 2m SSB about 30 seconds after the licence dropped through the letter box! Sheer bliss. But amateur radio is evolving, and at HRT we're keeping at the forefront of what's happening, rather than always dwelling in the past. We see our hobby going more and more towards digital communication, albeit with many 'traditional' modes retained for their simplicity. How do you see it going? Share your thoughts with other readers!

Dear HRT,

A friend of mine has recently failed his Morse test for the third time, and only missed it by an extra two or three errors. When you think about it, four errors on sending and receiving is not a lot of leg room, especially when your nervous. I know I certainly was on my Morse test and I was at a speed of 20wpm but still made a few errors.

If you take the thirty six words averaging five letters per word, then there is something like a hundred and eighty letters of which only four errors can be made on sending and receiving, that's not including the numbers. So to pass the Morse test you can see the high standards which are needed.

I think it would be much better to allow eight errors sending/receiving on plain language, and four errors on the numbers, therefore allowing more for nerves.

Yours sincerely,
R. Mansell, G0OVK.

Editorial comment;

Well, prospective Class As will now have to learn more to pass the RSGB Morse test, once it's introduced 'QSO format' symbols in addition to the normal Morse characters that used to be tested for many years. Why oh why oh why are unnecessary obstacles brought in?

Dear HRT,

Thank you for printing my letter regarding the lack of Novice Instructors in Grimsby. When I saw it a month or so later, I wrote to the RSGB to see if someone from Grimsby had registered, but they sent me the same list as before. There were people in Hull, Goole, and Bridlington, but I cannot travel that far. It would cost me mega-bucks! I wrote to my Senior Instructor and told him my problem, enclosing an SAE, but as yet I've had no answer. I am going to write again to the RSGB, but I don't expect them to help, can you?

Yours sincerely,
D. Hughes

Editorial comment;

Unfortunately Grimsby is just that bit too far for us to travel, but there must be plenty of potential instructors out there, throughout the country as well as in the Grimsby area. All we need to do is to persuade them to use their knowledge in securing the growth of our hobby. So come on you amateurs with time on your hands, ask the RSGB for information, and let's see some 'new blood' coming into the hobby!

Dear HRT,

Over the years that I have held an amateur radio licence, I have read many an explanation on the joys etc. of CQ contests. What I have never read and what I have been unable to ascertain, from the odd few people who actually admit to working contests, is where do these contesters go to when there's no contest on?

It is obvious to me personally, from daily working on the HF and VHF bands, that well over 90% of the amateurs that suddenly appear to work contests, never transmit on the bands during a normal non-contesting weekend or during the week, except for the very few who use the repeaters to and from home to their place of work. When I ask amateurs if they are interested in or take part in contests, the usual answer is no, although no one I have asked has been able to give a straight yes or no.

I know there are some who do operate on the bands outside of their contesting activities, and this letter is

not aimed at them in any way, it is however aimed at those vast numbers of operators who only come out during contests. A friend has suggested that the majority are probably all working packet, which I'm not at all convinced is true.

I must admit also that packet has been the death of 6m, 2m, and 70cm voice and CW operating, except for the repeaters, Morse practising and the odd Raynet exercise. On 10m there are no local nets, the same applies to 2m, 6m, and 70cm, at least not up here in Durham unless you count the daily sked on 144.775MHz that I and Colin G0PXQ

chat for two or three hours, on an almost daily basis.

It doesn't matter if you have a little or a lot to say, dust off your gear, fire it up and get those nets on the air. Do your contests, do your packet, do your SSTV, do your CW etc. etc., but remember the more you do the better you become at doing it. Get your fingers out chums and remember that in order to preserve the amateur bands as they are as well as improving them, you have to work them as often as possible, so lets take a leaf out of Michael Caine's book and become a 'Self Preservation Society' OK!

Your sincerely,
J. D. Bolton, G4XPP.

Editorial comment

The more we are active, the more our hobby will thrive. Many amateurs know that we at HRT don't sit around, we're trying to get you lot doing something, like getting on the air by reporting the DX you can work, like getting a cheap ex-PMR rig going for on-air use. We're alive here, let's hear from others who are also alive!

Kantronics KPC-3 TNC Review

*G4HCL looks at the world's first TNC which includes a
'new user' mode*
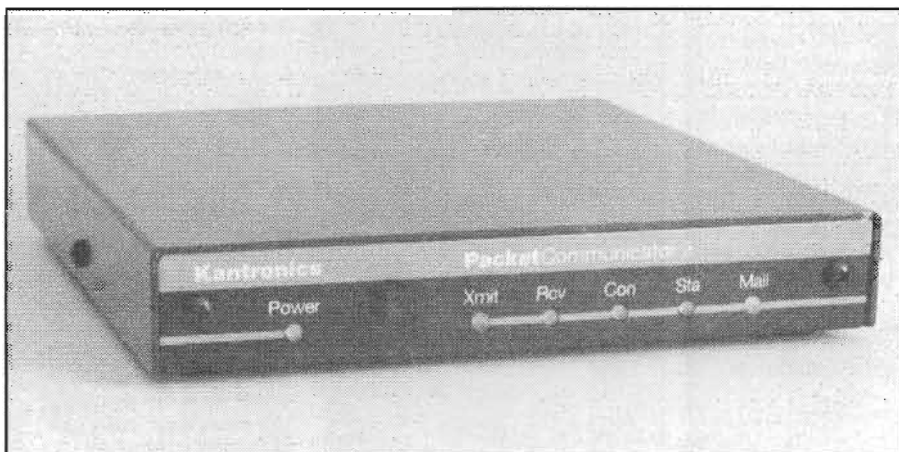
The KPC-3

Many amateurs obtain a TNC (Termi-
nal Node Controller) to get started on
packet radio, but connecting up be-
tween the TNC and their computer and
radio, either just 'following the in-
structions in the book' or even getting
ready-wired leads with the TNC, the
sheer amount of packet commands
available (needed?) get users into quite
a panic!

I know, I was one of them. Many
years ago, having used an electronic
RTTY system virtually every day on my
local RTTY repeater, the first time I
placed a TNC on air I mistakenly typed
'TRANS' on achieving a connection.
This I did virtually automatically through
instinct (well, I'd been doing it on the
keyboard for a while with the other
system!), but unfortunately this placed
me into 'transparent' mode on packet.
It was only through the patience of my
first QSO partner (thanks James) that I
eventually managed to get it back into
'converse' mode so that I could regain
normality (have you ever tried to get
out of 'trans' mode using a non-PC
terminal without a 'break' facility!).

Now this wouldn't have happened
with the KPC-3. Why not? Read on...

New User Commands

The point I'm making is that it's
easy for a newcomer (we're *all* new-
comers at some time) to get confused.
The KPC-3, when you first switch it on,
only allows you access to a limited
'NEWUSER' set of commands. You

need to read the instruction book to
find out how to get out of this, and thus
gain access to things like the ability to
monitor packets whilst connected (very
confusing if you're not aware of how to
cope with it!), setting up the internal
KA-Node, your 'Alias' and 'Remote'
callsigns and so on, plus of course all
the commands which, unless you know
what you're doing, could cause the TNC
not to do it's job in the way you think it
should.

Getting Connected

So I tried it out. After taking a look
at the 'Getting Started' book, connect-
ing the TNC to my radio and computer,
then popping the supplied disk into my
PC and loading the simple 'Pacterm'
program on this, I was away. A simple
'CONNECT GB7XJZ' command and I

was straight into my local BBS. No
problem.

The KPC-3 came with both 'Getting
Started' and 'Reference Manual' books,
plus all the connectors you'll need at
the TNC end for radio, computer, and
DC power linking. Even a couple of
lengths of cable are supplied, one multi-
way and the other ready-terminated in
a 3.5mm external speaker jack for
connecting to the receive audio of your
radio.

Many new users also have prob-
lems in getting a suitable program for
their computer up and running to use
with a TNC. A terminal, or a computer
running a suitable terminal program is,
of course, essential if you want to
communicate with the wonderful going-
on in your TNC, and although I fre-
quently detail such programs in HRT's
monthly 'Packet Radio Roundup' col-
umn it's surprising how much of a
'stumbling' block these can be for be-
ginners. I was, therefore, very pleased
to find Kantronics' simple 'no nonsense'
Pacterm program included in the pack-
age, which got me up and running from
'scratch' very quickly.

For the Experts

The KPC-3 includes all the usual
Kantronics TNC facilities (once you've
progressed from the 'New User' mode
of course), including their unique and

**The small unit with a facility for
internal batteries is easily portable**
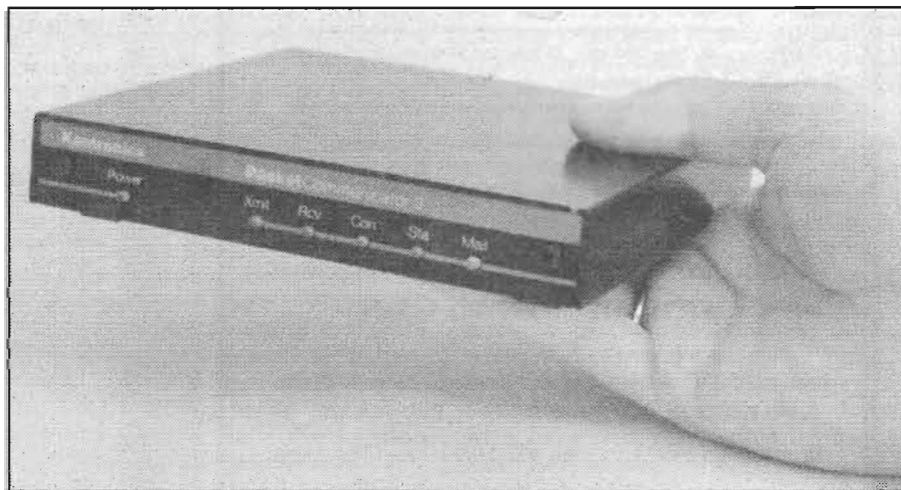
pioneering KA-Node plus a 'PBBS' personal mailbox (again pioneered by Kantronics in TNC software). 'Host' mode and 'Kiss' mode are also selectable, for networking use with the TNC controlled from your computer. Relatively new additions are that of a selectable carrier detect, either *internal* (from received audio), *software* (from 'intelligent' packet data detection), and *external* (from an external input, e.g., a DC squelch output from your rig). Software carrier detection is very useful, as it lets you run your rig with the squelch totally open to save you missing some off-air packets due to your receiver's squelch rise time, the overall effect being to reduce on-air retries and thus reduce the dreaded congestion many of us suffer!

Battery Power

The KPC-3 will run from a supply of anywhere between 6V and 25V, and there's a cutout inside the KPC-3 case for you to fit a 9V PP3 size battery to power the TNC. You just need to add a suitable battery clip, soldering the wires as instructed in the manual. You can select the front panel LEDs to be 'off' to conserve battery current, with these extinguished and the carrier detect set to 'internal' the TNC draws a minuscule 15mA when no signal is received. Plugging in an external supply automatically disconnects any internal battery you've fitted. Together with the TNC's thin profile (it measures 21mm x 133mm x 133mm) this makes it a candidate for portable packet operation, especially for emergency use on a hill top with its KA-Node and BBS facilities. A remote password-protected facility for altering the TNC's parameters is available, again useful for remote operation.

PBBS

The TNC's internal memory capacity for the PBBS and Node is 32k, how-

Manuals are supplied for both newcomers and experts
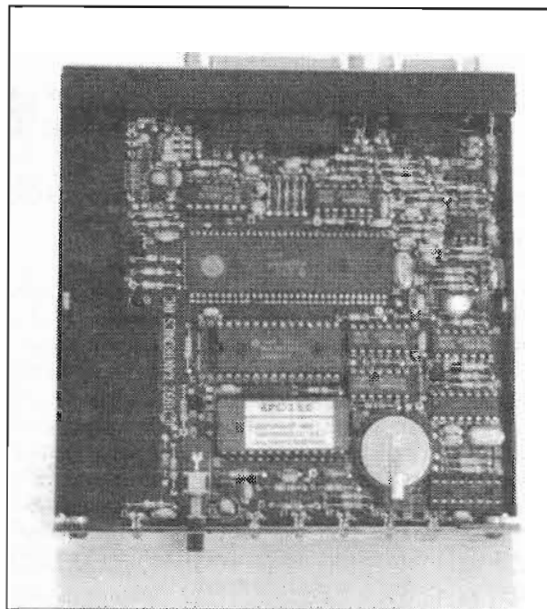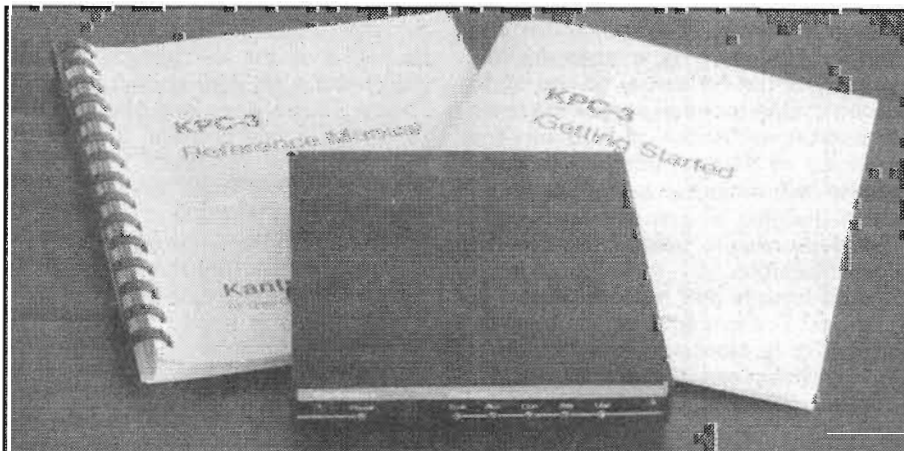
Inside the unit – note the space available for fitting a PP3 battery

ever by simply replacing the fitted static RAM with a 628128 or similar IC, you can extend this to 128k. Indeed, when 512k static RAMs become available, Kantronics have allowed for the fitment of one of these as well – that's forward thinking for you! The internal PBBS can of course accept auto-forwarded messages from your local network BBS, so you shouldn't have any worries of running out of memory if you receive lots of messages. You can also select whether the KPC-3's PBBS stores the BBS's routing headers in the message or not, and for outgoing messages it also allows reverse forwarding with an '@' field, including full hierarchial forwarding information if you wish in the message destination. A separate password-protected 'Remote SysOp' facility is also available for the PBBS, again this could be very handy indeed for a remote sited TNC and rig operating remotely.

On-Air Calibration

Another feature of the KPC-3 lies within the CALIBRATE command, where as well as generating the usual mark and space tones for deviation

setting, the KPC-3 can be set to generate a space/mark square wave. The clever bit is that, at the other end of the on-air link (your end?), you can command another KPC-3 to show you whether your receiver equalisation is set correctly. It does this by receiving the off-air mark/space square wave and displaying the ratio of the two tones on your screen, so you can adjust the receiver settings and/or the internal equalisation in the TNC to achieve a 'near perfect' setting.

WEFAX

Again, in common with other Kantronics TNCs the KPC-3 has the facility for HF Weather Fax (WEFAX) reception. You will of course need a suitable program for your computer in order to be able to received the 8-bit data from the KPC-3 and format it properly for display on your computer screen, or your printer. Kantronics for example have their 'Superfax' program available for the PC, 'Maxfax' for the Commodore 64 and 128, and 'WeFaxWorks' for the Apple Mac.

Conclusions

I used the KPC-3 for some time, both with a 'simple' terminal emulator (to check the facilities of the TNC, rather than any clever aspects of the software I was running), and with Kantronics' latest 'Host Master II+' program which controlled the TNC in 'Host' mode. The latter really 'opened up' the TNCs capabilities, and I'm a confirmed user of this software now. The KPC-3 performed very well on-air, despite my deliberate efforts in 'New User' mode to try to 'crash' it by entering various commands.

The 'New User' command set is a welcome introduction in my eyes, and I have no hesitation in recommending this unit for beginners into the world of packet.

The KPC-3 currently sells at £149 in the UK, and my thanks go to Kantronics Inc, 1202 E. 23rd Street, Lawrence, Kansas 66046, USA for directly air- mailing the TNC and software to me for review.

The Ins and Outs of 70cm Repeaters

Doug Ash G1BWW gives an introduction, and details the new linking system, of UK 70cm repeaters

Many newcomers to amateur radio soon discover their local amateur radio repeater. For many, this will be on 2m (145MHz), with the area of coverage being geographically fairly large. Whilst 2m is primarily designed for wide area coverage with mobile to mobile working, 70cm (433MHz) is designed to cover 'the community' or in most cases a town. With the increased use of dual band transceivers you will find many mobiles and handhelds, as well as home based stations, using 70cm. In some localities it is used as a way of staying in touch with other local amateurs. There are sixteen repeater channels available, twice as many as on 2m. The odd numbered channels RB1 to RB9 became available during the last couple of years, and a proposal has already been made to add a further number of 'wide separation' channels for low power, low specification 70cm repeaters. So there is still the potential to accommodate a 70cm repeater in areas that currently have no coverage. With the majority of all current Novice licensees being Class B (i.e VHF/UHF), Novices commonly contact other local amateurs via 70cm repeaters.

Remember also that getting onto 70cm is not expensive, as ex-PMR radio equipment is currently coming onto the market in increasing numbers; both handhelds and mobile units. This is due to commercial UHF users being made to re-equip for 12.5kHz spacing. Once you have the radio, all you need is some crystals for the channels you want to use, a toneburst board, plus a small amount of internal adjustments to get it working on amateur frequencies. (See the Surplus 2-way conversion handbook by Chris Lorek).

CTCSS

Whilst the number of repeaters has grown, unlike some other countries, facilities and enhancements on UK repeaters has been virtually non-existent. Whether this was due to a lack of imagination on behalf of repeater groups, or a negative reaction if a proposal was made to the Repeater Management Group of the RSGB, or the Radiocommunications Agency, I have not been able to ascertain.

One of the extra facilities which can be provided and which might exist on your local repeater is the radiation of a subaudible tone (CTCSS) along with the relayed speech. This subaudible tone is not normally transmitted whilst the Morse callsign is sent and no speech is present. This enables radios fitted with a CTCSS tone squelch facility (set to the correct sub-audible tone frequency) to only relay speech instead of that annoying Morse callsign every few minutes. This is especially useful when out in public with a handheld, or when listening at home with the XYL present!

Recently it has been agreed with the Radiocommunications Agency that repeaters may accept a CTCSS tone as a user alternative to the normal 1750Hz toneburst to access repeaters. In my area the two Bedford repeaters plus the one at Luton all radiate the 77Hz CTCSS tone squelch, with the Bedford repeaters also accepting it instead of a toneburst.

Many amateur handhelds are also now fitted with a keypad which is used to program the functions of the radio. These buttons often also permit the transmission of DTMF audio tones, when the PTT switch is operated, DTMF tones use the same frequencies as those used on telephones that are connected to electronic exchanges. In the United States there are two uses for these keypad generated tones, one is to set up local 'autopatch' telephone calls through the repeater, whilst the second use is to link up together, two or more repeaters.

Linking

In the UK, amateurs have for some time considered that there are some areas where it would be useful to connect to your adjacent home repeater whilst in the service area of a neighbouring one. Obviously this can be technically achieved, a recent example of this was the approval of the Bedford Repeater Group's proposal for the linking of their two 70cm repeaters, this being granted for a trial period of 18 months. One repeater serves the town of Bedford whilst the other covers the villages of Mid-Bedfordshire. Geographically these repeaters are at different heights above sea level, with Mid-Bedfordshire being on a plateau above Bedford.

So how *is* one repeater linked to another? The system that has been installed in Bedfordshire uses 'in band linking', this means that at both repeater sites, an extra receiver and beam aerial listen to the other repeater. Assuming that there are no users on the remote repeater, the link is enabled by a user giving a two-digit DTMF code from his keypad, following the normal 1750Hz toneburst. When repeater 'A' hears the DTMF tone sequence it radiates a subaudible tone on its transmitter output.

Repeater 'B' hears this tone via its second receiver which is listening to repeater 'A', and connects its second receiver's audio path to its transmitter. The link is then completed by repeater 'B' radiating a subaudible tone back to repeater 'A', which responds by connecting its second receiver to its audio path. From then on all that happens is that, instead of either repeater just relaying audio from its own local receiver it will also relay the audio received via the receiver listening to the remote repeater.

If this sounds a little confusing then don't worry! Users of either repeater should not notice any difference, whether the station they are speaking to is local or being received over the link. Once the link is set up, even if the remote repeater is not being used locally, it will continue to relay the other repeater. After the conversation has ceased, both repeaters timeout and the link drops. It can be set up again at any time by either user accessing either repeater with the 2 digit DTMF code applicable to that repeater. If a user tries to establish the link whilst the distant repeater is in use locally, the link will not be set up. When the link has been successfully set up, the user will hear three pips, instead of the normal one pip, when he releases his PTT button at the end of the DTMF code sequence. Because each repeater relays the other's audio, special provisions have to be made in the software to ensure that neither repeater will transmit locally the Morse callsign of the remote repeater.

For those people who do not have a DTMF keypad on their handheld or microphone, a suitable pad which can be held over the microphone is available from such well known shops as Tandy. These pads are often sold at rallies for a few pounds. Besides the trial linking of repeaters in Bedfordshire, two other trials have been proposed one, in Wales and one in Scotland. If the Radiocommunications Agency decides that the linking of repeaters does not create any new problems, then it is hoped that this may become a regular facility on a number of repeaters in the future.

From My Notebook
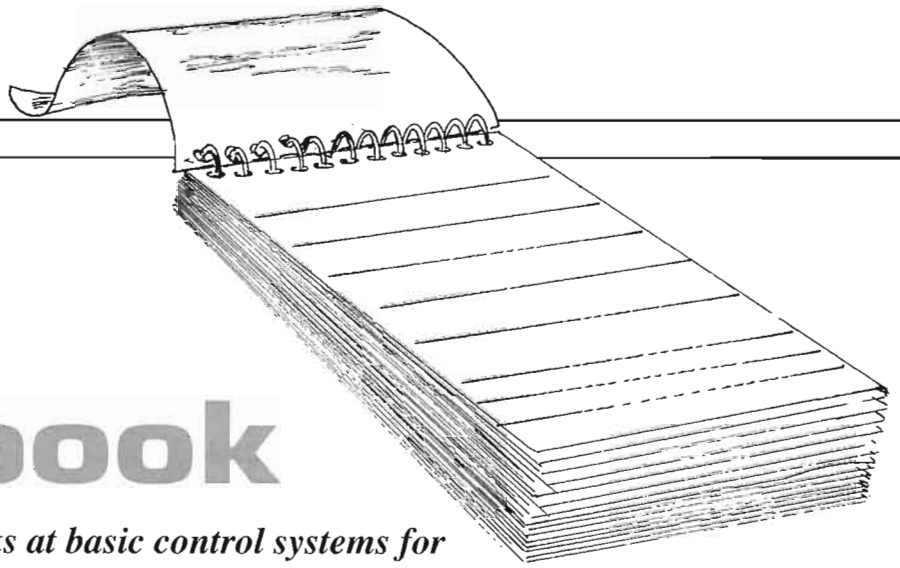
*Geoff Arnold G3GSR looks at basic control systems for your station*

Although the equipment importers will no doubt disagree with me, I think that it's a shame that amateur radio is no longer a mainly constructional hobby. There are a few areas where the DIY side still runs strong, though. Top of the popularity stakes must still be experimenting with aerials, with converting surplus commercial gear to the amateur bands running a pretty close second. A third area is devising and building control systems and gadgets to make the actual operation of a radio station easy and efficient, and there's nothing quite like something custom-engineered to suit your own requirements.

Over the next couple of 'Notebooks', I shall be using some simple examples to explain a few basic ideas which can be used and adapted in all sorts of different ways, plus one or two safety points to watch out for.

Send/Receive Switching

The time-honoured method of manually controlling the send/receive changeover in a transceiver is by using a relay with its coil connected between a live supply rail (typically the nominal +12V in modern amateur equipment) and 0V (earth), with the press-to-talk (PTT) switch in the lead between the relay coil and 0V. You can do it the other way round, switching the live side and having a permanent connection between the relay coil and 0V, but the usual arrangement of a PTT circuit is shown in Fig. 1.

The resistance of the coil in a relay intended for 12V operation will lie somewhere between about 100 and 1k ohms – the 'beefier' the relay contacts, the lower the coil resistance. Big, heavy contacts which normally have wider gaps require more physical energy to operate them than those in a small, low-current relay. Reducing the coil's resistance increases the current flowing through it, giving a higher ampereturns figure and therefore a greater magnetic force. As an example,

Fig.1
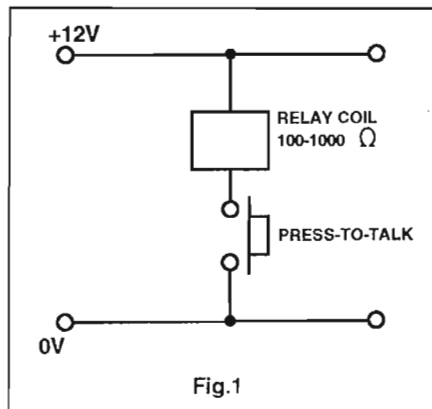
the familiar 'Continental' plastic cased, plug-in relays with two changeover contact sets have a standard coil resistance of 185 ohms for the 12V version, giving a nominal operating current of 60mA.

While the PTT switch is open-circuit (i.e., button not pressed), there will be +12V on the upper contact in Fig. 1, since no current is flowing through the relay coil, and there is therefore no voltage drop across it. If you connect a high-resistance DC voltmeter across the switch contacts, it will indicate 12 volts when the switch is open, and zero volts when it is closed. Instead of the voltmeter, you could connect a logic or comparator IC, and use it to tell some other circuit when the transmitter is 'on-air'. What you almost certainly could not do is to connect a filament lamp across the PTT switch, hoping to have it alight in the receive condition, but extinguished whilst transmitting (an unlikely requirement, I know, but I'm only using it to explain a principle, so please bear with me).

Connecting the lamp (or any other low-resistance monitoring circuit) across the switch would turn the relay-plus-monitor circuit into a potential divider, in which it would be quite possible that the relay would be operated all the time. That 12V 'Continental' DPCO (Double Pole Change Over) relay has a specified operating range of 5.5 to 17V, which means that it will 'pull in' with

5.5V or more across its coil, but will overheat if greater than 17V is applied. That 5.5V minimum operate level is of course slightly less than 50% of the nominal working voltage, so connecting a circuit with a resistance of less than 185 ohms (the same value as the relay) across the PTT switch will result in the relay being permanently energised.

'On-Air' Indicator

So, you can't connect a 'receiving' indicator lamp across the PTT switch, but what you could do (it's rather more useful, too) is to connect a lamp across the relay coil (Fig. 2), so that it is alight when the PTT is pressed. You could even put the lamp above your shack door, to warn members of your family not to stick their heads in and shout something rude when you've got the microphone live on air!

Fig.2
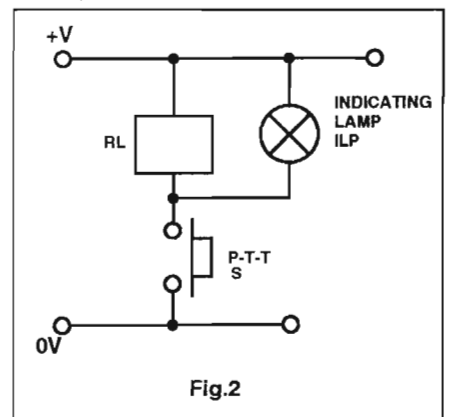
What happens if you've got more than one rig, perhaps on HF and 70cm? You can't simply parallel the two PTTs and connect them to a single lamp (Fig. 3), because pressing one PTT would then key both transmitters (the cross-connection could even damage one or both of the rigs, depending on their design).

What you could do is to run two cables and put two lights (or as many cables and lights as you have rigs) but that's not the simplest or cheapest way.

By the simple addition of two diodes to the circuit of Fig. 3, the two PTT circuits can be kept isolated from each other, whilst both connected to a single indicator lamp (see Fig. 4). When S1 is closed, RL1 will be energised, but the circuit via indicator lamp ILP and D1 will also be completed. D1 will be forward-biased (anode positive with respect to cathode) and will conduct, lighting ILP. But what happens to D2? Its cathode will be positive with respect to its anode, so it will be reverse-biased and non-conducting. Closing S1 will therefore have no effect on the circuit RL2/S2. Closing S2 will similarly have no effect on the RL1/S1 circuit.
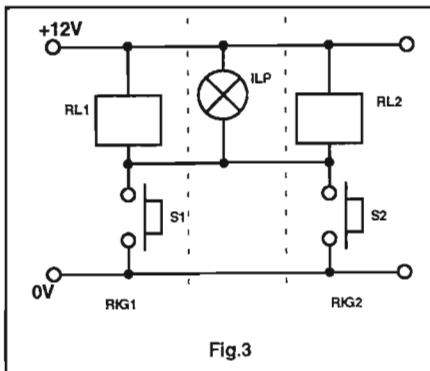
Like many bright ideas, there's a

Fig.3

possible snag. You will notice that I've shown a common +V and 0V rail for both rigs and the lamp. But if the 'top end' of each relay coil isn't fed from the same voltage, you could have problems, typically where the rigs have independent power supply arrangements. For example, a large HF rig might be run from AC mains with an internal PSU with various internal supply rails. Even rigs designed for operation from an external 12V supply will not necessarily use the same voltage for their PTT or keying line. Some mobile VHF and UHF rigs use a 'potted-down' 8V line for the PTT, for example.

Basically, if the open-circuit voltage at the live side of the PTT is not the same on all the sets which are commoned via diodes to the one lamp, you could have problems. Consider the case of Rig 1 having +12V at the PTT and Rig 2 having +8V at the PTT, in other words, the top end of RL2 is fed from +8V. If ILP is connected to +12V, there will be a net 4V across ILP and D2, with D2 forward biased. It won't affect Rig 1, because D1 will still be reverse-biased, but ILP may glow dimly.

One solution would be to connect the top end of ILP to the supply line used for the PTT with the lowest working voltage. However, that may not easily be accessible, and in any case it may not take kindly to having an extra load of upwards of 60mA connected to it for the lamp. The easier way out is to
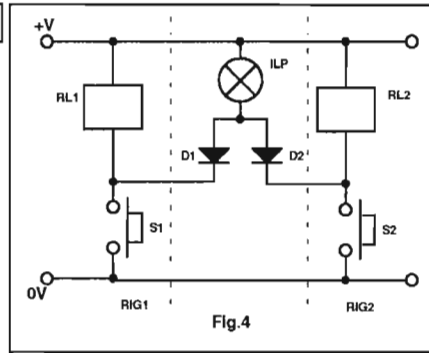
Fig.4

use a separate supply for the lamp, of a voltage lower than the PTT voltage in any of the rigs which it is monitoring. A separate +6V supply would be suitable in this case, and of course the lamp should be rated at 6V as well. In the circuit of Fig. 4, the lamp ILP will light if one or other, or both, of the rigs have their PTT switches closed, just like a logical 'OR' gate circuit.

Multiple Keying

You could adapt exactly the same logic principle to control two independent circuits from one switch – to key two transmitters simultaneously from one Morse key, for example – without in any way compromising their separate use. The circuit of Fig. 5 shows the idea. In a single-operator station, you could avoid the expense of three separate Morse keys by switching one key between the transmitters. Normally, this would require a 3-pole, 3-position
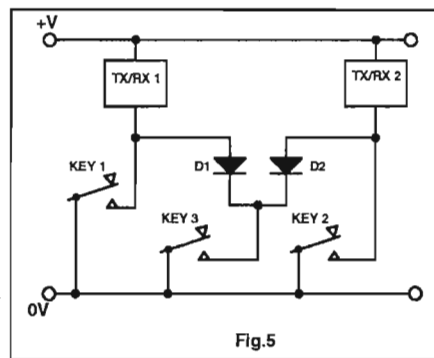
Fig.5

switch to keep the keying lines of the two transmitters separate except when both are to be keyed together. With the addition of two diodes, it requires only a single-pole switch, as shown in Fig. 6.

With any switching circuit, there will always be certain ranges of 'high' and 'low' levels which will provide reliable operation. You will probably have come across tables of acceptable logic
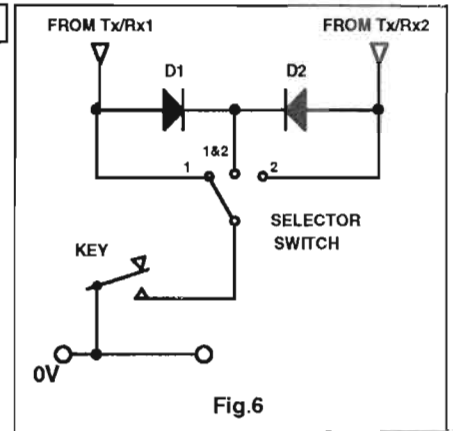
Fig.6

levels for TTL and CMOS logic circuits, for example. For some circuit arrangements, the resistance in the keying or switching line can be crucial.

There are two resistance values to be considered. First of all, the resistance when the switch contacts are open. It doesn't have to be a physical resistance (like the lamp I mentioned earlier) connected across the switch, for leakage across inadequate insulation can sometimes upset things.

Many years ago, I was involved in acceptance trials on a newly fitted shipboard radio installation. The connection between the Morse key and the main transmitter (all valves, with a high impedance electronic keying circuit), had been taken via a 3 point jack and plug. Tests were going well until it was discovered that the transmitter went key-down as soon as the key was plugged in. To cut a long story short, after a lengthy series of checks it was found that the jack-plug, a Post Office pattern intended for use on telephone switchboards, leaked quite badly between its contacts when called upon to carry the 250V or so present in the keying circuit during key-up. We stripped out the jack, cut a bigger hole in the control console and fitted a hefty 3-pole Bulgin connector, after which the keying gave no more trouble.

The second resistance value to be considered is the series resistance present when the switch contacts are closed. Again, this can be either a physical resistance, due to connections to the switch being over-long or in too thin a wire, or the resistance due to oxidisation of the contact faces. The forward voltage drop across a series diode is equivalent to having a series resistance in the circuit. The only difference is that the voltage drop across
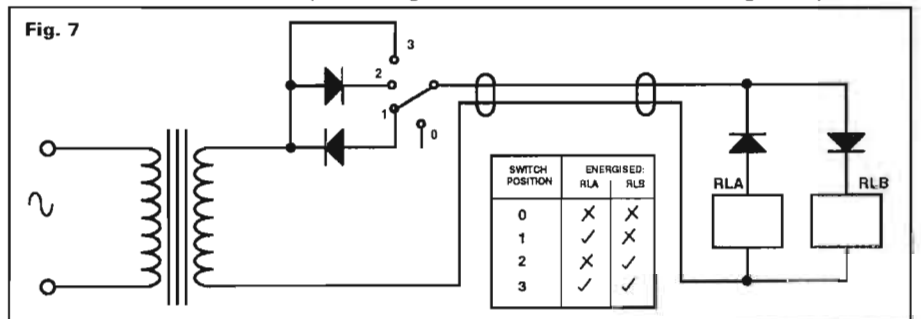
Fig. 7

SWITCH POSITION	ENERGISED: RLA	RLB
0	✗	✗
1	✓	✗
2	✗	✓
3	✓	✓

the diode stays more or less constant with varying currents through it, unlike a true resistance.

DC or AC?

The diode switching circuits I've described so far this month can only be used in DC circuits. There is however one control circuit which relies on both AC and DC for its operation, allowing several switched states over just one pair of wires.

The idea is shown in Fig. 7. With the switch in position 0 (off) neither relay is energised. In position 1, RLA is energised; in position 2, RLB is ener-

gised and in position 3 both relays are energised, the AC output from the transformer being rectified by the diodes adjacent to the relays. It might be necessary to connect a capacitor across each relay coil, to smooth the half-wave rectified pulsating DC and stop the relays buzzing. A clever idea, but I must admit I've never seen a really useful arrangement suggested for wiring up the relay contacts.

Summing Up

I admit that the examples which I've used this month to explain basic diode logic are not ones which many

people might actually use. I chose them because they've always seemed to me to provide about the simplest possible introduction to logic as a whole. Armed with a basic understanding, you are better placed to devise your own control circuit arrangements.

There are other clever things which you can do with the aid of a diode or two, and I shall be discussing a few of these next month, along with some ideas on what to look for in selecting components and circuit arrangements for control units and systems, with an eye to safe and reliable operation.
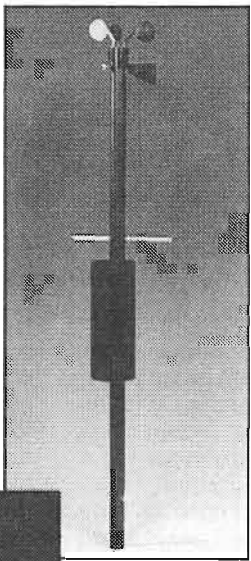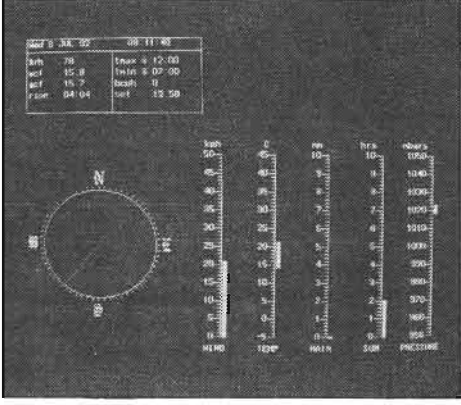
Jones Paddle Key Review

Dick Pascoe G0BPS tests an innovative paddle key
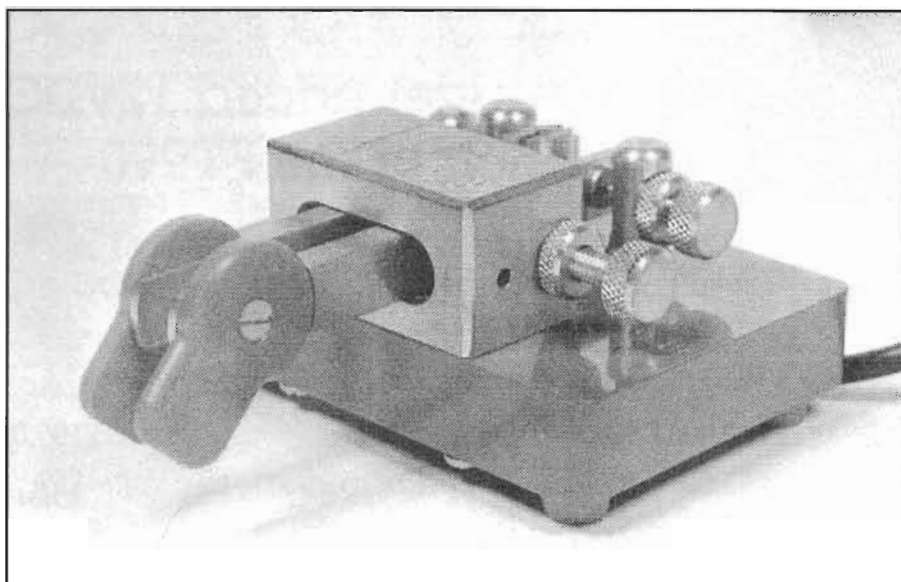
My first impressions of the new twin paddle key from Peter Jones Engineering is that it is *solid*, and that it is also *bright*! It may seem strange to comment initially on the colour of a Morse key, but the beautiful bright red base on this one will brighten up any shack.

Choices

I've been an avid Morse operator since first gaining my licence some ten years ago. I'm not a high speed merchant, so virtually any reasonable key will suffice, but like many other operators I take a delight in using the best quality equipment available to do the job. I've always been an enthusiastic exponent of the Bencher keys, tending to think of them as the 'Rolls Royce' of the Morse keys available. For those who couldn't afford a true Bencher, then a close second, and by far the best available in the UK, was always the twin paddle from R. A. Kent Engineering.

When the staff at Bredhurst Electronics decided to add a Morse key to the selection at their shop, they wanted one that would have all the facilities that all good operators would require. They first called several of their regular customers who they knew used CW, and asked them what they required of a commercial Morse key.

Construction

Most of the users' suggestions have been incorporated into this innovative key. A first look at the unit will show that the base is heavier than the norm, being made of solid steel, well painted and measuring 105mm x 75mm x 19mm. This base sits on four solid rubber feet which ensures that it stays where it is placed. I found that even at my (limited) speeds the key stayed where it had been placed. More than can be said about some other British made keys.

The bright red of the base is very nicely matched by the beautiful brass work of the key parts themselves. The bearings are enclosed in the brass case making the whole pleasant to look at, and the paddle arms are solid brass. Measuring 10mm x 6.5mm they will not be springy or show any movement at any time. The plastic pieces that extend from the brass paddle arms are fully adjustable, the circular section enables users to select the best height for the arm to suit each individual person. I have short fingers, and the height of the base from the table may have made this uncomfortable, after adjusting the arms I found that the key was very comfortable. Each user can select the height they require, which can be var-

ied at any time.

The weight of the movement of the paddles is another important factor in any twin paddle key. This has also been taken into account in the design and again it is entirely adjustable by a small spring hidden inside the threaded rods on the side of the main case. The contacts, which are the heart of any key, are solid copper with the thread on the adjusting arms being very fine so that almost any gap can be selected.

On Air

As I'm no high speed trail blazer, it was only fair that I gave another operator a chance to try out the key at high speeds. Ian G3ROO, who had been a professional radio officer in the Merchant Navy and who regularly used Morse at over 35wpm, tried the key for several days. He loves to have his keys set at lowest possible setting of resistance. He was a little disappointed but did say that he was unusual in this, most operators requiring some resistance to movement. He thought that the return action was good at speed and he also loved the finish of the key.

The 'piece de la resistance' for both of us was the final adjustment that is missing from any other key that I have ever seen. I love the Bencher and the Kent twin paddle, but remember my short fingers? With this key I can adjust the gap between the paddles to almost any that I find suitable. The base screw of the oval stanchion in between the arms can be twisted to select the paddle separation that's required, the result being a Morse key to suit all operators. I wonder how long it will be before this idea is copied by all other manufacturers!

The down side of this adjuster was the threaded hole in the top, which could have been made neater very easily. Having said that, this is the only criticism I have of what is an excellent example of British engineering.

Summing Up

The final point I'd make about this unit is the absolute professionalism of the finish. It is almost a work of art and would grace the operating surface of any amateur. I fell in love with this key the first time I used it and contrary to the advert, I couldn't afford the company so I just bought the key, my Bencher is now sitting in the 'backup box'. The key is priced at £57.95 from Bredhurst Electronics.

Project – 160m DSB Transmitter For The Novice

Stephen Ortmayer G4RAW shows how to construct an easy to make transmitter

The holder of a Novice Class A licence is allowed to use phone on HF only on 160m (Top Band) and 10m. The transmitter I've described here is for Top Band, but I've made versions for both 160m and 10m. The Novice Licence power limit is 3W output (or 5W input) so simple home made CW (Morse) transmitters can be made for many bands, however many Novices may like to try a bit of phone operation, hence this simple design. Double sideband (DSB) with the carrier suppressed is perfectly compatible for reception on SSB rigs. Spectrum conservationists may say that it uses two channels compared with one for SSB, but 2W (which is the power of this transmitter) cannot be regarded as being aggressive to other band users! I have had a lot of fun with this simple transmitter on the HF bands, one amateur even called me and said "you're using the wrong sideband"; "I can't be using the wrong one" I replied, "because I'm using both of them!".

Circuitry

The circuit is very simple. The output of the crystal oscillator is mixed in a simple single balanced mixer with the audio. The result is DSB with the carrier suppressed, this is amplified by the driver and PA to give about 2W out. The transmitter was based upon design ideas from the book 'Solid State Design for the Radio Amateur' and circuits by ZL2BMI from 'Break In'. A VFO (Variable Frequency Oscillator) could be made instead of the crystal oscillator, but the Novice would have to take care that they were transmitting in the correct part of the band, and stable VFOs are not easy to build. I used a 1975kHz crystal from my junk box, this being in the middle of the Novice section of 160m (1.950-2.000MHz). A crystal frequency may be chosen to suit local conditions, for example an established club 'net'. There may also be a proposal shortly to have a Novice calling frequency on 160m like the 3.570MHz on the 80m band, this having
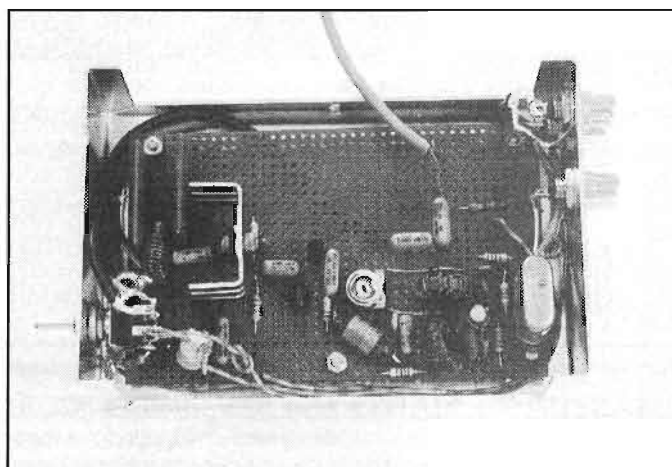
now become accepted as a Novice frequency.

Construction

The transmitter is constructed on plain perforated board, that is a board without copper strips. A printed circuit board could of course be made using a similar layout if you so wish, the layout not being critical. The board is prepared by drilling it as shown and temporally bolting two 6 BA solder tags onto it. These holes will be used to mount the board and the tags will connect the earth to the case through metal mounting bolts and spacers. The crystal oscillator is made first, up to L1, then the output checked at L2A with a diode probe, frequency counter, or by listening on an adjacent receiver. T1 is made next, for this three lengths of 26 swg are twisted together, about 6 turns to the length of 25mm. For this you can fix a hand drill in a vice and put the three wires into the chuck, wind-

ing the drill then twists the wires together neatly. The enamel from the ends should must be scraped clean, and the ends then carefully identified with a meter set on 'ohms' range or a buzzer continuity tester. The 'dot' on the diagram indicates the start of the winding. The two diodes should be matched for forward resistance on an ohmmeter, when you see 100 diodes for £1 at a rally you may think you'll never need that many, but this 'trial and error matching' is a good excuse for getting a few spare for your 'junk box'. The remainder of the transmitter can now be completed and your construction then carefully checked for correct soldering and the like.

L1 = 50 TURNS 28SWG ON T 50 2 TOROID
L1A = 8 TURNS OVER L1 28SWG
T1 = 10 TURNS (TRIFILAR WOUND) ON FERRITE TOROID (26SWG)
L2 = 30 TURNS 26SWG ON T 50 2 TOROID
RFC - 2 & 3, 8 TO 10 TURNS 32SWG ON A   FERRITE BEAD
RFC1 = 1mH

* DOT MEANS START OF WINDING

* HEAT SINK

Setting Up

Connect a dummy load of 50 ohms to the output (two 100 ohm resistors of

Components list

Resistors (1/4W carbon film);
R1 4k7
R2 10k
R3 220R
R4 270R (see text)
R5 100k
R6 1k5
R7 10k
R8 220R

Capacitors;
C1 390pF
C2, C4, C5 1nF
C3, C9, C10, C14 0.1mF
C6, C8 0.01uF
C11, C12 1n8 mica or polystyrene
C13 100uF 16V electrolytic
C7 0.22uF (see text)
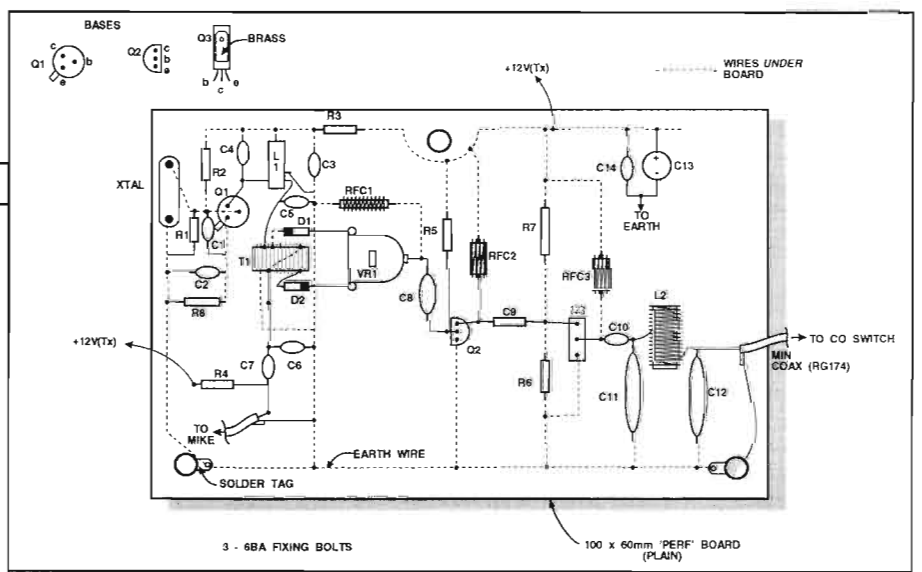
Transistors;
Q1 BC107
Q2 BC549
Q3 BD139 (with heat sink)

Diodes;
D1, D2 1N4148 (matched for resistance)

Misc;
L1 50 turns on T-50-2 toroid
L1A 8 turns over L1 both 28 swg enamelled
T1 10 turns trifilar on ferrite toroid
L2 30 turns on T-50-2 toroid
RFC1 1.0mH RFC2,
RFC3 8-10 turns 32 swg on ferrite bead
VR1 220R min pot

Fundamental crystal in Novice section
2 pole changeover switch
Plugs; Aerial, RX, and 12V
Perforated board; 100 x 60mm
Metal case; 120 x 80 x 40mm
Carbon mike (see text)

driver and PA stages and being amplified. I used a carbon mike insert from an old phone (but please don't go vandalising phones, as they aren't carbon any more!), this is connected into the mixer using a second lead, adding a plug and socket if you wish to connect and disconnect it. *(You can get carbon mikes from J. Birkett, 25 the Strait, Lincoln, LN2 1JF, at 50p each plus 60p p/p - Tech Ed).*

On Air

I have tried these simple rigs on other bands and during 'on air' tests I have had some very amusing comments like "turn up the mike gain". Well there is no mike gain but you could

1W rating are OK for short QRP loads). A good whistle into the mike should give some RF output! VR1 should be adjusted to reduce the carrier to the minimum possible, i.e., minimum output power with no modulation. The output can be monitored either on a simple meter with a diode probe, or an oscilloscope (if you have one) connected across the dummy load. Alternatively you can set this 'on air' with the help of another amateur. Theory says that you should be able to get 30dB of carrier suppression, I typically managed about 20dB, funny things these decibels! If you don't achieve enough carrier rejection then will simply sound like AM to a nearby station. Finally, I'd suggest enclosing the oscillator and the mixer in a shielded box, this should help prevent RF getting into the

try speaking louder! To change this, you may vary the values of C7 and R4 slightly to suit your voice or the mike you use. "Are you using a speech processor?" is another remark I have had, "Your audio sounds punchy as if you have a processor on" was another. Well old hands will tell you that they used to 'bang' their carbon mikes to re-arrange the carbon granules, but I don't know if punching this mike helps! The transmitter can be housed in a small aluminium box (Minnfords A20) with the TX/RX switch mounted on the front, with added sockets for the aerial, the receiver, and the 12V supply (I used phono types for these). During transmit periods you will of course need to mute your receiver, and two diodes back to back in the receiver lead will help to cut down the RF to the receiver to prevent front end overload during TX periods. My thanks go to G3MMK, G3ABS, and G3KKP who helped with on air tests, Desmond G3ABS said the audio was better than my 2m FM rig!

SCANNERS INTERNATIONAL

From the Editor's Desk

At *Scanners International*, we've been getting reports that a number of scanner owners have been having strange 'reception problems' when scanning across UHF FM channels.

It seems their receiver squelches have been opening to the sound of weird, strange sounding noises, on channels which in the past they've found clear sounding FM communication. 'Has my receiver gone faulty?' they ask. Some have compared notes with their friends, who are also receiving the noises, and ask 'is it an atmospheric problem?.

Veteran readers of *Scanners International* will know that certain users of the radio spectrum have been aware that their communications may be overheard, and that the sensible answer was, not to abolish the sale of all scanner receivers, but to simply scramble their transmissions. Well, it's happening, and that's undoubtedly what the 'weird noises' are!

A Good or a Bad Thing?

We've maintained in these pages that this is the right way to go. 'But it's spoiling our fun' you say! Tough luck, you shouldn't be listening to the police and other such users. Look at it this way, if you get caught then you'll have your knuckles severely rapped, you may even end up 'inside', as others have done simply for listening and noting down frequencies. If many such listeners get caught then it brings our hobby into total disrepute, so law-abiding people such as little Johnny who likes listening to airplanes won't even be able to walk down the street holding a scanner without the fear of arrest.

This still didn't stop one prospective purchaser of a 'top of the range' scanner from telling the supplier 'I'm paying a lot of money for this scanner, at £xxx it should have a descrambler fitted as standard'!

Descrambling

There'll no doubt be people who'll try and overcome this. There are many forms of scrambling of course, some of the simpler 'analogue' codes are fairly basic, but digital technology is now commonly used for communication which needs to secure from reception by determined people (such as criminals and foreign powers). Our study of the numbers of available 'key fill codes' for commonly available digitally encrypted scramblers means that determined 'hackers' may be at it for several years, and that's after they've come up with a suitable descrambler circuit! Then the radio user simply changes their scrambling code, the next day for example, and it takes another few years to 'crack' it. So the moral is, you might as well forget it.

A New Freedom?

This may be the start of a trend towards radio users, who don't want their communication overheard, actually doing something about it. This could also mean that scanner owners won't have to be so afraid in the future, for fear of legal action. Look at it another way, there are many, many aircraft and marine communication listeners, who (possibly rightfully) believe this to be 'a harmless and educational hobby', often attached to their love of other things such as aircraft, boating and so on. Listening to this communication, by someone in the UK, is currently illegal. Scrambling these types of international safety communications would probably be unlikely, so could this be a 'first step' to the law being eventually changed?

Come and Meet Us!

One of the yearly 'highlights' in the scanner enthusiast's diary around the end of October is that of the annual Leicester Radio Show. This year it's again being held at the Granby Halls in Leicester which is well signposted. You'll be able to meet the Argus Specialist Publications team there on our stand (just turn right as you walk through the entrance doors and you'll see us). It takes place on the 23rd and 24th October this year, so why not come along and meet us? Maybe even take out a subscription to your favourite ASP magazine? (you'll be amazed at the number we publish). It's also the show where many traders launch their latest offerings – we know that a new 'basic' receiver from AOR is 'on the cards', could this be the venue for the first showing? At last year's show we revealed the new AR-1500 on our stand, and gave away an AR-2000 scanner in our free contest, you'll have to come and see us to find out what we've planned this year! Whatever happens, there'll be plenty of scanners on display on the many trade stands, with plenty for you to also try out, along with heaps of other amateur radio receivers and transceivers to look at. Even our resident ASP photographer Manny bought the 'scanner of his dreams' there, and if you're thinking of going equipment-hunting don't forget to take along the 'Buyers Guide' you'll find specially printed in this month's issue. See you there?

Scanners by the score on show, a selection of handhelds shown here with the handy JIM power supply unit (made by Solid State Electronics, Southampton).

Satellite Rendezvous
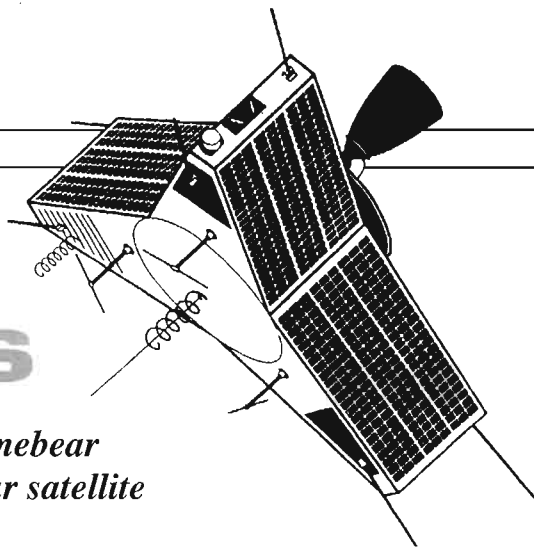
AMSAT-UK News collated by Richard Limebear G3RWL, including the offer of a free amateur satellite book

Oscar 13

First, here's a warning about AO-13 Keplerian elements. Some copies of the NASA 2-line Keplerian Elements for AO-13 are wrong, e.g. the sets with Epoch 151.59699146 and 194.98725910. *Do not use* these elements as they are *incorrect* and will cause your favourite tracking program to produce *erroneous* output – you have been *warned!* AMSAT-UK suggest you use the set with an Epoch of 184.02025280 or one of G3RUH's AO-13 Smoothed Keplerian Element Sets.

Following on from last month, where the reorientation of the satellite was detailed, shown here is the latest calander of events for Oscar-13 until the end of this year. A reminder that up to date information about AO-13 operations is always available on the beacons, 145.812MHz or 435.658MHz in CW, RTTY and 400 bps PSK.

Did you manage to contact the JW/DL6DBN/P satellite dxpedition from Svalbard/Spitzbergen on the B transponder, which occurred around the end of July?. He had to carry the whole equipment by himself, so operation times were planned to be limited to a maximum of two hours each day and an EIRP of less than 200W. He'll only QSL to stations which were not stronger than the beacon, and QSL cards should be sent via his home call and preferably via the bureau.

Oscar 10

There's a mystery with the AO-10 orbit numbers; they seem to be too low by about 2800 revolutions. Anyone with any ideas why this might have happened are invited to contact Peter DB2OS either direct or via AMSAT-UK. As a consequence of this, don't trust the 'Satellite age' and 'epoch revolutions', which are both in error in InstanTrak displays.

Oscar-10 was launched nine years ago and at the time of writing it is still usable for transponder service; 70cm uplink and 2m downlink. As usual, please *do not* attempt to use it if you hear the beacon or the transponder signals FMing. Finallyon Oscar-10, see below for the offer of a free book on this satellite.

Russian Satellites

RUDAK has been operational with the 'software' FM repeater (DSP) for some time now (uplink 435.016MHz, downlink 145.987MHz). The FM mode is in continuous operation at the present time and is not being interrupted by ranging or telemetry broadcasts.

At times the receiver was so sensitive that it was possible to work the FM Mode with only a 1W portable rig and a 20 element crossed yagi aerial! If the receiver becomes desensitized as a result of QRM, about 10-15dB more power is necessary to put a good signal through the transponder. There is still no complete explanation for this effect.

The command team hope that AO-21 RUDAK will stay active for a while and they will continue the FM-Mode until some voice and other experiments resume. There are no plans at the present time to use the RUDAK BBS Mailbox System; the BBS hardware has been confirmed to be 100% functional and their efforts are now concentrating on the new RTX-2000 Digital Signal Processing (DSP) hardware. The FM-Mode for example is completely done by software!

Please send them your experiences with the RX-sensitivity of the FM Mode. Important is power (EIRP or with antenna), local range and elevation. Rather sensitive passes seem to be at low elevations. It looks like the RX (helix) aerial is not pointing to the earth centre. Check it out.

KitSat

By now, KITSAT-A (Oscar-23) which was launched as a secondary payload on board the Ariane V-52 mission, should be operational if all went well. As this is being written, the spacecraft checkout so far has gone smoothly. All of the subsystems and payloads have been tested, and apart from finding a lizard in one of the tool boxes, there have been no surprises.

It's based on the UO-22 design with a 9600 baud PACSAT Communications Experiment (PCE) and CCD cameras for earth image processing. A new experiment flying aboard KITSAT-A that was not present on UO-22 will be the Digital Signal Processing Experiment (DSPE) which will support a variety of speech synthesis experiments including store-and-forward speech relay, voice telemetry and message broadcasts, and high-speed modulation techniques.

Kitsat's downlink will mix telemetry, experiment data, camera images and, store and forward packet facilities using the now familiar Pacsat software protocol. Both up and downlinks use 9600 bps FSK AX.25 protocol needing G3RUH 9600 bps modems with direct input to TX varactor, and from the RX discriminator. Existing UO-22 users can use their stations without modification.

Kitsat's orbit is quite different from that of Uosat 5. Its orbital inclination of 66 degrees will make its track resemble a more northerly variation of that of the Mir space station. Unlike Uosat 5 it will not be Sun synchronous in this orbit. So whereas Uosat orbits cross UK in a timing pattern repeating month after month, the Kitsat orbit pattern of 8 passes per day with acquisitions roughly every 117 minutes, will drift as a pattern in respect of the time of day it starts and finishes, more slowly than Mir's does but still quite noticeable over a month or so. The cycle starts with a dead zone between 1100-2100 and zone gets earlier day by day; it takes about 117 days to repeat (11 Aug to 5 Dec - ish).

In addition Kitsat, flying at about 1330 km, is much higher up than Uosat 5. So each pass will be in range of UK for much longer than Uosat 5, allowing far more user access to a wider footprint of simultaneous users.

Pacsat Software

The latest word from the Pacsat software team is that the new code to allow AO-16 and LO-19 to use the new PB (and thus to broadcast the directory information) should be operational before the end of July.

SAREX Mission

On the STS-47 Space Shuttle 'Endeavour' misson planned for mid-September, Flight Engineer Jay Apt N5QWL and Scientist Mamoru Mohri 7L2NJY are due to have operated 2m FM voice and packet. Together with this, 'robot' QSOs are planned to be accomodated with successful connects being issued a contact number by the robot, the packet callsign being W5RRR-1. If you managed to work the shuttle, then QSL details are via N5QWL, 806 Shorewood Drive, Seabrook, Texas 77586 USA. Include either a self-addressed US stamped envelope ($0.50 of US postage attached for non-US stations), or a self addressed envelope with appropriate IRCs. Include the Callsign worked, Date, UTC, Mode, and Frequency. For packet contacts, include the QSO number issued by the robot. SWL QSLs; include the Callsign heard, Date, UTC, Mode, and Frequency.

AMSAT-UK News

AMSAT-UK, who are the UK affinity group for amateur radio satellites, still have a large number of Oscar-10 Technical handbooks that they don't want any more. It seems a shame to just toss them in the bin. As well as describing the satellite it includes other basic information such as groundstation equipment *(and a good deal of interesting information on elliptically orbiting satellites – of relevance to all Phase III AMSATs – Tech Ed)*. If you would like one of these books, *free and without any obligations*, please send an A5 size envelope (around 240mm x 175mm)

THE AMSAT - UK OSCAR 10 HANDBOOK

AMSAT Phase 3

International Satellite

MARCH 1985

The Oscar-10 Handbook, yours for the asking from AMSAT-UK

with a 36p stamp on it to AMSAT-UK at the address below, don't forget to say it's for the Oscar-10 book *(we at HRT presume this generous offer stands only for as long as stocks last, so don't hang about!)*.

For further information about AMSAT-UK contact; AMSAT-UK, c/o Ron Broadbent, G3AAJ, 94 Herongate Rd, London, E12 5EQ. A large SAE gets you membership info (plus an Oscar-10 book if you add enough postage!) and SWLs are of course very welcome.

Calendar of events for Oscar-13 to the end of 1992				
Date	Event	Modes	Sun Angle	SEL/SAZ
1992 Sep 21 [Mon]	Move to 180/0	B JL S	-1 to 29	-2/241
1992 Nov 23 [Mon]	Move to 210/0	B JL S	-29 to -4	33/305
1992 Dec 14 [Mon]	L OFF	B — –	-27	33/333
1992 Dec 28 [Mon]	T.B.A.		43	29/351

KEPLERS							
SAT:	OSCAR 10	UoSat 2	AO-13	PACSAT	DO-17	WO-18	LO-19
EPOC:	92199.99241900	9218.58455609	92184.02025280	92199.77545685	9217.06646905	92196.75265515	92201.11335470
INCL:	26.6608	97.8477	57.2410	98.6439	98.6438	98.6439	98.6438
RAAN:	73.4038	233.2242	16.1908	281.9676	279.4014	279.1348	283.5803
ECCN:	0.6036720	0.0012516	0.7284864	0.0012553	0.0012764	0.0013216	0.0013641
ARGP:	1.1541	354.9765	289.6202	84.2541	90.6896	91.3505	79.7528
MA:	359.9406	5.1315	9.4138	276.0072	269.5750	268.9191	280.5195
MM:	2.05881926	14.68610507	2.09726215	14.29720770	14.29846360	14.29837764	14.29922976
DECY:	-2.9E-07	4.78E-06	-1.63E-06	1.06E-06	1.08E-06	9.8E-07	1.21E-06
REVN:	4041	44745	3106	12965	12927	12923	12986
SAT:	FO-20	INFORMTR-1 AO21	UO-22	RS-10/11	RS-12/13	Mir	
EPOC:	92195.2489950	92205.81805100	92205.74678297	92205.47282882	92203.87923551	92205.84149550	
INCL:	99.0750	98.9469	98.5074	82.9290	82.9235	51.6250	
RAAN:	108.9495	295.8182	280.5621	121.5779	167.0386	63.4571	
ECCN:	0.0541281	0.0034461	0.0007092	0.0012158	0.0027535	0.0002810	
ARGP:	133.9087	214.9889	194.5769	143.6087	244.8826	325.6111	
MA:	230.8038	144.9004	165.5213	216.5880	114.9476	34.4801	
MM:	12.8321175	13.74489828	14.36678584	13.72290698	13.73996683	15.53001704	
DECY:	-3E-08	7.8E-07	1.76E-06	1.76E-06	3.2E-07	1.4105E-04	
REVN:	11384	7433	5350	25476	7316	36798	

Packet Radio

Roundup

HRT's SysOp G4HCL looks at a Russian TNC, a British software package, and USA upgrades

We've been used to TNC offerings from the USA, there's one reviewed in this issue, and some of us have built TNCs either from commercially-available kits as clones of the 'classic' TNC-2. An advantage here is that of 'common' plug-in EPROM software between different 'makes' of TNCs, which extend their scope somewhat. The latest commercially-made TNC I have in my shack doesn't come from the West, but from the Compas-R company in Moscow. It's a TNC-2 clone, and I recently found a well-respected packet pioneer in

Germany had two of these Compas-R TNCs which he used – they get about a bit! Compas-R are currently setting up a distributor for these in the UK, and at current prices it looks like they could be an economic alternative to western-made TNCs. If you're interested, drop me a line and I'll put you in touch with the right people!

Lan-Link V2.00A

Back to the UK, as promised here's a rundown on the latest release of Lan-Link, written by that well-known British software author Joe Kasser W3/G3ZCZ. It's version 2.00A (the recently released Version 2.00 was quickly updated by the 'A' version as a 'bug fix'). It's designed to support most packet- only TNCs as well as the KAM, PK-232 and MFJ-1278 all-mode units for Morse, RTTY, AMTOR and ASCII, automatically optimising the configuration in each depending on the mode you select. It also has the honour of being the first packet software to be used in orbit around the Earth. I can't hope to detail all the features offered by the program, this would easily fill a complete book, indeed the on-disk manual comes to over 170 pages. But here we find the advantage of shareware, a 'try before you buy' system, which Lan-Link 2 is, but here's some of the program's offerings together with some of my findings in use.

For packet, it gives the 'usual' split-screen operation, with pop-up menus and screen colours which you can set to your own needs. As well as 'manual' use, it allows automatic connect at-

John G8OQN puts the finishing touches to the GB7SW SUNPAC node
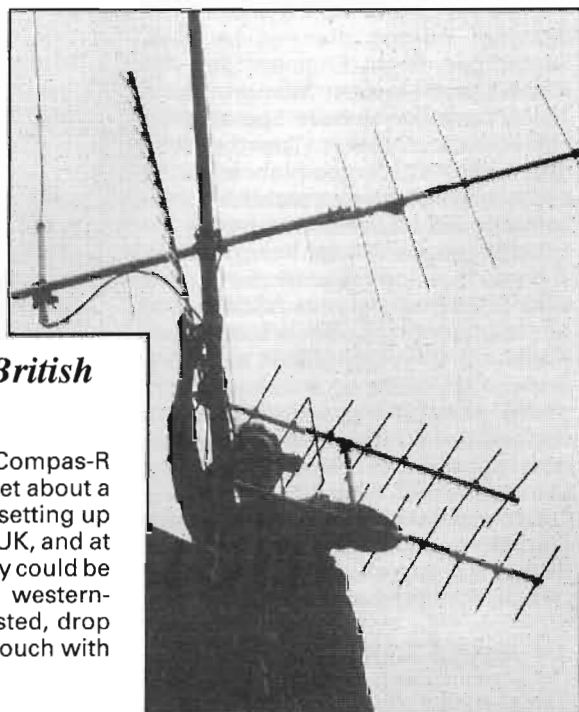
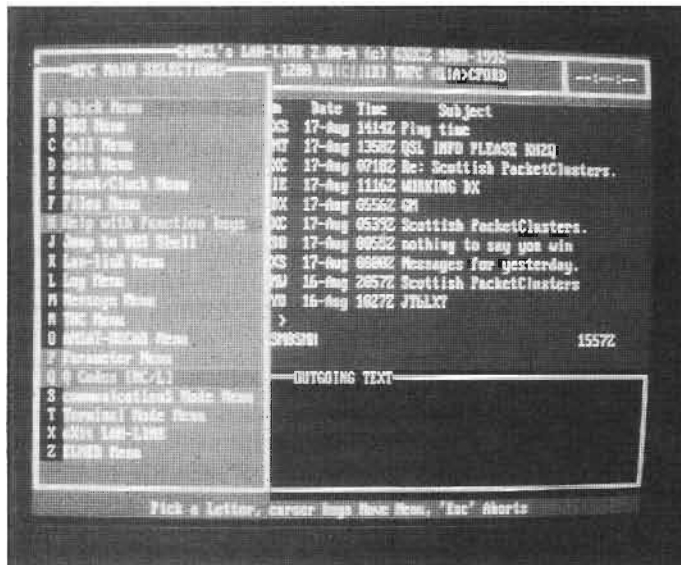Dave G4WPT places the SUNPAC GB7SW node 23cm beam into place

tempts to your local PacketCluster or BBS, and it can even 'watch out' for your callsign in the 'mail for' beacons from the BBS, then automatically connect to it and download your messages for you. A 'Zap BBS' facility allows you to automatically connect to a BBS at a preset time (like the middle of the night) to downloading bulletins and the like onto disk, and a 'Zap PacketCluster' will issue a connect to your local cluster, then automatically issue your pre-stored commands before returning to manual operation.

As well as selectable 'alert indictors' showing you that certain callsigns are on-air, it gives you the facility of easy multi-stream switching (to work your many friends!) with different screen colours for received packets, and for when times are quiet an automatic 'beacon mode' can be set up to let others know you're around.

An automatic 'contest' (or 'DXpedition') mode is available where the program will call CQ and either work the connect or keep going after disconnect. For this and for 'normal' use, an automatic logbook is incorpo-

Pop-up menus act as a 'memory jogger' for Lan-Link

A typical on-air Lan-Link screen

rated in the program (with separate VHF and HF logs for all-mode units), storing log files in dBASE 3 format. These can, for example, be processed by the DBASE log book package in PC-HAM for indexed listings, tracking of DXCC and other awards, as well as being scanned, edited and so on within the Lan-Link program. A 'SAREX' (Shuttle Amateur Radio EXperiment)

Easy setup of Lan-Link through on-screen menus

mode, for attempting communication with MIR, SAREX, and Microsats, allows automatic connect requests as soon as their callsigns appear on frequency, a 'smiling face' character appearing next to the '>' prompt when successful connection is made! If you do happen to get the chance to operate packet from space yourself, you can contact Joe G3ZCZ for a special EPROM for your TNC to use with Lan-Link, remember it has been done before....!

The program also offers various facilities for AMTOR and the like, such as a selective answering machine and mailbox, and for packet you can also use the program as a LAN (Local Area Network) message store and forward. I could go on, but suffice to say that the features are very comprehensive!

I found getting the program up and running was very easy indeed, although at first I made the mistake of running the 'INSTALL' program rather than the 'LLSETUP' program (of course, I should have read the instructions first!). On-screen prompts guide you through the various setting-up procedures, and within a minute or two it was happily communicating with my TNC. I used it with Hercules Monochrome, CGA, and VGA computers, finding it best with a colour monitor which showed different incoming streams in different colours. I initially found the odd problem running with a KPC TNC, for example in trying to clear the 'MH' window (probably due to 'finger trouble' on my part), but this wasn't a problem with the two TNC2 types I used. After several weeks of use, I was still finding new things to use the program for! Why not try this shareware offering yourself? It's distributed in the UK by Readycrest Ltd, 19 Hill Chase, Walderslade. Kent. ME5 9HE (Tel. 0634 687168), to whom my thanks go for the evaluation copy of the software.

SUNPAC Shines at Summer Rallies

Now to the activities of a packet group. The SUNPAC group was formed in June 1990 to provide a focus for the improvement and expansion of the packet network along the South Coast. This summer it has become more widely known due to the displays and demonstrations mounted at the RNARS rally at HMS Mercury and the FRARS rally (Hamfest) at Wimborne, both of which the group is grateful to event organisers for allowing SUNPAC a free stall.

Hundreds of people, including several European amateurs, visited the stalls and SUNPAC Chairman Dave Jackman G4WPT told HRT; "Attending the rallies has been beneficial, both for us and local amateurs with an interest in packet. Our stall had a fairly continuous stream of people and we were able to hear the voices and see the faces behind the callsigns and BBS destinations, as well as exchange ideas, discuss problems, hear praise and criticisms of the network. It also enabled newcomers to discover the potential of the mode, and of course provided an ideal place for membership renewal, which at just £3 per annum is excellent value!"
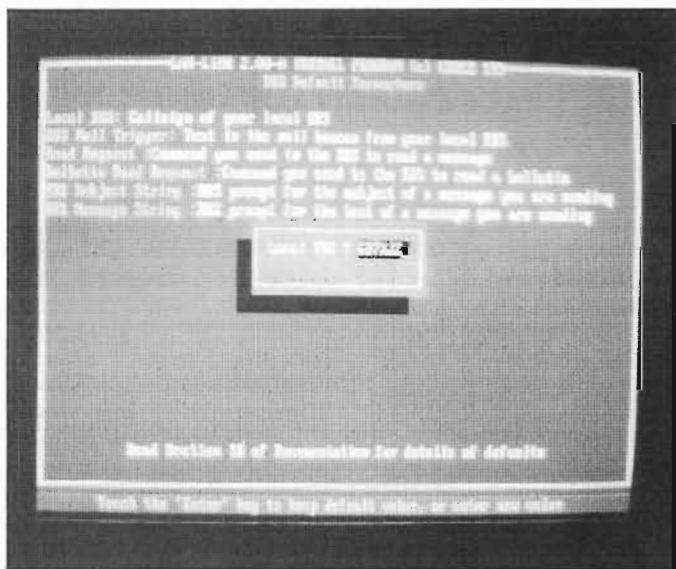
SUNPAC is an entirely voluntary, non-profit making group, with the aims of providing a forum for network co-ordination and group planning; offering support to packet users, liaising with neighbouring packet network groups and working as a team to improve the network.

A recent valuable extension to the Southern Packet Network is the SUNPAC financed and maintained four frequency node at Salisbury, GB7SW. This provides linking between GB7NW near Swindon in the North, and the

GB7BNM/GB7RS nodes in the SUNPAC region as well as giving the Salisbury area its own user access port. It is also planned to link to the Isle of Wight on 23cm in the near future. Equipment currently in use includes four Tiny 2 TNCs (running TheNet 2.08 software), three ex-PMR radios, and one homebrew transceiver.

SUNPAC welcomes new members, both beginners and more experienced operators. They would particularly like to hear from people with experience of 1.3GHz radio equipment and aerials to assist with future developments which will benefit users locally, nationally and internationally.

Anyone interested in finding out more about SUNPAC, helping with technical projects, equipment design and construction or simply joining the group, should write to: The Membership Secretary, SUNPAC, P. O. Box 73, Eastleigh, SO5 5WG, or on packet to G4WPT @ GB7BNM. My thanks go to John G8OQN, the Assistant Secretary of SUNPAC, for this comprehensive information.

Kantronics Upgrades

With my 'main' TNC being a KAM all-mode unit, I've been a keen user of Host Master II for some time. This PC
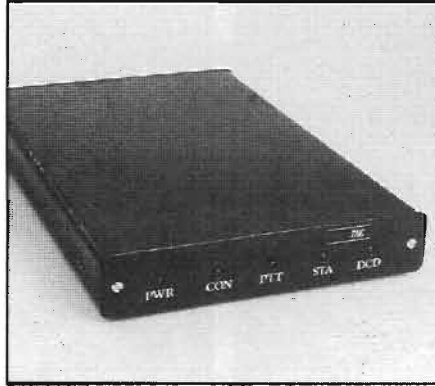
The Moscow-built Compas-R TNC2

program controls a Kantronics TNC in 'host mode' to provide a variety of functions that normal 'terminal' modes won't, such as the unique ability to monitor unconnected packet activity while you're having one or more 'connections' and allowing simultaneous mixed-mode operation on different radio ports. I recently received the latest version of this program, Host Master II+, which appears to do everything the earlier version does plus more besides. It logs your contacts, even prints the log info onto QSL labels for you, as well as providing ten 'buffers' for each mode

on which you can embed serial number, date, time, call exchange and so on onto all menu-driven from either your keyboard or a mouse. If you've got a VGA screen you can even run it in 43/50 line mode to get 'that bit more' onto your screen.

The other thing new from Kantronics is their Version 5 Update EPROM for the KAM, KPC-4, KPC-2400 and KPC-2. Amongst other improvements, this adds access to the mailbox on AMTOR mode A, gives password-protected remote on-air access to your TNC command set, and controls whether or not mail message headers are stored in your personal mailbox. Upgrading is, of course, a simple plug-in job which makes life very easy! My thanks go to Phil Anderson of Kantronics for the above.

CTRL-Z, End of Message

That's it for this month, next time I plan to look at the G7JJF packet program (supplied by Riverside Computers Shareware and PD Library, Tel. 0602 452242), and if all goes well the TNC-DL 'build-it-yourself' TNC kit. Thanks for your packet messages, do keep in touch! 73 from Chris G4HCL @ GB7XJZ, or by post via. P. O. Box 73, Eastleigh, Hants. SO5 5WG.
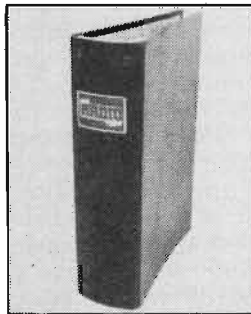
QRP CORNER

Dick Pascoe G0BPS discusses add-on audio filters to improve your receiver

I recently had the pleasure of meeting some of those people known in ancient times as the 'North Folk', as opposed to the 'South Folk'. Those with an interest in history will realise that I was in the area of Norwich in the county of Norfolk, where I found a hotbed of intrigue and much muttering of very little. The very little in this case of course being very little power. If buy now you're balled, I'd gone to the first Norfolk ARC rally held in the beautiful setting of the Hewitt School in Norwich.

Each and every rally has its core of constructors, looking for that 'last' component to finish their lifelong project, but in this area I found a higher percentage of builders, than users, of black boxes. A few questions of the show's organiser Sheila G0KWP (who had done a fantastic job by the way) revealed that the local club had a keen QRP section. They meet once a month and actually build things that work! They also help each other out with constructional problems and offer information to the newcomer to this side of the hobby. You can get more information on this group from Stuart Line G3YXO, 'Thistledown' Church Road, Swainsthorpe, Norwich. NR14 8PH.

Filters

When operating, it can be very difficult to make out the difference between two very closely spaced signals. It's very annoying when the one you want is 'buried' under another, and when a very strong station also joins in the fray things can get extremely difficult. I mentioned narrow CW filters some months ago, but of course there is another way around the problem! This is to use an audio filter between your receiver's audio output and your speaker or earphones. The optional narrow crystal filters for commercial radios are usually very expensive, and are not always available for the radio you have at any particular time. In my own Argonaut 515 QRP transceiver I have the 'optional' extra of the audio filter supplied by Ten Tec, the 208, which has several stages of filtering and works extremely well. This type works by being placed in the AGC loop of the receiver by using a plug at the rear of the rig. They are quite good, but not as flexible as some of the others available.

An add-on audio filter usually functions by limiting the passband of the audio. This may sound impractical, but I've found it does work. You may ask 'is it really worth the expense?'. The answer has to be yes, because once you have one of these units it will stay with you for ever, as it can be added to any receiver that you may purchase or build in the future. A commercially made active filter 'add-on' can cost from a few pounds to several hundred, most are really good, but do try before you buy. One of the better filters is the Datong FL3, and some of their earlier versions are also OK too. Other filters such as the SuperScaf are well thought of and should be looked at. A good quality filter will also add to the value of your radio when the time comes to part with it.

But as usual, you don't have to spend a lot of money to get the benefits of these, and you can build your own without too much expense. There are several versions around, but one that I like is one of the simplest, see Fig 1. This is a simple filter utilising just two transistors, which can be any general purpose NPN types such as a BC183, BC182 etc. This circuit shows just one section of the filter, more can be added if you like but beware of using too may sections as this will result in too narrow a filter, causing 'ringing' which you'll hear as a howl in your earphones. ICs

may be used of course and any such as the 741 will prove ideal.

QRP SSB

My remarks in this column about the new JIM handheld transceivers raised comments from Ty Nicholsen GM0LNQ (KA9WRI). Ty tends to spend the long summer evenings resting, and now gets on the air from his hammock with this 2W 20m handheld into a dipole at 8m. Ambitious you may say, but regular contacts with Alec RW1AW in St. Petersburg proved that the system worked.

Ty has also managed to work the Olympic station in Barcelona, getting a 55 report, and has also logged Hungary and Switzerland all on SSB. It does prove the fun that these little radios can generate. His only criticism so far is the VXO, and he is looking at coupling a VFO into the rig. This will make it much more versatile, albeit a little larger, which may detract from its uses.

G-QRP Club Convention

Time for a reminder of this event, which has become one of the highlights of the QRP world in the UK (the other has been the 'QSO party' at the home of Chris G4BUE). For the Convention, the home of the club's secretary George G3RJV tends to taken over by club members over the weekend of the gathering, with bodies to be found sleeping in some very strange places! The main point of this gathering is to exchange news, stories, and ideas on homebrewing. Many visitors bring along their latest homebuilt gear, and it's rumoured that Ian G3ROO's latest offering will again be a 'full' HF transceiver but this time it'll be synthesised, all home made!

This event isn't a rally in the accepted term, but a gathering of like-minded souls. If you feel that this suits you, then you'll be most welcome. Book the date now, Saturday October 17th 1992, from 10.00am until 5.00pm, at St Aiden's Church Hall, Manchester Road, Rochdale, Lancs. There will be the usual QRP attractions with lots of homebrew gear on display, plus a few traders with an leaning towards QRP (of course), a full lecture programme, bring & buy, swap with surplus sales, components and kits. Food and drink will be available and the 'not to be missed' pie and mushy peas lunch. Look out for your's truly and tell me how you are doing on the bands.

That's it for now, news and views to me either via HRT editorial, on packet via SEKBBS, or to 3 Limes Road, Folkestone CT19 4AU.
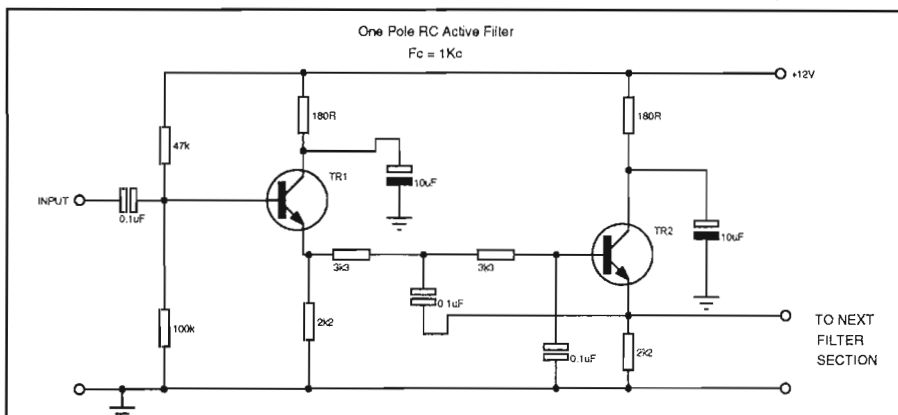

Fig. 1 Simple one pole active audio filter, Fc = 1kHz

VHF-UHF Message

Geoff GJ4ICD decides to build his own 4m/6m rig in between working VHF and UHF DX

Well July was another winner for the VHF/UHF DXer, Sporadic E was plentiful and again a 28 day reoccurrence took place, solar flux levels hit up to 176+ which is really amazing at this time of the year. Some great expeditions took place on 50MHz and at last Spain got its allocation for 6m.

50/70MHz Transceiver

Some readers may recall that some years ago Tim G4WIM designed a combined 50MHz and 70MHz transceiver, and this is available in kit form. Well this project seems to be the rage at present, and I know of many fellow enthusiasts that are currently building this all-singing all-dancing radio from the kit. This is probably due to the upsurge in both six and four metre activity.

During the past month or two, continental stations have been asking for crossband contacts from 50MHz to 70MHz, so even I have decided to have a go at this unique project! I'll bring you news of mods or tips at a later date, provided I can get the PCBs!.

Beacon List

At last, a complete European beacon list for 144/432/1296MHz has been compiled, this will be featured in the next issue of HRT. It contains over 120 European beacons, so don't miss it.

So what's been Happening?

Well firstly on Six, things have been humming. July 5th saw a return of tremendous propagation via 'ES', and again a repeat of the big June event. UX1A (KP40) put on a fine DXpedition for us all, and was worked by many UK stations. The station's QSL route is via OH2BC (don't forget to include return postage if you do this direct), OH2BC is also the QSL route for ZA1A if you worked that group during July. Both countries count for ARRL/DXCC and RSGB awards.

UA2F also put on a fine show from Kaliningrad (KO04) during the early part of the month and this QSL route is via DK2ZF. The 6th brought in similar conditions but with the addition of the

OX beacon (Greenland) at around 2000z.

On the 10th, Spanish stations were giving out their good news, that as from that date 50MHz privileges had been granted to 80 EA stations. At last more new squares to work! This permission included EA6 but not EA9 or EA8, however EA9IB and EH9MH rectified this situation a week or so later by gaining their 50MHz permits. EA8ACW was also given permission by the 20th, making in total four new countries on 50MHz to aim for.

Later on the 10th, I heard EH5CJ on 6m and 'caught' him for my 134th country, he also worked G3KOX later that day. Angelo, I2ADN/IH9 moved squares to JM66 on the 11th, the 12th brought in ZSs and 7Q7 at the usual late afternoon slot of 1600z, and Neil G0JHC (Lancashire) made it with EH6VQ (EA6VQ) for a new one.

Things went a little quiet for a few days, then on the 16th EH3ADW (Always Drinking Whisky are his phonetics) appeared and must have worked half
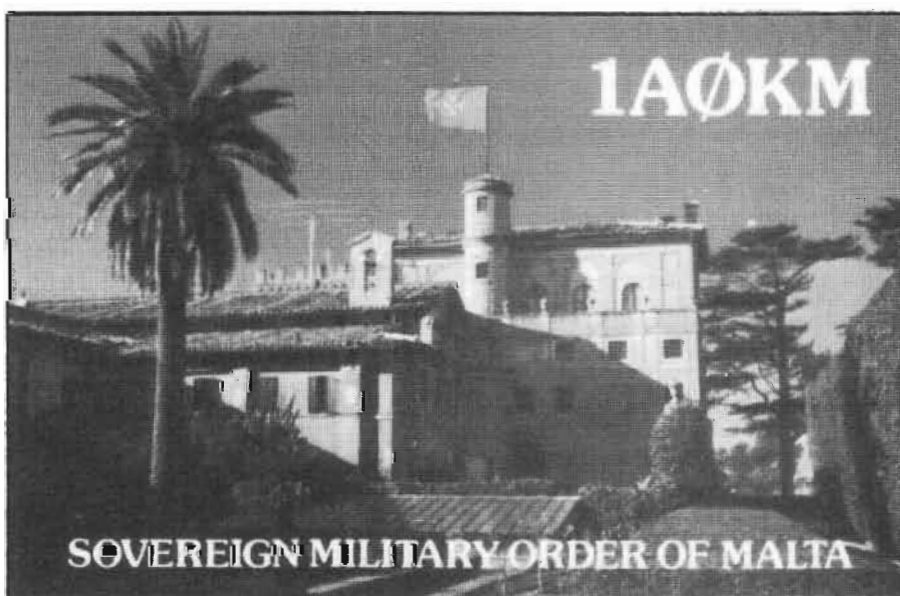
the UK. Also on the same day the OZ gang appeared from TA2 (Turkey) in KN61, and graced many UK logs with their first Turkey station (QSL via OZ1DOQ).

The 17th was reported by many and here is what was logged; I2ADN/IH9 (JM66), TA5ZA, YO, YU, I, 4X1IF, TA6/OZ1DOQ (KN62), 7Q7RM, 7Q7JL. That day, Brian G3SYC in Yorkshire was heard working, would you believe, 9K2ZR for a new one giving Brian over 100 legal countries, well done sir!

However, as my country score was being caught up I decided to put a little more effort into the band and cleaned up on the 18th with EH9IB (135), EH6VQ (136) and YL/ES9C (137), the latter QSL info is via Avro ES5RY.

The UK Six Metre Group committee had a count up of 50MHz countries worked from the UK, and would you believe that over 146 countries have been worked? If you total all the British Isles contacts made on 50MHz it adds up to over 150. Now that is the highest score in the world, albeit nobody has worked them all!

Brian G3COJ reports working EA8/DJ3OS on the 19th, and on the 20th what appeared to be another cycle repeat occurred with everything in Europe on the band. This was a very widespread event, and USA stations then started to report beacons from Europe on 6m. Nick G3KOX worked W1/2 on the 21st late at night, and Bob G3NSM worked W1 the following night. Nigel GJ7LJJ sent me a copy of his 50MHz DX (with an indoor dipole!), it reads like an HF log with most of Europe listed, proving that DX can be worked without power and large aerials, providing you have propagation!

Ela G6HKM pulled off new ones this month in the form of; ZA1A (QSL via OH2BC), 4U1ITU (QSL via I0XGR), UX1A (QSL via OH2BC), EH6VQ, EA, YL/ES9C (QSL via ES5RC) and EH9IB, just seven new countries this month!

Component 'Food Parcel' Thanks

GM1OVJ wrote to say he knows of other YOs trying to get hold of components. I will forward this info along with the next parcel to Siggy YO2IS, and I must not forget to thank you all out there who continue to send all varieties of components at your expense. These include Cliff G1TID, Steve from Kent, and John G8PKN, two more large boxes were sent on 28th July.

Nice Ducting on 144MHz

Good conditions occurred on the

14th between the North coast of Spain and Northern England, many stations report S9+ signals from IN53, 63, 73 and 83. Bob G0MOK from Bolton Lancashire sent news of his 144MHz DX, but for some strange reason it did not arrive until mid July. So Bob, better late than never, Bob's report was for June 22nd and included; HG6, OK2, Y26, YU3, I3, IC8, and IV3 stations via 'ES' with QRP.

Steve G8LGX wrote to say "What's happened to 144 and 50MHz horizontal FM?". Well Steve, I don't really know (as Les Dennis would say), nets used to be on 145.650 and 675 but vanished when packet came on the scene, can anybody help? Are there any nets around you or the Kent area?

Italian border on 432MHz

Keith GJ6TMM had the band to himself on the 18th and worked down to the Italian border, not bad for QRP. Generally from reports this band was open to OZ, PA and DL on the 6th/7th, but I am told the best was on the 18th which most people missed.

New Beacon?

Another beacon has been found on 23cm, this is FX4UHX (IN94, or the 'old' square ZE09 as it signs). Its nominal operating frequency is 1296.945MHz and it's been heard on the south coast from time to time. At 0800z on the 15th this beacon was S9+ into GJ, which is a nice distance considering no sea path.

FX3HPF on 1296.880MHz (plus or minus a bit!) has also made a comeback. This beacon seems to come and go whenever it feels like it, but it now looks to be sorted out. It signs FX3HPF and

after three cycles then gives the full info; FX3HPF JN09BP 1296.880, but I made it slightly HF on 1296.882MHz.

Italian news

On speaking to Al I0AMU, I learned that there may be no further operation on 50MHz from 1A0KM or HV3SJ. This was possibly due to damage caused to the 300 year old buildings when erecting aerials, and the trustees are now not very impressed with amateur radio. However Al has assured me that he will try to persuade them for some 1993 operations.

Brunei now on 6m

Peter Bacon, or as known to me 'Big Pete', G3ZSS now has everything set up for the Autumn openings. If you were lucky in working him in Feb/March/October/November of this year then you should now have received this beautiful QSL card. The locator is OJ74 and should be a new field for many DX fiends.

Final Final

On the 26th July an opening between JA and DL + YU took place on 50MHz, was it multi-hop 'ES'?

Well that concludes another month of VHF/UHF DX news. Please send me your news, views, and any comments you have about the bands to; Geoff Brown, TV Shop, Belmont Rd., St Helier, Jersey. C.I. or you can fax them at night on 0534- 77067. 73 de Geoff.

VATICAN CITY

HV3SJ

QSO WITH	CONFIRMING QSO						
	DAY	MONTH	YEAR	GMT	MC.	RST	2 WAY
GJ4ICD	11	7	90	1739	50	55	cw SSB

QSO VERIFIED BY I0DUD

73

☐ PSE QSL   ☐ TNX QSL