



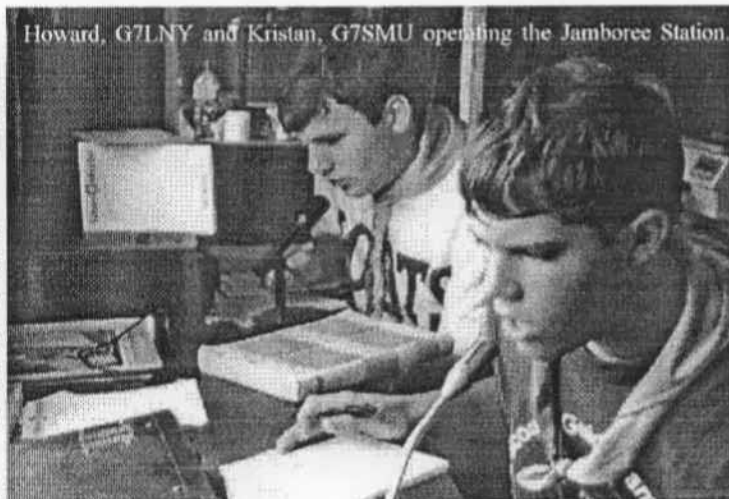
THE SEPTEMBER MEETING

Continuing the digital communication theme, this month we return to the subject of Amateur Television with a talk and demonstration by the brothers Chris, G0IPU and Andrew, G7TKK entitled "SSTV - The Big Picture"

In his first demonstration of JV-FAX in February 95, Chris described how comparatively easy it is to interface a Personal Computer with an Amateur Transceiver to exchange high quality slow-scan colour television pictures with similarly equipped stations either on HF or VHF; since then there have been a number of improvements in computers and the controlling software.

Initially there was a problem in obtaining digitised pictures for transmission but now with lower prices for scanners and digital still cameras, stations can create and edit their own interesting images. The picture illustrated here was taken by a local press photographer with his digital camera at the recent International Scout Jamboree described later in this newsletter (*sorry Chris we cannot print it here in colour, but we will have one on the notice board, ed.*)

The meeting opens at 7.30pm in the Marconi College, Arbour Lane, Chelmsford. We hope to see you there.



Howard, G7LNY and Kristan, G7SMU operating the Jamboree Station.

DATES FOR YOUR DIARY

- 3 Sept. CLUB MEETING - SSTV - Chris, G0IPU & Andrew G7TKK.
- 15 Sept. BARTG RALLY - Sandown Park Race Course.
- 15 Sept. EAST OF ENGLAND RALLY - Peterborough.
- 21 Sept. RSGB HQ SATURDAY OPENING - with boot sale.
- 29 Sept. HARLOW & DISTRICT RALLY - Harlow Sports Centre.
- 1 Oct. C.A.R.S ANNUAL GENERAL MEETING.

* **SPECIAL DATE FOR YOUR DIARY** *
* The committee have reserved the evening of 14th *
* December at the Marconi College for the annual Christmas *
* Social. *
* In the October newsletter we will provide details of the *
* menu, cost and meeting time. *

C.A.R.S. ANNUAL AWARD

Early notice is given for the consideration of members with regard to our **Society Award of Merit** which will be presented at the October AGM to a member who has made a substantial contribution in the field of Amateur Radio during the past year.

Nominations should be made in writing and given or sent to a committee member.

If there is more than one nomination, voting slips bearing the names of the nominees will be circulated during the AGM.

EVENT CANCELLED

Displayed on the notice board at the August Club Meeting was a poster announcing that The Essex Repeater Group would be holding a Boot Sale at Bradfields Farm, Nr Benfleet on 15th September.

We have now been advised that this proposed event has been cancelled due to lack of support.

COMMITTEE MEETING

The next Committee meeting will be held at 7.30pm on Wednesday 11th September, in Telford Lodge, you are welcome to join us.

GB2EIJ - Essex International Jamboree

Report by Christopher, G0IPU

As many of you know I am now involved with the Scouting movement, and back in the last week of July I was at the "Essex International Jamboree" at Kirby-Le-Soken. There were 6000 Scouts and Guides from 32 countries. I held the licence for the radio shack and thanks to the team including Nigel (G6ZVV), we were able to put on a good show.

The shack was well equipped with rigs thanks to ICOM-UK. The HF rig, an IC775-DSP worked well on the 3 ele beam, but was not so good on the half wave for 160M. The auto ATU seemed to constantly be matching the antenna. The 2M/70cm rig, an IC860 was, well used by the previous event (TA at the Royal Tournament) and the 70cm PA was not working. So we ended up using a 70cm hand held. The other 2M only rig was Nigels, an IC275H and was used mainly on SSB in to Europe (DL,ON,PA,F and some G). On HF the best DX was (ZD7) St. Helena and despite much help from Geoff (G3EDM) we only heard VK but never got to work them.

During the event was on I must have spoken to 2000 Scouts, Cubs, Beavers, Guides, Brownies and others who were interested in what was going on in the shack, out of these 20 or so lads (Scouts) came back with an interest in the novice licence. I gave them the RSGB hand-out about Amateur Radio and a DIY radio magazine, and as much help in where to go in there local area to do a course. Some were even brave enough to go on air and many greeting's messages were sent. One contact we made was with the Radio Station in Kibbel Stone Park, Staffordshire where my son Daniel was but he was not in their shack at the time. I did call in on the 28.325MHz net on the Tuesday and talked to Geoff (G3EDM), Roy (G0MWT) and Harry (G5HF), others on the net were not audible due to difference in polarisation.

I also called in on the "Shaving Net" on 1.972MHz, it was just after this that the ATU problem became apparent on the IC775-DSP (It was a half wave on top band I was using) and I had to cut short the QSO. After that 80M went a bit strange too. All in all the VHF/UHF rigs went well and one operator, Kevin (M1ACZ) worked his first pile-up; I think he enjoyed it too.

Next to the radio shack there was a marquee where Peter (G1FOA) was in charge of the AM radio construction project, using a ZN416 IC and a few other components on a small PCB. At the last count, 950 kits were made, of which about 10% did not work first time; these were taken to a testing bench where they were corrected. This event was well attended; all left with a working AM radio and an earphone.

At the end of the week, I must admit, I was worn out to say the least but I hope some of the young people I spoke to will know the difference now between CB and Amateur Radio and even have a go on their own some time.

LAST MONTHS MEETING

DIGITAL AUDIO BROADCASTING - Colin, G0TRM

OR NEVER MIND THE (BAND) WIDTH HEAR THE QUALITY.

Dick began his excellent lecture on DAB by reminding us when and how the digital revolution began. It was back in 1972 that the compact disc first made an appearance and became generally available. Dick played a short extract from a CD to tune our ears to digital sound and to set the scene for the evening. This illustrated the quality available in terms of 2 or 4 times audio sampling which is now taken for granted when using CD's and the now much used computer 8 or 16 bit sound cards, and the fact that all sounds require digitising before storage on to a hard disc. The storage required is in the order of 10Mbytes per minute of sound.

Dick outlined the aims of DAB which are High quality sound, i.e., CD standard, low bandwidth, lower transmit power, multi-media use e.g., traffic news, RDS, text and graphics.

Dick gave comparisons between various audio modes and gave the respective requirements in terms of digitising, quantising and data rates:-

Medium.	Sampling Rate.	Data Rate.	Quantising.
Telephone	8 kHz	64 kbits	8 bits
DAB speech	24 kHz	-	-
NICAM	32 kHz	320 kbits	16 bits
CD	44 kHz	1.4 Mbits	16 bits
DAB Music	48 kHz	96 kbits	0-15 bits.

Digital modulation allows some trade between Tx power and signal bandwidth. NICAM and DAB use QPSK which halves the signal bandwidth by transmitting 2 bits for each phase state.

So why didn't they use NICAM for radio? The problem is multi-path propagation which causes modulation echo's and selective fading. The DAB signal counters echo's by sending very slowly, using a 1ms symbol period which is much longer than the echo delay time of 1 to 5 μ s. To increase the data rate the DAB signal modulates more than one carrier.


To counter selective fading, DAB spreads its carriers across a 1.5MHz frequency range so that when some carriers are faded others are enhanced. The programme data is combined with error correction codes so that the data lost with the faded carriers can be reconstructed from those correctly received.

Finally, some of the programme data is time delayed by up to 380ms to prevent short bursts of interference from interrupting the signal.

The DAB carriers are spaced at 1kHz, at this density the modulation sidebands overlap but amazingly, by measuring the signal over a 1ms period the receiver is able to determine the phase of each carrier.

The spectral efficiency of DAB is further enhanced by repeating a small period of the signal, allowing receivers to make use of signals repeated from sites up to 96km apart, with the careful timing, the whole country can be covered using just one DAB channel.

A DAB transmitter produces 1536 carriers with a gross capacity of 2.3 Mbits/s in the Main Service Channel. The MSC contains the coded audio samples and programme associated data; it can be configured to contain up to 9 stereo channels at 192kbit/s or to combine other data services with a smaller number of audio channels, and can be changed at any time without interrupting the audio.

DAB signals have been allocated the old Band III TV channels between 216 and 230MHz. Currently the BBC and NTL (the old IBA) use 1 channel each to carry up to six different stereo and mono broadcasts plus some data services in a 1.5MHz bandwidth. We were given a taste of both channels in turn. The BBC output contained the four main stations together with Five Live, World Service and BBC extra (local radio). NTL gave us Kiss FM, Melody Radio and Virgin among others. Both stations were received at good strength and quality thanks in part to a 4 element yagi erected on the roof by Dick with much appreciated help from Roy PMX. Signals are currently being transmitted from Crystal Palace, and Croydon using 400 Watts. Comparisons were made between DAB and FM broadcasts. Both were very good indeed with the FM signal perhaps giving a somewhat fuller sound than the DAB. There was no doubt that the DAB signal was virtually noise free and very clean. The FM signal suffered some background noise due to a very limited antenna but never the less it proved to be a very interesting and most enjoyable demonstration. 

The DAB delay was clearly and convincingly demonstrated during the lecture by tuning a standard receiver and the DAB receiver to the same broadcast when the 10 O'clock time signal was being relayed. A near one second delay was clearly heard during the sequence of pips.

Dick obviously knows all the right people because he was able to show us one of the very few PHILIPS DAB receivers in this country.

I enjoyed the evening very much indeed and all our thanks to him for an excellent performance in both content and giving CARS another 'First'. (Thanks to all who helped to make the evening a great success.)

My personal thanks also to Dick in the preparation of this report.

For any member wishing to know more about the encoding and decoding methods employed; I am sure Dick will be only too pleased to help. Readers are also referred to an article on DAB in the July issue of RADCOM.

TRANSISTORS, VALVES AND CAR RADIOS

By Geoff, G7KLV

Talking of transistors, it always seemed odd to me that one of the first applications of transistors in TV sets was in the 500 to 900MHz tuner. One would have thought that the audio stages would have been the first to be transistorised. On reflection though the UHF valve tuners were pretty unstable beasts. The first generation of transistorised tuners which replaced them were a great improvement! Next to follow were the sound and vision IF stages. Valved audio, frame output and line output stages were amongst the last to go. Probably all a question of economics.

On the other hand the audio output stage was the first to be transistorised in early car radios about 1958. Valves suitable for use with 12 volt HT lines had been developed but an output valve working from such a low HT line was just not on. The transistor came to the rescue. It was transformer driven in class A from the valved audio amplifier stage. A further transformer was used to couple and match the transistor to the speaker. As quiescent collector currents of something like 1 amp were the norm generous heat sinks were essential.


Prior to the development of the low voltage valves, the circuitry of car radio's was similar to that of conventional mains radios apart from the high voltage department. To generate the high voltage AC a vibrator was used in conjunction with a step up transformer and applied to a rectifier valve. Synchronous vibrators ie. with two sets of changeover contacts, were also available in which case a rectifying valve was not required. "Hash" filters became a necessity.

As transistors replaced valves the circuit details changed. Variable capacitors gave way to inductance tuning, probably because of the latter's resistance to microphony.

Then came the mechanical push button tuners. Tuned RF amplifiers became the rule rather than the exception. They had disappeared from "table" and portable radios long ago. Size and weight reduced for a while as IC's were used, one for the audio amplifier and one for the rest of the functions. The popularity of cassettes caused an increase in weight, size and component density. FM and phase locked loops with preset electronic tuning dramatically increased circuit complication and a modern car radio is a state of the art job. As if that was not enough we now have ABS; Sorry, I think I mean RDS!

The few car radios that I have repaired have, fortunately, only involved replacement of the audio IC and have been quite straight forward. Car radios are now extremely complicated beasts, employing both analogue and digital technology, all crammed in to a remarkably small space and must present quite a challenge to the service-man. Luckily I have not been faced with a modern car radio, yet!

73 from Roy & Ela Martyr,
G3PMX & G6HKM

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