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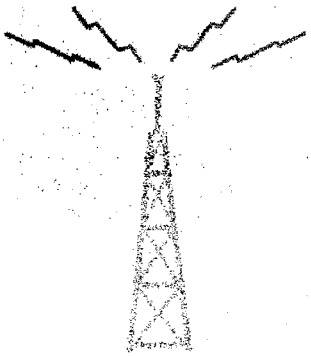
PUBLICATION OF THE WIGTOWNSHIRE AMATEUR RADIO CLUB

GM4RIV



GM3W

Issue No 7
Winter 2001

A Note From The Chair

As Most of you will be aware by now I was voted in as the new club President at the last AGM, this I must say came as something of a surprise if not a shock.

The first thing I would like to do as the new "leader" is offer my personal thanks to Eric FSZ our retiring President and his committee for the work they have done for us all over the past year.

This has been quite a difficult year for organising events etc due to the FMD crisis but I'm sure next year we will be able to get back to normal. We have prepared a survey for all our members which you should by now have, this is an attempt to find out what you the members would like. I have already had a suggestion from NBG for dancing girls but let's try and make it a bit more realistic to start with.

We are planning a few special events and activities over the coming year and also a membership drive, as most of you will know by now Ian MM0WIG (congratulations that man!!) has taken on the position of senior instructor for the DG area and has already got two pupils for his first Intermediate class which starts on the 6 Dec, he is also looking for a volunteer to assist him, so come anyone fancy having a go!! Well that's all for now folks, but remember **it's your club.**

I must apologise for the magazine being late and not to the usual high standard but John DWJ our editor/ publisher has not been too well just lately , we wish him a speedy recovery and look forward to seeing back at the club soon.

Richard MM1BHO (President)

Silent Key

Alex Anderson OBE

GM4VIR

Passed away on Saturday the 10th November 2001

Alex was the repeater keeper for GB3DG and Dumfries and Galloway RAYNET controller for many years and could be heard most days as GM4VIR/MFM (Massey Ferguson Mobile) He will be greatly missed, our sympathies are with Hazel and all the family.

Correction

I made a mistake with the Silent key information.

Alex died early Sunday 11th November

And he was awarded the MBE and not the OBE

This was awarded in recognition of the work done by Raynet during the Lockerbie disaster and the award was received by Alex on behalf of all Raynet operatives involved.

How to Learn Morse Code in only 44 Years!

by

Ian Macdonald

GM8AVM- MM5WIG

My interest in amateur radio began when I was 14 years old. (You can yawn here if you are over 60). My first receiver was the family radio, a *Fullotone* radio/gram that had a Short Wave Band. In the 1950s most amateurs transmitted in double sideband a.m. and local and good dx could be heard with a short piece of wire that hung out the back of the set. No bandspread here, only a volume and tone control! I quickly joined the R.S.G.B. and the I.S.W.L. and was hooked. I studied for the R.A.E. but did not sit the exam until 1968 some 10 years after becoming a S.W.L. In the meantime I had spent 6 years as a Radio/TV Engineer and had joined the Ministry of Aviation at the Telecommunications Engineering Establishment (Gatwick) as a Radio Technician. After passing the R.A.E. I tried to learn Morse Code on and off with little success using gramophone records! I honestly never had the time or training to learn it properly and it became a bit of a mental horror!!! I also had simply *no sense of rhythm*. I gained my **GM8AVM** call in 1968 but rarely used it. Life went by and I lost interest in the hobby. I spent the next 30 years as a Telecommunications Engineer with the C.A.A. at Glasgow Airport. It was only when I semi-retired to Wigtown that I took a fancy to look up the R.S.G.B. and see what was going on in the world of the hams once more. I fired up my old 2 Metre rig and chatted with Richard (**MM1BHO**) for some weeks before coming along to W.A.R.S. My first impressions of the Club on a cold February night earlier this year was of a really happy friendly crew! I decided I must try one last time to overcome the Morse Bug!

I started from "scratch" on 11th February 2001 to learn the code properly once more.

I have kept a journal of progress to analyse later on. Using the fantastic wee computer program from DK5CI supplied by one of my nephews and

regular weekly sessions at the Club on Thursdays with Jim (**GM3VNW**) and Gerry (**GM4BAE**). I was soon doing practice QSOs at 6 w.p.m. within a few weeks. No one will ever know the sense of achievement I have felt in these past few months by doing this. I struggled on each week even when I felt things were going badly. By May I had enough courage to send my application to the R.S.G.B. to try a **5 w.p.m**. test. On 28th June I sat the dreaded test! I sat the test at the Club with Jim and Gerry as examiners. They had endless patience in making me feel at ease during the test. One week later I got the pass slip! One week after that I got my nice new call sign **MM5WIG**. Yes! I asked for the **WIG** part. My daughter said it is just right for a baldy old git like me!

Yes, it really has only taken me 44 years to get a Morse Pass Slip!

I am like a kid with a new toy with my first first H.F.rig, an old FT101ZD and a Carolina Windom bought from the Club.

A W3DZZ is in the making!

I am now on H.F. and struggling to polish up my code to try the 12 w.p.m. test before it vanishes! Some say why bother? I can honestly say I am now enjoying that which haunted me for years, I now want to QSO on QRP CW. .....Life is funny that way!

If there are any of you that are timid about learning the code.....my advice....do not give up.....be like Robert the Bruce! If I can do it ...so can you...promise!!! If you find it hard, try for the **5 w.p.m. test** as a stepping stone..it does help get you there.

I am willing to help anyone else learn if they really want to try.

My thanks to Jim and Gerry for their great patience with their worse student ever. Their enthusiasm is the essence of amateur radio itself.

I am willing to pass on copies of the DK5CI computer program and lend anyone my copy of the super book,"The Secret of Learning Morse Code" by Mark Francis G0GBY.

Ian

International Lighthouse Weekend

The advance party took off on Thursday evening to deliver the mast trailer to Corsewall. This took a little dextrous driving by Richard as the road to the lighthouse is by no means straight. On one particularly narrow section we came head to head with a very shiny Red open sports car. This incident was handled very diplomatically by Richard with comments like "what a beautiful machine" which caused the owner to swell up with pride. The vehicles passed like ships in the night. With the trailer in place and an inspection of the barn we headed back about nine o'clock. The next day arrangements were made for myself and Jim, who had arrived by bus earlier, to meet up with Richard just outside Stranraer. We met up and arrived at Corsewall at approximately 14.30 hrs. After unloading the tea urn, max priority first, we set to tidying up the barn and setting up operating positions. Ian then arrived and we began setting up the mast and beam , the wx was bright so this operation was no problem. Then the trap dipole was erected, but found to be a little far removed from the barn. You know! beyond the feeder lengths available. We commenced operations at around 19.00 hrs using GM4RIV until midnight then changing to GB2LCP. As there were only three of us to carry on through the night, operations came to a halt about 0230 hrs Saturday morning. The next day up nice and early and we were

joined by Leo MM0LEO, Jim MM0CNF, Gillian 2M1FQI and Hoppy GM4LPT. The stations were manned throughout Saturday and overnight into Sunday. We were then joined by Eric GM0FSZ and Ian GM0NBG who found everyone in good spirits, even Jim GM3VNW who had been up all night. The estimated total of stations contacted at that time was about 600. We were particularly amazed by a Brazilian station who came in at a good 5 & 9 with studio audio from a wire dipole 6 metres high. Incidents like that really brightened up the night. I have not had the opportunity to check the log in depth but Australia, Argentina, Brazil, Belarus, Slovakia, Jordan, the list goes on. For those who didn't make it over the week end it's all down in Richards log, a worthwhile read. One kind member, who visited briefly on Saturday and would no doubt wish to be nameless, left us with a tidy number of pancakes, butter and a nice bottle to go along with them. Thank you * * *, they certainly vanished quickly. This individual had to leave after lunch Sunday so couldn't help out with the dismantling of the site but we owe the orderly withdrawal from the site to Eric, Richard, Jim and Ian. Apologies to any one missed out and thanks to all who helped in any way over the week end.

Neil

(GM4LQS)

Fast Scan Amateur Television (FSTV)

Eric is good at arm-twisting, so an introduction to FSTV!

Frequency bands and equipment in use:

The bands in reasonably general use are 70 cms, 23/24 cms, 13 cms and 3 cms. There are a few stations experimenting in the amateur bands at 24 GHz and above, but they tend to be the province of the dedicated amateur, with access to the appropriate test equipment.
70 cms was the first on the scene, but is being superseded by the use of 23/24 cms and above. The basic reasons for this are that the bandwidth available (about 2 MHz, a.m. d.s.b) does not allow good quality TV pictures to be transmitted or for the use of intercarrier sound, and one suffers from a fair amount of QRM from other (commercial) users of the band - as well as the flack one gets from other amateurs if the bandwidth is increased to get better picture quality! Nevertheless, 70 cms has the best dx by far, and amateurs along the South and East coasts regularly work continental stations. Transmitters and receivers still appear at rallies, and tend to be a mixture of home-brew and the early dedicated commercial designs. Frequencies in common use are 436 and 438 MHz, with talkback on 144.750 MHz, fm or ssb (for the longer distance contacts).
23/24 cms is now the most commonly used band, and with wider allowable bandwidth (using fm - of more later) can give broadcast quality pictures with intercarrier sound, thus permitting full duplex TV plus sound operation if required, but this is usually at the expense of requiring appropriate filters, at least on receive. Transmitters and power amplifiers are available as kits, or ready-built, from a number of sources advertised in the British Amateur Television Club (BATC) magazine CQTV, and RadCom, etc. There are a few kit and ready-made dedicated receivers around, but most amateurs use satellite receivers in conjunction with a low-noise pre-amplifier (usually ready-built). Pre-amplifiers are necessary for all but local contacts, as the average satellite receiver has an equivalent noise figure of around 9 to 13 dB; rarely as good as 6 dB. This means that in order to get an overall system noise figure down to 1 dB or less, a pre-amplifier with a noise figure of around 0.8 dB and a gain of 20 dB or so will be needed. Frequencies in use are 1245 through to 1280 MHz (avoiding

1260 MHz) for simplex contacts, with 1250 and 1255 MHz being the most favoured. Initial contact and talkback, as for all FSTV, is on 144.750 MHz, moving up or down a channel (25 kHz spacing) if 144.750 MHz is busy. The other ATV frequencies from around 1311 to 1316 MHz are used for repeaters, and are best avoided, unless there are no repeaters in the area! Antennas in use are almost entirely Yagis, ranging from the scaled-down UHF TV 18 element Severnside Television Group's cheapies, through to the 55 element Tonnas and Eagles, etc.

13 cms is becoming more popular, given the increasing availibilty of devices and commercial modules working at near the amateur frequencies. Kits and ready-built TXs and RXs are being advertised, and some stations have re-coded the PICs in the commercially available 2.4 GHz security/lan equipment, to obtain synthesised amateur band kit at a relatively modest outlay. The cheapest receiver option is to obtain a C-band (2.5 to 2.7 MHz) low-noise block as used in the middle East/USA, and use it with a conventional satellite receiver. These LNBs use a local oscillator at 3.65 GHz, so the video comes out inverted (if the transmitter uses conventional video sense modulation), so make sure the satellite receiver has an invert video switch! Caution: The C-band LNBs I have come across (Chapparel and California) both have completely wide open N-type coupled HEMT front ends. As such, they are extremely sensitive to out-of-band inputs, and usually will not tolerate more than a -40 dBm intended or extraneous input, before saturating or sprogging furiously. (So using these at a site like Cambret is likely to be a problem!). Power amplifiers are mainly dedicated ready-built or kit designs. There is a fair amount of commercial activity on this band, which can give rise to bad QRM in some localities (but on the other hand some rather interesting TV from surveillance cameras!), and one needs to use the band with care: 2330 MHz is usually fairly free. Yagis still have the best gain vs size characteristics, and are available from a number of sources (albeit expensive) which has led to a fair amount of self-build designs arriving on the scene.

3 cms is next in popularity to 23/24 cms, probably because of the early availibilty of surplus 10-15 mW 10.678 GHz Gunn diode radar doppler modules (providing the TX), and satellite receivers/low-noise blocks (providing the RX facility). More recent TX designs use a fundamental frequency dielectric resonator oscillator, or multipliers up

from a lower (synthesised) frequency. Frequencies in use are 10 to 10.125 GHz, and around 10.250 to 10.350 GHz. The latter segment is more popular for simplex contacts, as it is also used for repeater inputs and, given the directivity of the almost universally used ex-satellite dish antennas, there is little problem in inadvertently accessing a repeater, if there is one in the area (rather unlikely!). Ready-built and kit solid-state 1 to 10 W power amplifiers are available, but are expensive: the other alternative, that of surplus travelling-wave tube (TWT) amplifiers, are really only of use in the shack, given their power supply requirements. If the cheap Gunn diode approach is used, it can involve enlarging the cavity slightly and/or selecting from a range of diodes, before getting a combination which will work at the lower amateur band frequency and with decent modulation linearity and sensitivity; this is not usually a problem with the DRO or multiplier designs. The older style, easier to convert, single-band LNBs use DRO local oscillators at either 10 GHz or 10.77 GHz, which means that the IF would be at 315 MHz or 455 MHz (inverted video) for a typical amateur contact at 10.315 MHz, which is well outside the optimum LNB IF bandwidth of around 900 to 1800 MHz. So it is usual to replace the existing DRO (puck) in the LNB with a 9.0 or 9.1 GHz device, to bring the IF into the centre of the IF bandwidth. In order to maintain a reasonable conversion gain with the LNB, it will also be necessary to re-tune the microstrip lines/pre-mixer filter to suit the lower amateur band input frequency. There are a number of sources for converted LNBs, and it could be that a modern wide-band LNB would work without modification (but I have not been involved with any of these).

A few more technical comments:

Assuming that the interest will be with 23/24 cms and above, it is worth mentioning that although the modulation standard employed is nearly identical to the analogue satellite TV service, the allowable deviation for repeater outputs is 7 MHz peak-to-peak, rather than the commercial satellite service's 15 MHz, or greater. This means that if you come across an ATVer who lives in a repeater area, he/she is likely to be set up to be reciprocal to the repeater, and his/her transmitted deviation when received on an un-modded wide bandwidth satellite receiver will give a rather weak picture. Outside of repeater

areas, there is no problem in increasing the transmitter deviation to give a fully-saturated picture on a standard satellite receiver. However, most satellite receivers do have an internal video gain control and/or IF bandwidth reduction adjustment, which can compensate for the amateur service's lower video bandwidth.

For interest, the broad repeater specification for all bands 24 cms and above is:

Video bandwidth (3dB)	5 MHz
Video pre-emphasis	CCIR 450
Colour sub-carrier	4.433618 MHz
Peak video deviation	3.5 MHz
Sound pre-emphasis	50 microseconds
Peak sound deviation	50 kHz
Sound sub-carrier	6 MHz
	(other frequencies optional)
Sound sub-carrier w.r.t video	- 18 dB
Frequency stability	0.005%
Antenna polarisation	Horizontal

Note that although individual stations have no restriction over the polarisation they can use, the fact that all repeaters are horizontally polarised means that most stations will use horizontal polarisation as well. Unless it is mentioned specifically, one should always assume horizontal polarisation is being used for all bands.

ATV signals are reported in P grades, roughly equivalent to the R grades for telephony:

P5 is near broadcast quality with noise-free fully saturated colour.
P4 is fully watchable, with slight graininess
P3 is getting quite noisy, but picture content fully recognisable
P2 is noisy, with the smaller detail lost
P1 is very noisy, and only large detail recognisable, sync. unstable
P0 is used to describe that a signal can be detected (by TX being switched on/off)

I have measured the difference between P5 and P0 signals (at 3 cms),

and, rather surprisingly, it is only about 15 dB, if judged visually. Looking at the recovered video, however, it is still quite noisy at a visual P5, and a further 10 dB of input is required before the video signal cleans up entirely, for instance as to the same degree as the recovered video from a powerful local main UHF TV transmitter.

Regarding range, 70 cms obviously has the advantage, given the lower frequency, and dx contacts have been made over many hundreds of miles; especially over sea paths.. But, as the frequency increases, one is more constrained by topography. As a guide, and from personal experience, 24 cms is readily workable over sea paths up to 80 miles or so, as is 13 and 3 cms, using modestly-sized Yagi and dish antennas and 0.25 W. 70 cms is a doddle, using about a Watt into a 5 element Yagi. However, the sites for such contacts have been carefully chosen (during contest working) for the least possible intrusion into the Fresnel zone from objects local to the TX and RX sites at the highest frequency in use, and the contest station has a lot of aerial gain at 70/24 cms especially, so the results are perhaps a bit atypical. Over rolling farmland, 24 cms (P5) is usuable up to 20/30 miles or so, providing any large obstructions are not immediately adjacent to the TX or RX sites. In general, if there are obstructions in the Fresnel Zone, bare, rounded hillsides give the lowest path loss, whereas knife-edge ridges and tree-lined hills give greater losses. As examples of recent (local) 24 cms contacts, I worked GD1HIA (Phil) P5 on the north side of the Isle of Man from Ravenshall point (near Gatehouse) using 0.5 W into an 18-element Yagi, and P3 using 45 mW. GD1HIA was using an omni-directional Alford slot antenna, with a gain of probably around 7 dBi or so. Another contact was GI0UZG (Tony) P5 (both ways) from the picnic site at Stairhaven on Luce Bay (at sea level), using about 15 W, and the same Yagi. I assume Tony was at his Dundonald QTH and was using a 35 (or more) element Tonna and 15 W on TX. I also received GI6FXD (Alan) from Carrickfergus at this location P1, but apparently he had an obstructed path his end. With one of Tony's (Wyzcom) 0.5 dB noise figure/45 dB gain pre-amplifiers (rather than my 1 dB/17 dB), Alan's picture would probably have gone up at least a P point; maybe by two P points. I would also guess Tony (and perhaps Alan) would be workable from the club premises, given an antenna mounted high enough to minimise problems from immediately adjacent buildings, and perfectly from

anywhere along the Mull of Galloway and lower Ayrshire coastline.

Mobile operation

It would seem very likely that if some members of the group want to have a go at ATV, they will need to go out mobile: even if you have one active local station, it can soon get a bit boring just looking at each other! To start with, I would recommend 24 cms, given that the kit is a little easier to come by, and not too dear. Perhaps the only difficulty is with using a mains-powered satellite receiver, unless you can power it off an inverter: the rest of the kit should work OK off the battery voltage of 12.6 V. However, the older satellite receivers can usually be modified to work off 12.6 V, provided that the local oscillator in the tuner module has an analogue tuning input and will tune to 1280 MHz below 12 V, thus allowing a simple potentiometer to be used across the battery supply. Generally, I have found this to be the case, as the normal tuning range, 950 to 1750 MHz, is covered by around 2 to 18 V (non-linear). It is also likely that the tuner module, and most of the video and sound demodulation circuitry will also work off the internal rails at 12 and 5 V. The other rails, quite often at 18 and 24 V, seem to be used for the tuning voltage, LNB supply and digital displays, etc., which are not needed, and can be dispensed with. [Note: The commercial and modified LNBs used for 13 cm and 3 cm respectively will still work satisfactorily at 12.6 V, albeit very occasionally the DRO LO frequency may be on the verge of drifting a 100 kHz or so with varying battery voltage]. The controlling features for mobile dx operation are really antenna gain and pre-amplifier noise figure, so those are the areas to go for if you are serious; but less expensive kit can still provide a lot of fun!

For receive: Yagi, tripod or mast, satellite receiver, pre-amp, portable TV
For transmit: Antenna as above, transmitter, power amplifier (optional), video source e.g. camcorder or surveillance camera, sound source (optional)
Talkback: 2 metre mobile radio.

Happy ATVing!

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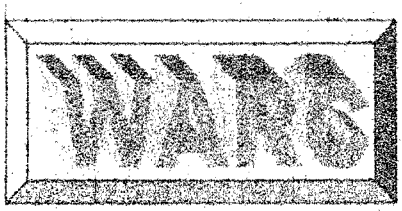

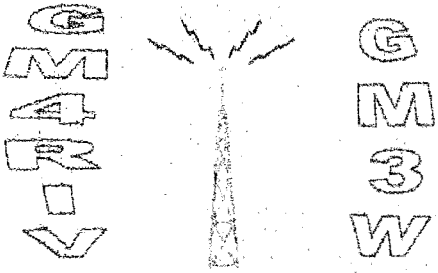

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