

Digicom

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of
The Midlands AX25 Packet User
Group

MaxPak

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Editor:
G0OJR Barry
E-mail: g0ojr@hotmail.com

Assistant Editor:
M0DCM Dave
E-mail:
m0dcm@blueyonder.co.uk

Chairman	G0CNG Chris	E-mail: chris.g0cng@nasuwt.net
Secretary	G4GSB Miles	E-mail: milesclifford@aol.com
Treasurer	G0KFS Albert	E-mail: g0kfs@speed-mail.co.uk
Webmaster	M0DCM Dave	E-mail: maxpak@blueyonder.co.uk

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www.maxpakgb.org.uk

Chairman's Jottings

Greetings to all our members. Welcome to this edition of Digicom. As you'll see from the other items, I and Barry, G0OJR, our Digicom Editor attended the 2003 Packet Conference on behalf of Maxpak, held at the Marconi Club in Coventry on 13th September on a very warm and sunny day. It was great to meet so many people for the first time and to put faces to callsigns. For those of you with internet access, the conference web site, at

<http://www.marcov.co.uk/pk2003>

is well worth a visit.

Onto other things.

During September, those of you who use the GB7WV nodes to access GB7MAX via WV22 or even just route through any of the WV nodes on your way elsewhere, will have noticed several outages varying from 10 to 20 hours on several weekends. On each occasion the whole lot has been QRT. Since the Mander Centre is currently undergoing major restoration, I suspect that mains electricity to the Node Cabinet has been switched off to allow weekend works to take place when the offices of Mander House are unoccupied at weekends. My apologies for these outages but unfortunately they are totally beyond my control. I'm not sure as to how long these weekend outages are likely to continue for; hopefully not too long now.

Also still no news about when the Perton GB7PP nodes are likely to return to service. Since the last issue, Tony, G7BUG and I have been busy revamping the computer setup at GB7PMB which has resulted in much more reliable operation of GB7PMB and its SALOP node, with virtually 100% availability since the work was completed on the weekend of 20-21 September, with user access ports currently available on 144.950 MHz and under test on 70.3375 MHz (but more work remains to be done on this port both to the Ascom Radio and its antenna before we consider this port to be fully reliable). SALOP/GB7PMB also have a user port on 432.675 MHz but due to current licencing limitations on 70cms this port is operated on an ATTENDED BASIS ONLY and will do so until further notice. For those of you who can access SALOP on any of the above frequencies, you may connect directly to either GB7PMB or GB7MAX. There is a fast internet link between GB7PMB and GB7MAX, so connecting to SALOP on 144.950 and typing C GB7MAX will connect you straight through at high speed.

A reminder that TELNET access to both GB7MAX and GB7PMB continues to be available (see previous digicoms for full information, or contact either myself or Tony G7BUG for more information and an access password).

It is hoped sometime over the Autumn period to install a new Node at our Secretary's QTH in Madley, South Telford. Work is already in progress with antenna installation. We plan to initially have two 1K2 user ports on 70.3375 Mhz and 144.950 Mhz with a possible 23cms link to WV14 to follow at a later date. More news to follow soon.

Finally, on the Rally Front, we have booked to attend the MARS Kings Heath Rally in November at Camp Hill Boys School, so hope that many of you will be able to see us there.
So, 73's until the next issue.

Chris G0CNG
Maxpak Chairman and Membership Secretary.
Sysop of GB7MAX, the Maxpak Bulletin Board.

Editors Comments

Hello again everyone to a packed edition of Digicom, and apologies for the lateness.

In this issue you will find the first part of the minutes of the Packet Conference, which was held at Coventry in September.

I would like to inform everyone that myself G0OJR, will be running a Foundation Course at the HQ of a new Amateur Radio Club called The Charlie Delta ARC. If you know of anyone that wishes to take the course and the exam, then get in touch with M0DCM Dave on 01902 635244, via E-mail m0dcm@blueyonder.co.uk or via Packet m0dcm@gb7max.#28.gbr.eu

The Course is starting on November 3rd, and will be held over 6-8weeks at The New Junction Inn, Forge Road, Darlaston. There is no reason for any candidate to be pressured into joining the club whilst or after the course.

I look forward to meeting all new candidates for the course on November 3rd.

More news in the next issue.....

Barry G0OJR, Digicom Ed.

Minutes of the 2003 Packet Conference - Part 2 (of 4)

1. The "1U Xrouter" project (Ant, M1FDE)

The first presentation was a talk and demonstration by Ant, M1FDE of a project that combined two elements from last year's conference. He showed us how an item of hardware - the "Arkwright's Till" - had been built into a 1U case and set to run with XROUTER software - see last year's conference notes for further details on both.

The project is therefore effectively a large tnc, being an 8 Port TNC/Router, with 4 modems, an Ethernet interface, but with no fans or hard disk. He uses it as part of his combined radio and Internet LAN.

Ant described its advantages as having remote capability, running with low noise and on low power, being reliable, and having capacity for future experiments.

His design comprised a front panel with power & reset switches, a FDD drive (not necessary, but useful for testing), a Compact Flash card slot (for the system software and configuration settings), and LED's to indicate system and (eight) channel status.

His use of a Compact Flash card gives the equivalent of a bootable IDE disk, is very fast, uses low power, and is removable. With it, it is easy to load software and backup disk images (e.g. using "Gemulator Explorer" for Windows). CF to IDE adaptors are available at reasonable price from TAPR or online from linitx.com.

Ant went on to outline certain PSU requirements, Ethernet interface considerations and modem specifications (with 4 ports being data synchronous, and four being radio-ready), and spoke of the value of using XROUTER as the node/routing software.

The state of the project is quite advanced. The hardware is nearly all tested, the router works on air, and he can connect over LAN via telnet from WinPack. Future plans include testing G8PZT's support for Arkwright SCCs, and devising a control interface for RC748 transceivers.

Sketch schematics and Arkwright register maps are available on Ant's website (see below)

Internet resources:

XROUTER <http://www.g8pzt.pwp.blueyonder.co.uk/>
Arkwright till <http://www.tvipug.org/arkwright/arkindex.html>
Linitx web page <http://linitx.com/>
Chelmsford ARC <http://www.g0mwt.org.uk/>
M1FDE web page <http://homepage.ntlworld.com/mtn>
Email address m1fde@g0mwt.org.uk/

2. Forward Error Correction for Amateur Packet Radio (1) (Paula G8PZT)

The second presentation was a technical description of "Reed Solomon" Forward Error Correction as used in XROUTER, by the software author, Paula, G8PZT.

Introducing the usefulness of FEC in packet links, Paula observed that the UK packet network is performing nowhere near its theoretical capacity, with the major limiting factor being packet loss - typically 10%. The reasons for this are many - poor signal/noise ratio, fading, flutter, de-sense, QRM, etc - not counting media access errors.

Although packet protocols can work with this, it does represent serious loss of throughput, and datagram mode TCP/IP becomes unworkable at these rates. Simply raising speed will not help. The problem is that a single bit error causes the loss of a whole packet. Error correction by repetition is highly inefficient when bandwidth is so limited. However, by using FEC, an unusable link can be turned into a good one.

Just as the brain is able to decode words with minor spelling errors in them (by looking at their context), so FEC sends extra "contextual" information along with the packet data, allowing the packet to be reconstructed if it is damaged.

Paula outlined a variety of FEC methods, but highlighted the benefits of

the "Reed-Solomon" method, whose theories are already in use in the field of CDs, DVDs and cellular phone technology. Although the method is computationally intensive, requiring intensive CPU activity or special hardware, it performs well in correcting data errors.

In Paula's XROUTER, the FEC works by encoding AX25 frames plus frame relay header into Reed-Solomon code words, giving an error correction capability of 8 symbols. Code words are encapsulated in normal HDLC for transmission on physical layer. Then, upon receive, HDLC CRC is ignored and the (possibly corrupt) codeword is decoded to an ax25 frame.

The improvement over non-encoded links was illustrated and shown to be the equivalent of an increase in signal-to-noise ratio. This improvement applied to both short and long packets.

Packet stations who are not running FEC will see the additional parity bytes as additional data, leading either to a failure to decode or possibly to corrupt node broadcasts or inaccurate APRS positioning. Therefore FEC should not ideally be used on a shared channel.

The additional packet contents do represent a protocol overhead (approaching 10%) but this bloating is fully justified given the considerable cost in bandwidth usage of retransmission of failed packets.

Those wishing to implement FEC would need the following soft/hardware: the Xrouter program, an SCC card, or YAM modem, or a TNC with modified BPQKISS firmware. Note that some TNCs using an RUH modem may require a squelching mod unless RS232 data rate is high. It would also be possible to use a Baycom modem provided their driver program was modified.

FEC has been tried over several poor RF links and on a link simulator. The conclusions of early tests have been positive. In every case the reduction in packet loss and improvement in link throughput has been quite dramatic. One notable example was that FEC enabled a TCP/IP link to run datagram-mode, where not even AX25 could get through.

Paula highlighted the protocol's limitations, most notably that not all link problems can be solved by software alone. FEC cannot correct heavy distortion, severe QRM, etc. Such engineering problems must be solved first. Also this version can't use BER worse than 1 in 100. Stronger FEC cannot be

used, either, because of mis-framing problems. And G3RUH modems cannot be used without modification to the TNC.

However the author plans to develop the concept further. By using suitable hardware, it should be possible to dispense with HDLC framing and use embedded sync data. Stronger FEC should be possible, too, along with techniques such as concatenation, cross interleaving, etc. Adaptive coding is also envisaged - using stronger FEC methods when a link degrades and vice versa. Support may also be forthcoming for other L2 protocols, eg. Frame relay.

3. Simplex Voice Internet Links - Application processing (Steve, G8SFR)

The third presentation was a talk about the process of applying for Internet Voice gateways - the means by which amateur voice communications can be linked over the Internet to gain wider coverage than the standard voice repeaters.

The talk was given by Steve, G8SFR (one of the DCC representatives present) who began by observing that Voice Internet linking - a recent phenomenon, having started around 2000 - had become more popular than he had ever dreamed. This increase in popularity had led to many applications from amateurs wanting to become "gateways".

Initially applications via e-mail had been the norm, but in response to the increasing number of applications, the DCC soon changed the application system to an online system (at <http://www.dcc.rsgb.org>). This had worked well for a couple of years, but applicants were often found to have misinterpreted the instructions and had become confused about which information was to go in which box. Steve wanted his talk to be an attempt to clarify the situation.

The first considerations to be addressed by any potential applicant - before making the application - were "Is there a need for my gateway?" "Can I share an existing frequency with another gateway on a time sharing basis (day/evening, etc)?" "Is the frequency I have applied for clear in my coverage area (have they listened on air)?"

Secondly, when filling in the online application form, applicants should take care to fill in all the required fields accurately. Particular care is needed with the blue boxes in which only numbers must be entered.

Remember also that an accurate 6 figure NGR locator (eg. TQ628411) must be supplied.

The application is processed as follows: a copy of application is sent to the applicant's e-mail address as an initial check of validity. The DCC then looks at the application, checks it for accuracy, and for conflict with other gateways (often by simply checking with local maps). If there is another gateway within 35/40 kms of the applicant's station, then the application is rejected. Steve highlighted the problem of a user of one gateway being relayed by another gateway. If RF is received by two points then there will be double relaying - and if the two gateways have radically different systems then there will also be a delay in audio being relayed into the chat rooms. (This may be addressed one day and perhaps solved by use of CTCSS being made a condition, and thereby guaranteeing unique access).

The application, if approved, is then forwarded to the RA for further licence checks and final issue. If the application is rejected, the applicant is informed and the application is deleted from the system, pending a response from applicant. After 3 months the application is finally deleted, during which time appeals may be considered (eg. with further circumstances being offered for consideration).

Operators of gateways are requested to read all the schedule to the NoV. Further, they should ensure that their radiated power levels are within the ERP limit of the NoV, trying to use less power if possible. Deviation must be kept within the limits of the NoV, and operators must ensure they only operate the gateway when in attendance - defined by the RA as being within earshot of the station.

Steve mentioned certain considerations regarding the future of Internet linking, referring to a recently-held review whose outcomes are to be publicised in near future. In particular there has been concern expressed over people who get an NoV then sit on it. Steve indicated that it may become necessary to ask for all stations to re-apply for their NoVs, in order to clear out such unused applications.

On other matters, the guiding document will always be NoV not BR68, and unattended operation - whilst not ruled out entirely - is not expected in the foreseeable future for 70cms, given the block on applications for clearance within this band. It may be - as a consequence of this -that

more other bands may become more commonly used (2m, 6m, 10m etc).

Finally Steve referred to an ongoing discussion about access to Echolink software, as well as to the fact that from the end of 2003, all packet applications will be done online - applications will be otherwise be sent to RSGB who will type it in for the applicant.

4. Various DCC items (Steve, G8SFR)

The fourth presentation took the form of Steve, G8SFR, remaining on his feet to update the conference about the 70cms situation.

At the beginning of July RA had said that the Primary User (the MoD) would process no further applications for clearance until further notice. The existing 12 radio amateur applications were halted and had now been returned to the applicants. The RA cannot comment on the "until further notice" clause...

With this block on applications in force, Steve said he would not be processing any new applications, and would be returning any 70cms applications to the applicant. The rest however will be dealt with in the normal way.

The 70cms position is still unclear, but Steve indicated that it is not only the amateur bands which are being caused havoc with - the RA were recently told that they will not be able to issue PMR frequencies in UHF band. Their processing time has increased considerably, and as a consequence radio amateurs will be lower down the priority list.

There is a possibility that we may no longer have access to 70cms on an unattended basis, but existing users should continue as they are, maintaining levels of usage.

Changes to existing 70cms clearance agreements is possible; administrative changes, such as changes of callsign or address may well go through without a hitch, but remember that the distance with which stations can be moved (without the need for new clearance) is short.

Also if you have an NoV (or are a station holding a letter of Clearance) you should be aware that in the event of your "B" callsign changing to an

"A" callsign, your NoV (or Clearance) becomes invalid. In this circumstance you should contact the DCC, and a letter of authorisation will be issued.

Mike G7RAZ
Minutes Secretary

Members Letters, News & Comments

There is only one item of news this time and that's about the formation of a new Radio Club. The club is called the Charlie Delta Amateur Radio Club, and is situated at The New Junction Inn Public House, Forge Road, Darlaston and is run every Monday from 8:30pm. More information is available by contacting M0DCM Dave by phone 01902 635244, by E-mail m0dcm@blueyonder.co.uk or by Packet m0dcm@gb7max.#28.gbr.eu
The Charlie Delta ARC URL is : www.cqdx.co.uk

MAXPAK Modems
Price list for 2003
Specially reduced prices
Prices include P & P

MAX-01 1200 baud PACKET MODEM
Baycom type modem (3 IC's), PCB, circuit diagram & parts list plus all the components required to populate the PCB.

Members price £15.00

Non members price £20.00

Ready built and tested modems available
£5.00 extra

PRE DRILLED AND PUNCHED CASE
including installation kit etc.

Members price £5.00

Non members price £6.00

MAX-02 1200 & 9600 baud MODEM.

This unit is available and comes complete with, PCB, all the components required to populate the PCB, full construction details and agw software on 3.5" floppy disk. FOC

Members prices

Kit including PCB/power kit £30.00

Pre drilled case £ 5.00

Ready made and tested modems are available
for £10.00 extra.

Agw software on 3.5" floppy disk. FOC

Non members prices

Kit including PCB/power kit £40.00

Pre drilled case £ 7.00

Ready made and tested modems are available
for £10.00 extra.

agw software on 3.5" floppy disk. FOC

The MAX-01 has been tested with,
Windows 3.1x, Windows95, Windows98
and Windows ME

The MAX-02 will **NOT** work with Win 3.1x
but has been tested with,
Windows95, Windows98
and Windows ME

MAXPAK Who's Who

2003 - 2004 COMMITTEE MEMBERS

Chairman and Membership Secretary

Chris G0CNG QTHR or @ GB7MAX

chris.g0cng@nasuwt.net

Tel: 01922 494680

Secretary

Miles G4GSB @ GB7MAX

milesclifford@aol.com

Tel: 01952 585447

Treasurer

Albert G0KFS @ GB7MAX

g0kfs@speed-mail.co.uk

Tel: 01922 409705

SysOp GB7MAX, GB7WV, MB7UV & GB7DY nodes

Chris G0CNG

Details as above

Technical Manager

Bob G8KHV QTHR

g8khv@lichfieldtechnology.co.uk

Tel: 01543 257500

Webmaster @ maxpakgb.org.uk & Assistant SysOp GB7MAX & GB7PMB

David M0DCM @ GB7MAX

m0dcm@blueyonder.co.uk

Tel: 01902 635244

Digicom editor

Barry G0OJR @ GB7MAX

g0ojr@hotmail.com

Sysop, GB7PMB / SALOP/SALOP1 Nodes

Tony G7BUG @ GB7PMB

g7bug@blueyonder.co.uk

Tel: 01952 820471

Hon SysOp GB7PP nodes

Mick G1DKI QTHR or @ GB7MAX

Tel: 01902 756051