RadCom

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Out of This World

Astronaut Richard Garriott explains ISS orbits to school children in GB4FUN

09060

RSGB Matters
The first GB2RS news from Bletchley Park

Duplexer Review
Duplexers for 2m and 70cm on the test bench

National Hamfest
Luso Towers make their first UK appearance

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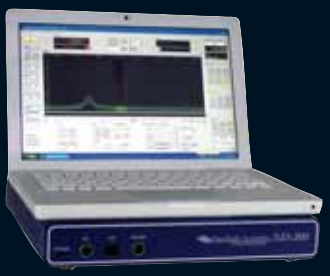

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RadCom

THE RADIO SOCIETY OF GREAT BRITAIN'S MEMBERS' MAGAZINE

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Inside GB4FUN, astronaut Richard Garriott explains basic orbital mechanics to a class at Budbrooke School following his chat to them from the ISS. Full details on P25.

News and Reports

Reviews

Features

Amateur radio – still working when all else fails. Page 68.

Inexpensive modules can get you on ATV, page 76.

Technical Features

One of the Isoterm interfaces reviewed on page 62.

Regulars

Promoting ARDF

Opportunities arise to promote ARDF or radio orienteering to groups of twenty or more, either from within the amateur radio community or outside of it. Scouting is such an example this will be looked at in a future issue of *RadCom*. Since ARDF appeals to amateurs who have some interest in outdoor activities, then it might equally appeal to folk of this sort who are not licensed amateurs. Groups such as the local orienteering club could find the greater challenges of radio orienteering to be very attractive.

Last year, the RSGB ARDF Committee decided to put together a set of FoxOring transmitters and suitable receivers to allow groups of upwards of twenty in number to experience this variant of ARDF. In FoxOring competitors are given a map on which a number of 'control' circles are marked. A very very low power transmitter (typical range 100 to 200m) is placed either inside or just outside the circle. Competitors navigate using map reading skills to the vicinity of the circle and then use direction finding skills to locate the transmitter. This form of competition is attractive to orienteering groups since it is a halfway house between ARDF and orienteering.

Eleven low power transmitters were constructed and combined with 24 imported Chinese-made receivers to form the kit. It has now made its debut at some summer low key orienteering events where orienteers have had the chance to try it out for themselves and it was also used at the Scottish ARDF Seminar in April. It is a means of promoting amateur radio to the wider community and radio orienteers continue to attract enquiries about our hobby from a wide range of people.

The equipment is all contained in a purpose-built transit case which can be shipped around the country for use at different events. If you are interested, please contact Bob Titterington, G3ORY by e-mail to g3ory@lineone.net.

The kit of ARDF equipment which allows the activity to be introduced to groups of 20 or more. In the bottom of the main box are 24 Chinese made receivers and 11 home built very low power 80m transmitters. The removable tray contains headphones, aerials for the transmitters and spare batteries. One of the very low power transmitters can be seen on the ground in front of the box.

London 2012

The RSGB have responded to the Ofcom consultation document on the Spectrum Plan for the London 2012 Olympic Games & Paralympics. The RSGB fully appreciates that the 2012 Games are a premier international event and inevitably need significant spectrum resources and equipment to facilitate broadcasting, security, press/media, officials, etc. But the Society has highlighted that some existing amateur allocations (which are also listed in the Ofcom draft plan) need to be retained for use near venues for such things as the increased use of repeaters by visitors to the Games, Special Event Stations and RAYNET. The RSGB have also asked that Ofcom provides additional detail and resources with respect to the issue of registration and monitoring of spectrum use.

The RSGB response can be found of the home page of the RSGB website (www.rsgb.org) but if you want to read the original consultation document and the RSGB response, these can be found in the Spectrum forum section of the website, at www.rsgb.org/spectrumforum/consultation/.

Amateur Radio & Art

Artist and Filmmaker Esther Johnson is looking for three different amateur radio clubs based in the London area to set up a radio station during an exhibition of her work on 23, 24 and 25 October 2009 in London. A different radio club is required for each day of the exhibition with volunteers to man the station throughout the day. The radio stations will accompany Johnson's 16mm film TUNE IN, made in 2006, which focuses on amateur radio. Johnson will also be exhibiting photography of radio enthusiasts alongside her film work.

Further information on TUNE IN can be found at www.blanchepictures.com/films/tunein.htm. You can watch an extract of the film at http://flamin.filmlondon.org.uk/productions_details.asp?FilmID=50. There is no fee available for this but it is a great opportunity for amateur radio to be visible to a wider audience, as well as being part of this unique arts event which will be well publicised. If your club is interested in taking part in this exhibition please contact Esther no later than Monday 14 September by e-mail to esther@blanchepictures.com.

Quality Assurance

At their meeting in July, the Trustees of the Radio Communications Foundation appointed Jeff Smith, MI0AEX to the position of RCE Quality Assurance Manager. Jeff takes over from Colin Richards who stood down earlier this year. Jeff is a Past President of the RSGB and is a working school teacher. He takes up the position immediately.

G5RP Trophy

A little history of this trophy appeared in the January issue, when a news item was carried about the trophy's award for 2008 to Tim Beaumont, M0URX. To recap, some years ago the Vale of White Horse ARS decided to commemorate its late chairman, Ted Wake, G5RP, by sponsoring a trophy for recognition of significant achievement made by newcomers to the field of HF DXing. The terms of the trophy were thus framed as 'The greatest progress in the DX Field made by an RSGB member resident in the UK during the 12 month period July – June'.

These words were chosen in order to focus on newcomers to HF DXing at the end of their first good year, when they have piled on a lot of countries (or whatever other measure applies). It's important to realise that this award isn't limited to those newly licensed, as getting the HF DXing "bug" can and does happen at different times in our hobby. The term 'greatest progress' can also be judged in a variety of ways, where "recent and rapid" achievement is key, though of course much is up to individual merit.

The RSGB manage the award of the trophy along with a representative of the sponsoring club. The trophy has often been presented at during the DX Dinner at the RSGB HF Convention – sometimes to the winner's complete surprise (although there is no requirement for nominations to be kept secret). In addition to its current holder, in the recent past it has been awarded to Dominic Smith, M0BLF (2001), Robert Morgan, M0TTT (2002), Richard Pollard, M0RJP (2003), Stuart Heathcock, M1SMH (2004), Katie Filmer, M3XPO (2005) and Michael Wells, G7VJR (2007). Whilst a number of nominations were received in 2006, no award was made – we do aim to maintain the status of the trophy as one that truly reflects its citation. It is interesting to see that the trophy is achieving its intended purpose of giving recognition to up and coming DXers, and encouraging them to do greater and better things in this area of our hobby.

The problem with 2006 perhaps demonstrated the importance of nominating someone at the right time, which is after the individual has demonstrated real achievement, rather than merely showing promise. Often we find that nominations are a little early - based too much on promise and not enough on achievement - so there are sometimes opportunities to nominate the same person one more time; but seldom beyond that, because the trophy is unlikely ever to be awarded to an established DXer.

In the January column it was said that there is never a shortage of suitable candidates, but that nominations are sometimes not forthcoming. So if you know of someone who deserves recognition and encouragement in HF DXing, now is the time to put in a nomination. These should be sent to John Gould, G3WKL, RSGB HF Manager, QTHR or by e-mail (preferred) to g3wkl@btinternet.com, to arrive no later than Friday 11 September. Remember to base the nomination on the person's achievements between July 2008 – June 2009 for this year's trophy.

John Gould, G3WKL
HF Manager

Region 1 ARDF Championships

September sees the Region 1 Championships taking place in Bulgaria. The venue is the town of Obzor on the Black Sea coast and the event coincides with the 50th anniversary of ARDF activity in Bulgaria using what we now know as the IARU rules. The competition days are 18 and 20 September.

The RSGB will be represented by Steve Chalk in the M40 category and Bob Titterington competing in M60. Our competitors are all self-funded.

The Region 1 ARDF Working Group will also meet during the period of the Championships and there are some important issues to be decided. There is a strong move to add one additional age category for both men and women and also attempts to try and make it possible to set more appropriate courses for the wide range of age groups.

Ursula Williamson of the Leicestershire Orienteering Club is taught how to use a 3.5MHz ARDF receiver by John Marriott. Each competitor had 10 minutes of tuition from an experienced radio orienteer before setting out at this event, held near Loughborough.

GB2RS at Bletchley

GB2RS news went on the air for the first time from Bletchley Park at the Wireless Waves event on 2 August. The news readers took calls after the bulletins using the RSGB HQ callsign GB3RS. The news was read by Alison Johnston, G8ROG, RM9 and assisted by Andrew Vine, M0GJH, DRM 94, Jim Stevenson, G0EJQ, RM13 and Bob Palmer, M3DPQ, representing the Milton Keynes club. Two readings where undertaken as a demonstration to the public, on 80 and 2m simultaneously at 1pm and again at 2.30pm on 40m.

Equipment used was a Trio TS2000 and a Yaesu FT897. A trapped dipole was used for 40 and 80m and on VHF the antenna was end-fed 2m dipole.

News readings are due to start from Bletchley Park in the near future. Amateurs wishing to assist with this on a regular basis should make it known by contacting Dr Alison Johnston, G8ROG, Regional Manager for London and Thames Valley, by e-mail to g8rog@rsgb.org.uk. Further details are available upon request or by visiting the GB2RS news section of the RSGB members website.

News team on-air: Alison Johnston, G8ROG, Andrew Vine, M0GJH, Jim Stevenson, G0EJQ and Bob Palmer. Photo: Peter, 2E0BFG.

GB2RS Newsfeed

Readers will be interested to know that a live GB2RS newsfeed will be available on the main RSGB website. This feed picks up on amateur radio stories in the press both in the UK and around the world. In the last week, several amateur radio clubs have received coverage for their participation in the International Lighthouse & Lightship Weekend and there have been stories about GB4FUN and AMSAT. The stories will change daily as new stories appear around the world. You find these stories towards the bottom of the news page on the RSGB website, www.rsgb.org/news.

Exam Success

Midlands ARS latest Foundation passes are L-R: Mike Creswell, Jim Moy, M1CPC examiner, Matthew Walters and Matthew Shaw.

The Rhondda Amateur Radio Society has two newly qualified Intermediate licensees . Congratulations to both candidates who are eager to exercise their new callsigns on the air. The club is hoping to attract others to take part in the courses and enjoy the same success as Chris and Tony. The club meets at the St Barnabus Church Hall, Penygraig, Rhondda on Tuesday evenings at 7.00pm.

L-R: Chris, 2W0PHP, instructor John, GW4BUZ and Tony, 2W0SCL.

On 28 June, James Steeper and Rod Rayner successfully completed their Foundation Course run by Les, G1LQB and Gerry, G6KGG at the Lincoln Short Wave Club. They now hold the callsigns M6JFS and M6AGR respectively. The courses were held over two weekends, culminating in the exam on the final Sunday, although Les, G1LQB does go through the *Foundation Licence - Now!* book on Wednesday evenings and Saturday mornings prior to the course. From left to right in the picture below are Les, G1LQB, James, M6JFS, Rod, M6AGR and Gerry, G6KGG. The Club is hoping to hold another course late Autumn and details can be obtained from Pam Rose, Secretary, on 01427 788356 or from www.g5fz.co.uk.

Following an Intermediate Exam course back in July, there were 10 successful students passing with flying colours, including an Explorer Scout and a successful Foundation candidate. The President of RS Harrow, who was one of the tutors on the course, presented the candidates with their certificates. The Society wishes the students well and hopes to hear them on the air soon, and also encourages them to obtain their full licence.

In the photograph above, showing only the Intermediate graduates, (l-r) Nathan, 2E0NAZ, Eric, 2E0NQV, Tom, Paul, 2E0SRP, Andrie, 2E0KAD, RSH President Ray Snow, Peter, 2E0TAV, Eddie and Nandesh 2E0GEE. Photo courtesy of, Jim, M0UJC.

Kettering & District ARS are pleased to congratulate their first four students to undertake and successfully pass the Advanced Examination and gain full licence holder status. Particular thanks are given to Maurice, now M0MAO, for his organisation of study and revision sessions throughout the training period.

Kettering successes (l-r) Maurice, M0MAO, Gary, M0NNH, Stephen, G1LMN (tutor), Nigel, M0GWK and Sam, M0SRW.

Enigmatic Reunion

On 4 September 1939, the day after the declaration of war by Prime Minister Chamberlain, codebreakers, including Alan Turing and Gordon Welchman, reported for top-secret duties at Bletchley Park and so began a most remarkable period in codebreaking history; the breaking of Germany's Enigma.

Today, Bletchley Park is home to an impressive permanent collection of Enigma and other vintage cipher machines and equipment. To mark this special anniversary, the exhibits will multiply when over 70 more previously top-secret machines from all around the world will be on display on 5 and 6 September. The arrival of these extraordinary encoding machines will coincide on the Sunday with Bletchley Park's Annual Enigma Reunion event, uniting them with many of the men and women who cracked their codes during World War Two, often without ever having seen the machine itself.

The machines will be arriving from museums and private and government collections all around the world, including the UK's own Government Communications Headquarters (GCHQ), the USA's National Cryptologic Museum and military museums in Scandinavia and Europe. Some of the machines have never before been publicly shown in the UK – such as the Enigma KD, Swiss K, T and other interesting machines that are still under wraps until this event opens.

Another highlight will be a talk on Saturday 5th by Prof. Tom Perera, W1YP, entitled The U-Boat Menace and the Enigma. He will have a table with his discs and various Enigma demonstrations too.

Family Fun Day

On 11 July, South Essex Amateur Radio Society set up a two transceiver field station at Canvey Island Yacht Club, located on the Thames mud flats, 20m from the high water mark (locator JO01HM). Callsigns for this for this Family Fun Day were GX4RSE/P and GX6RSE/P. Propagation was not good but many visitors displayed an interest and several operated under supervision.

RSGB SHOP

RSGB Yearbook 2010

Edited by Steve White, G3ZVW

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Apollo 11

To mark the 40th anniversary of the Apollo 11 moon landing, AMSAT-NA arranged for a number of ground stations to transmit, via AO-51, a short compilation of audio sound bites and a SSTV image in acknowledgement of that achievement 40 years ago.

The transmissions were scheduled for early evening on 20 July, which meant that the UK and Europe were some of the first to receive them. The UK was well placed with an almost overhead pass at 1722UTC. To the credit of the uplink station, Dave, G1OCN, this produced excellent signals for virtually the whole pass although there was some QRM on the L Band uplink frequency later identified by Graham Shirville, G3VZV, as the aeronautical high power radars with which we share the band.

Several UK stations reported receiving strong signals including GW1FKY, G0SFJ and G8OQW, but the best report came from EA4DUT who, during the previous pass over Europe, describes receiving an excellent signal on his home made Arrow antenna by the Mediterranean shore at JN00DF in Spain.

Edgware Activity Periods 2009

The Edgware Activity Periods run from 22 September to 2 October in short periods of operation – these can be found on their website, www.g3asr.thersgb.net. You can use SSB or CW on any or all of the bands. The format and rules of the event are unchanged from last year, but check them out on the website. In addition to individual club members, participation by club stations is encouraged to spread some bonus points as shown in the rules. The Edgware Club station, GX3ASR, will be operated once more by G3SJE and other club stations should identify themselves by use of the GX prefix. The call to use to show that you are participating in the event is on CW - CQ EAP or on SSB - CQ Edgware Activity Period.

NEWS IN BRIEF

• Churches and Chapels on the Air (CHOTA) is expecting a lively support from RSGB members around the country. E-mail g3xyf@btconnect.com for details.

GB1AMB

For two weekends in June, Bromsgrove & District Amateur Radio Club ran GB1AMB from the Avoncroft Museum of Historic Buildings, in Bromsgrove, Worcestershire. Over 600 contacts were made in over 30 countries, on VHF and HF.

The first weekend was also a Second World War II re-enactment at the Museum, with a large military display and many visitors to the Museum and the Special Event Station.

Club members, Barrie, G4AHK, Roy, G6NYG, Neil, M3NFL, Roger, G3KWK, John, G4OJS, Chris, M0BQE and Roger, G6OPY were the main operators with backroom help from other club members including Ray, G4HFP. Radios used were Yaesu FT-895, FT 1000MP, Icom 7400, together with VHF and HF beams.

Information about the station was posted on QRZ.com, with hundreds of enquiries. QSL cards are on the way to the many contacts.

GB2GHR

Members of the Gloucestershire Amateur & Electronics Society will be running GB2GHR for Gloucester Heritage Weekend on 12 and 13 September. St Michael's church tower

has recently been refurbished as a Heritage Cultural Centre thanks to Lottery funding. The tower is right on the city cross and the club hope to erect a dipole antenna from the top of the tower. They will be working from 10am to 4pm and, being in the very centre of the city, they expect to welcome many people during the event.

NEWS IN BRIEF

• During September, a special event station will be operating at weekends from a former Royal Observer Corps underground monitoring station at Machynlleth in Wales. The station will be operating all modes on HF and 2m and welcomes all visitors. For a schedule, please e-mail mo@magmo.org.

Bring Your Rig BBQ

Hastings Electronics & Radio Club has been holding a summer barbecue for some years. This year it was decided to make it an unstructured all day event, with the Chairman and Newsletter Editor up at the picnic site in time for the early 80m AM net.

Members came and went during the day and in all they had 6 stations working, five of them together in the evening. After helping to put up the command tent in a high wind, Antony, G4CUS went off to his car and worked a number of stations on HF. William, G8CMK and Henry, M3IJJ were able to have a Clansman to Clansman (UK/PRC320) QSO walking round the country park. Despite being on low power they caused interference to an Italian on 20m SSB so QSYed to 10m.

It was interesting to see the different ways in which roach poles were used to rig antennas.

Mike, M0EDU supplied everyone with chocolate cake, straight from his portable oven and later there were a number of BBQs on the go!

Transmission 2009

The British Wireless Fund for the Blind has found that the loneliness felt by so many blind people can be greatly helped by a radio. It offers a constant and vital link to the outside world – news and debate, sport, drama and music. In fact, it offers a whole new life. All of their state-of-the-art audio sets are specially adapted for the needs of blind people. And the high contrast controls are of great help to partially sighted people too.

Transmission is the annual amateur radio fund-raising event for the British Wireless for the Blind Fund. Clubs and individual amateurs get sponsorship for the number of contacts they make over the period of the event. This year it takes place between 0000UTC on 19 September and 2359UTC on 20 September.

There are special trophies for both clubs and individuals to win, one for the most contacts made and the other for the most amount of money raised for the charity.

For more information on this worthwhile event, check out their website at www.blind.org.uk.

Lottery Award

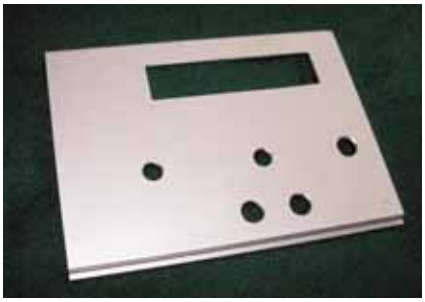
The Falkirk and District Amateur Radio Society has received an Awards for All Lottery grant of £4,915. The application was made to fund two projects designed to expand the main activities of the club. The first will assist the delivery of training with the acquisition of a new laptop, LCD projector and software. The second project will develop their HF special event station, GM0FRC, with a replacement tri-band antenna, linear amplifier, and associated instrumentation and test gear. F&DARS would like to thank the Awards for All team in Glasgow for their help towards our successful application.

F&DARS has a long and successful record of training at Foundation, Intermediate and Advanced levels and the new equipment will help improve the presentations to both students and experienced members alike.

The picture shows a group of members present at the formal announcement of the grant, including Gordon, GM3ULP RSGB RM; Alex, GM7OAW RSGB DRM; Ken, GM4NTX President F&DARS and lead instructor; and Peter, GM8GAX Chairman F&DARS.

LC Meter

Following the recent review of the G4HUP LC meter, a pre-cut front panel is now available for those who have difficulty with the metalwork side of the project. In the time since the review, G4HUP has also revised the PC board to have larger pads where possible, assisting those who may be concerned about their soldering abilities. There is also a backlit LCD version available for those who prefer it, but this must be externally powered. All information is available at http://g4hup.com.



Construction Competition

This year's winner of the Morecambe Bay Amateur Radio Society Construction Competition was Martin, MOLCY. He is ex RAF Telecomms and was inspired by the Duxford Lancaster Bomber and crew positions restoration project. Seen here is Martin showing his winning entry, a lifelike representation of a Lancaster Bomber wireless operator crew position. Martin explained to a packed MBARS meeting that while the framework of this construction uses modern materials the main equipment (T1154 and R1155) are original with all other parts made to look as realistic as possible.

This Station consists of Receiver R1155, Transmitter T1154, Aerial switch type J, Morse Key, Aerial Ammeter and Fishpond Radar Indicator Unit.

Demonstration Day

South Essex Amateur Radio Society operated a demonstration HF station for Canvey Railway and Model Engineering Club Open Day at Waterside Farm Leisure Centre on 26 July. A very pleasant day with many visitors, Maximillian and his daughter from HB9-land being the furthest.

New ESR Analyser

Peak Electronic Design Limited produces the Atlas ESR (Model ESR60), which measures capacitance and ESR (Equivalent Series Resistance). Measuring ESR is a way of finding faulty electrolytic capacitors and even for tracing PCB short circuits.

Now they have a new piece of test equipment that offers even more than the ESR60. The new instrument, the Atlas ESR+ (Model ESR70) adds several features that many hobbyists, technicians and engineers could find invaluable. The most notable new feature is the inclusion of audible alerts. Every measurement of ESR is shown on the display as usual, but the unit also produces a variety of tones depending on the value of ESR. The ESR measurement range has also been doubled, measuring from 0 to 40Ω with a resolution as low as 0.01Ω.

The original ESR60 unit will continue to be manufactured by Peak and is available at a new special price of £75 inc VAT, while the new ESR70 is available for £89inc VAT (both with £2 delivery in the UK). If you're an existing user of the original ESR60, you can send it to Peak for a hardware and software upgrade to the ESR70 features for £55 inc VAT. Customers with an ESR60 unit less than 3 months old can upgrade for just the difference in price between the two units.

Museums on the Air

On 27 and 28 June, members of Ayr Radio Group and Kilmarnock and Loudoun ARC were active from the Burns Museum in Alloway South Ayrshire for the Museums on the Air weekend.

GB2TAM

The Chelmsford Amateur Radio Society will be operating GB2TAM from the Thorpe Abbotts 100th Bomb Group Memorial Museum, in Norfolk, on 12 and 13 September. Thorpe Abbotts was a WWII air station, which was the home of the USAAF 100th Bomb Group from 1943 to the end of the war in 1945. Although much of the air station has now gone, the control tower still stands and has been restored to its former glory by a group of dedicated volunteers over the last 25 years, most of who are still working for the museum.

GB2TAM has been organised to coincide with the weekend of the 100th Bomb Group reunion, which is held each year in Albuquerque, New Mexico. It is hoped that, band conditions allowing, they will be able to make contact with the reunion and possibly speak to some of the veterans who will be attending.

The station will be operating on all HF bands using SSB as well as 2m FM and will be pleased to contact stations regardless of location. A GB2TAM QSL card will be available for all contacts.

GB100LB

Dover Club had a special event station GB100LB to celebrate the centenary of the flight by Louis Bleriot across the English Channel. The club operated on many bands with plenty of contacts particularly in France but including the rest of the world despite the contest on 20m. The event was very well organised operating from two sites including the Royal Military School near Dover Castle where the first commemorative flight of the Bleriot plane this year landed, not a great distance from the original site. A special thanks to all concerned, particularly Peter Love, GOKOK.

GB0CR

On 19 July, King's Lynn Amateur Radio Club held its 2nd Field Day/Family Picnic Day in the grounds of the Castle in the village of Castle Rising some 4-5 miles North East of King's Lynn. Using the callsign GB0CR, in conjunction with Castles and Stately Homes on the Air, quite a bit of interest was shown by visitors to the Castle. Club members were able to show and explain something about amateur radio.

This year they managed to avoid the IARU competition and some reasonable contacts were made into Europe. The antenna in use was a centre fed dipole with the centre attached to the top of the Castle flagpole, a height 65ft, down to a fence located about halfway up the side of the very considerable surrounding earthworks on one side of the Castle, and down to a tree on the other side, a total length of 100 metres. This was tuned using an SGC 239 HF Smart Tuner and contacts were made on 20, 40 and 80 metres. The other equipment in use was the club's Icom IC 736 and an Icom SM 20 microphone.

One very interesting contact was made with Roger, G4ROJ in Kidderminster, who was using a kite antenna. Roger had recently given a talk to KLARC on the use of airborne antennas.

The picture shows Tony, G1IZH, operating and Peter, G4YYJ, logging using XM log on the club's laptop. The club will QSL 100% to all contacts. The club is most grateful, once again, to Lord Howard of Rising for kindly allowing them the free use of the Castle and grounds for the Field Day, also to castle staff members, Maureen and Norman, for all their assistance in connection with this event.

VMARS

The Vintage & Military Amateur Radio Society celebrated their 10th anniversary at the recent Wireless Waves weekend held at Bletchley Park. The Society was formed to encourage the collection, preservation, restoration and use of historic radio equipment with the aim of keeping as many sets as possible on the air, especially using AM and CW. They had a lovely collection of working radios on display and ran a special event station for the weekend working many amateurs around the world – including joining in some AM nets. On Sunday, they had their official anniversary celebrations with a lecture by Antony Wedgwood, G0TJD on Some Post War HF Manpacks for Long Range Patrols. Antony had several examples there for VMARS members and guests to view. Membership Secretary Stuart McKinnon welcomed everyone to the anniversary and the anniversary cake was cut by Chairman, Bronek Wedzicha, M0DAF and Antony Wedgwood, G0TJD.

McMichael Rally

Tony, G8TEE was the lucky winner of this year's Star Raffle Prize, a brand new Yaesu FT-450 worth £600 at the recent McMichael Rally. The prize was very kindly donated to all the clubs involved in running the Michael Radio Rally & Boot Fair by Yaesu and Martin Lynch & Sons.

This rally was the most successful to date with the car park overflowing with visitors. The weather was fantastic with brilliant sunshine and just a few spots of rain. Just as well – Martin & Chris didn't have any wet weather protection for their stand!

Next year's event will be even bigger and better with lots of new attractions and more stands. Date to be announced.

NEWS IN BRIEF

• The DX Cluster GB7MBC is now on Twitter. It provides such things as DX news, IOTA, Contests and Solar information. If you wish to follow it on Twitter just add it to the list of tweets you follow. See http://twitter.com/GB7MBC.

RSGB SHOP

RSGB Deluxe Log Book & Diary 2010

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Packed with extras, the *Deluxe Logbook & Diary 2010* is the very latest edition for those requiring more from their Logbook. Ever popular, the *Deluxe Logbook & Diary* contains a wealth of reference information plus a diary. All fully updated, you find the very latest UK Band plans, DXCC prefix list, RSGB QSL Bureau information including the various QSL managers, details of Ofcom, GB2RS, a locator map (and an explanation of how locators work), repeaters, events and a list of major contests - pretty much everything you need to know right at your fingertips. And, of course, it has a generous amateur radio station log section, so you can record all your contacts.

The Deluxe Log Book & Diary 2010 includes:

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- Current UK band plans
- European locator map
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- Repeater listings
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The *Deluxe Log Book & Diary 2010* is also the ideal way to neatly record a whole year of activity and store it in an attractive way for years to come.

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Callseeker Plus 2010

If you want the convenience of an instant search callbook that covers the UK and Europe that is *Callseeker Plus*!

This CD contains the most up-to-date listings of United Kingdom and Republic of Ireland amateurs' callsigns, you will also find comprehensive coverage of callsigns from across Europe. It also contains the all the information from both the RSGB Yearbook Information section in an easily searchable PDF. Callseeker Plus boasts a host of "extras" including hundreds of Mega Bytes of useful amateur radio software (list available on the website).

Callseeker Plus is really easy to use and requires no installation or disk space. The software runs straight from the CD so you can easily search by callsign, name or location. Navigating through the search results is quick and easy and you can print the results in a variety of formats including straight to an address label. Users will also find callsigns from 9A, DL, EA, ES, F, HA, HB9, I, LX, LY, OE, OH, ON, OZ, SM, SP, SV and Z3. Those wanting to access the "Information" pages of the RSGB Yearbook 2010 can go straight to the PDF from the "extras" button where they will also find all the added software in including the very latest Acrobat Reader 9 program.

Callseeker Plus is a must for every radio amateur who wants an economical choice with lots of software, additional information and data from across Europe.

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Eagle Has Landed

Special event station GB400IYA was activated on 20 July to commemorate the 40th anniversary of the Apollo 11 moon landing in 1969. Located at Norman Lockyer Observatory, Sidmouth, the station was on air throughout the day until 2300UTC with authentic 1969 time-synchronised NASA comms running in the background for the benefit of visiting public.

Despite poor conditions on the 3.5 and 7MHz bands, a steady stream of inter-G and European contacts were made during the day, with the number of contacts improving during the evening to include USA and Canada on 14MHz. At 2017UTC, the touchdown time of the Eagle Lunar Module in 1969, the lucky stations in QSO with the station were Giles, G0NXA and Ralph, G0UWB, two of the many stations who related their own memories of this historical event.

UNESCO, NASA and the International Astronomical Union have designated 2009 as the International Year of Astronomy to commemorate the 400th anniversary of Galileo's first glimpses through a telescope, and GB400IYA is one of several international amateur radio stations promoting the year on air.

Sponsored by Icom UK, the station is located in the historical McClean telescope dome and is active every weekend until December 31st.

Science Museum

Donald MacLean, G3DNQ recently donated his collection of early TV artefacts, including the world's first video recording (a 1935 78rpm disk) and a manual for the Baird TV receiver to the Science Museum. The collection was received by Ian Baird, grandson of John Logie Baird and curator of the Media Museum. G3DNQ was a post-war TV producer before becoming Head of Popular Music at the BBC, amongst other posts.

Amateur Radio in the New Forest

Yew Tree Heath, in the New Forest, was used for anti-aircraft defence equipment during WWII, but on 26 July, it was the scene of more peaceful activities. Amateur radio stations were set up on the site by members of the local Waterside New Forest Radio Club for their annual HF Picnic.

The radio stations were set up on Yew Tree Heath by Tim, G4YVY, Tony, G6MNL, Bill, G0XAZ and Malcolm, G0WFQ. Gordon, G1ZEC and Robin, G0OSG helped with the main tent set up. Chrissy, Diane and Sue provided much appreciated tea, coffee and cakes, and the weather remained dry for most of the day.

Many HF radio contacts around Britain and Europe were made during the day, using both the club's G5RV aerial and Tony's unconventional and very compact experimental spiral HF aerial. Several successful contacts were made using the latter, including Chas, GM3JUD on 80m, Tomi, HA6IAY and Peter, OZ8CTH on 20m, and Chris, SM0OWX on 17m.

More club members and other amateurs arrived during the day and helped to make the event a success, including the welcome appearance of some senior members. The HF Picnic is basically a radio event but, in practice, it also provided an opportunity for radio amateurs and their families to meet socially and discuss more than purely technical matters. Everyone felt that it had been a most pleasant and useful day, and well worth the effort.

Old-Fashioned Junk Sale

Ted, G3YCN died in January, leaving a mountain of bits and pieces that could be a good starting point for many junkboxes - or as a top-up for others. Much was listed and offered by e-mail last month in the Members Ads. It is anticipated that there will be a great deal left to pick over and, to this end, a very large field with a little cover and plenty of tea and coffee will be set aside for an old fashioned rally on Sunday 20 September where everyone can turn up and meet like-minded people and old friends. They can fill their boots with junk: components, books and equipment of a bygone era – what's left from the list (still available from G3VFC, e-mail terry@chipperfield.name) and more.

Located at Detling, very close to Kent County Showground on the A249 which links the M20 with the M2, plenty of parking is available. Within sight of GB3KN (which was in Ted's charge since 1984), talk-in will be on that repeater in tribute to his work with others on 'KN and GB3RE.

Ted was an RSGB member for 62 years: his passion for the hobby was immense and with this in mind his family would like to support newcomers and old timers by offering his collection of 'potentially useful stuff'. Any monies raised at the field sale will be split between the Royal Signals Benevolent Fund and the Radio Communications Foundation.

Railways on the Air

Following last year's first 'Railways on the Air' event, Bishop Auckland Amateur Radio Club is planning to coordinate ROTA 2009. The event is timed to coincide with the anniversary of the running of the world's first steam passenger train on the Stockton to Darlington Railway. As last year, clubs and individuals as encouraged to make contact with a local heritage railway and arrange to run a special event station from their site over the weekend. The event will last over the weekend of 26 and 27 September.

ROTA 2008 produced over two dozen registered special event stations linked to heritage railways from as far afield as Australia and Poland, although most were in the UK. It is hoped that more international stations will register this year and join in with the event. BARAC will run a special event station over the weekend signing its permanent special event call sign GB2EVR on HF, 2m and 70cm at the Eden Valley Railway in Cumbria on the Stockton to Darlington extension. Mike, G0NRK, will as before lead this station and coordinate operations on the day.

Although you do not have to register for the event, special event stations who take part and e-mail BARAC a copy of their log after the event will receive a customised unique certificate for themselves and the Railway. This year the certificate will feature a print of an original oil painting depicting a railway scene. To register go to the BARAC website at www.barac.m0php.net/ and follow the links.

Bath Radio Classes

The Bath radio classes run through the academic year and the 2008/09 classes were as successful as ever with some 24 candidates passing through. Tuition came from Steve, G0FUW, Mike, G3VTO and Lewis, G4YTN. Some ex-students assisted with practical assessments and exam invigilation. The classes are kindly sponsored by the City of Bristol RSGB Group, which helps to keep the costs down.

Two Foundation courses were run, one starting in September and another after the June Advanced exam. Both had 100% pass rates allowing 10 newcomers to get on the air for the first time. These included young Katie, M6KTE, who had a very nice mention in the *RadCom* letters page just weeks after passing the exam.

Most of the first batch of Foundation students continued and were joined by some who had held M3 licences for a while, so there were 10 Intermediate students. The 2nd Bath Buildathon was run to enable most to complete their radio projects.

All but one of the Intermediate crowd carried on to Advanced level. They were joined by Stuart Withnall, now M0GPC, who travelled all the way from Cheltenham every week; Advanced training is thin on the ground in the South West. Ten students was the biggest Advanced class since the days of the old RAE and, despite some headaches along the way, they all made it to the exam. It wasn't quite 100% pass rate this time round, but one of the successes was re-sitting, showing that if you keep going it is achievable.

In addition to the formal classes they facilitated eight 'external' assessments/exams, including Ben Pearson, an MSc student who was doing a project developing radio systems for third world countries and wanted to know more about the technical side of radio. They also helped Leo May, M6LEO, who studied at school with some mentoring from his science teacher, John Weston, G3LYW.

Looking forward, the classes will start again on 3 September and there are tentative plans for a 3rd Bath Buildathon in January 2010. Details can be had from Steve Hartley, G0FUW, 01225 464394, or via e-mail to g0fuw@tiscali.co.uk.

AMSAT-UK FUNcube

AMSAT-UK has announced a new amateur satellite project - FUNcube. The project has received major initial funding from the Radio Communications Foundation (RCF) and is expected be developed in collaboration with ISIS - Innovative Solutions in Space BV.

FUNcube is an educational single cubesat project with the goal of enthusing and educating young people about radio, space, physics and electronics. It will support the educational Science, Technology, Engineering, Maths (STEM) initiatives and provide an additional resource for the GB4FUN Mobile Communications Centre. The target audience consists of primary and secondary school pupils and FUNcube will feature a 145MHz telemetry beacon that will provide a strong signal for the pupils to receive. It is planned to develop a simple receiver board that can be connected to the USB port of a laptop to display telemetry in an interesting way. The satellite will contain a materials science experiment, from which the school students can receive telemetry data which they can compare to the results they obtained from similar reference experiments in the classroom.

It is anticipated FUNcube will be launched into a Sun Synchronous Low Earth Orbit about 600-700km above the earth using one of the many launch opportunities that exist for Cubesat missions. FUNcube will carry a UHF to VHF linear transponder that will have up to 1 watt and which can be used by radio amateurs worldwide for SSB and CW communications.

The RCF funding for FUNcube is made possible through the generous bequest from a silent key who wanted the hobby that he loved brought to the attention of others.

You will be able to track FUNcube using a small hand-held antenna as shown in this picture (photo: ISIS).

NEWS IN BRIEF

• Horndean & District ARC (region 10) will be running their next licence training course in October. The first part of the tuition for the Foundation licence will be on 3 October, with the remainder of the course, plus the exam on 11 October. They are also running an Intermediate licence course, with the exam also on 11 October. The Foundation course is run at a registered venue in the Portsmouth area. Further information from Stuart Swain, G0FYX, e-mail stuart.swain@hotmail.co.uk, tel. 023 9247 2846 or see the club website www.hdarc.co.uk.

• From 4 to 5pm on Friday 25 September Martin Maynard, G8CIX will be joining the ranks of those who have taken their place on the empty Fourth Plinth in Trafalgar Square in London. This is part of the One & Other event devised by the artist Antony Gormley. Ofcom have issued the callsign GB1AO Golf Bravo One And Other and Icom UK are going to help with supplying equipment and expertise to see what sort of amateur radio signals may be suitable. There is a possibility that D-Star can be used.

• Pafos Radio Club in Cyprus has recently installed a new repeater, 5B4PRC, on 145.750/150, 88.5Hz CTCSS, 290m ASL at locator KM64FT. The repeater is located at the QTH of Brian, 5B4AHW. It should be easily accessible by any visitor to the Pafos area using a handheld.

• Over 10-13 September, GB80RBP will get another airing when the Radio Society of Harrow operates from the former RAF Bentley Priory, in support of Civic Trust Heritage Open Days Weekend for the Bentley Priory Battle of Britain Trust. Visitors are most welcome over the weekend. Apart from GB80RBP, there will be other displays and re-enactments and fund raising activities taking place.

• Thanks to donations from several interested parties, a new digital repeater, GB7SN has been installed at Norton in the South of Sheffield. It has a receive frequency of 439.7375MHz and a transmits on 430.7375MHz. The UHF frequency of GB7SF-B was transferred to GB7SN-B and GB7SF-B was taken off the air on 23 July. GB7SN port B was switched on test at 1511 BST on 23 July and now offers extended coverage to the South of Sheffield, Chesterfield and Worksop Areas. It is hoped to connect this to the worldwide D-Star network in the near future. GB7SF remains operational on VHF giving good coverage over Sheffield. Further details of the group's repeaters are available on www.qrz.com and the GB7SF website.

• GB0CAS (Campton All Saints) has been issued to G3JNB to operate on 80m in the recently established 'CHOTA' event that will be on air during the annual Historic Churches Trust 'Bike 'n Hike' sponsored cycling and walking fund raising event on 12 September (10am-6pm). QSLs to G3JNB.

Train the Trainers

Telford & District Amateur Radio Society will be hosting a Train the Trainers Session on Saturday, 19 September. It will be at their Headquarters near Telford in Little Wenlock Village Hall, Malthouse Bank, Little Wenlock, Telford, TF6 5BG. The Tutors will be Dave Wilson, M0OBW and Dave, G1PIX, starting the session at 10am and finishing about 4pm. To register your interest, and for catering purposes, please contact Mike Street, G3JKX using e-mail mjstreetg3jkx@blueyonder.co.uk as soon as possible.

Museum Exhibit

Thames Valley Amateur Radio Transmitters Society has been in existence for 75 years. The Society has decided that it was time to deposit all records with the local museum so that they can be examined by the public – including any young people who could become interested in amateur radio. The records are with the Surrey History Centre in Goldsworth Road, Woking. The records cover 1933 to 2008 and include a large album of photographs, newspaper cuttings, registers of members and visitors, early financial accounts, G3TVS QSL cards and much more.

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* Frequency Counter
* LCD readout
* SWR & impedance meters
* Connectors: N-socket (Ant), BNC (Counter)
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MFJ-260C	0-500MHz 300W SO-239	£44.95 C
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MGJ-264	0-600MHz 1.5kW S0-239	£75.95 C
MFJ-264N	0-650MHz 1.5kW SO-239	£84.95 C
MFJ-267	0-60MHz 1.5kW with meter	£159.95 C

MFJ Indoor Loop Tuners

These loops rival full-size dipoles and are extremely quiet.. Our director, G3OJV, has worked VKs and Ws using 50W indoors on SSB!

All tuners cover 7-30MHz 300W

MFJ-933 (top) 7 - 30MHz loop tuner £194.95

MFJ-935B (middle) similar to MFJ-933 + with meter £212.95 C

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Just add a wire loop for 1.5 frequency span. eg 13ft of wire bent into loop = 30-20metres.

MFJ-57B 20/15m loop £36.95

MFJ-58B 20-10m loop set £54.95

MFJ-962D 1.5kW 1.8 - 30MHz ATU

- Standard 'T' network
- VSWR meter
- 0-200/0-2kW
- 6-way Antenna/load switch
- Balanced feeder terminals
- Roller coaster Inductor

W&S £289.95 C

MFJ-969 300W 1.8 - 54MHz ATU

- 'T' match network
- Coax, balanced and end fed ants
- Built-in dummy load
- Roller coaster inductor
- Very accurate Average/ PEP meter
- 3-way antenna switch

W&S £209.95 C

MFJ-902 TINY TRAVEL TUNER 1.8 - 30MHZ

This Ultra compact tuner covers 3.5-30MHz up to 150W and matches coax or wire.
Size: 11.5 x 5.7 x 5.7cm

W&S £106.95 C

MFJ-904 TINY TRAVEL TUNER 1.8 - 30MHZ

The same as the MFJ-902 above but with large cross-needle VSWR/PWR meter.

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MFJ-941E 1.8-30MHz ANTENNA TUNER

* 300W
* Cross needle meter
* VSWR & 30/300W pwr meter
* Size 260x180x70mm
* Weight 1.6kg

W&S £139.95 D

MFJ-945E 1.8-54MHz MOBILE ATU

* 300W max
* Cross needle meter
* VSWR & 30/300W power meter
* Size 210 x 150 x 60mm
* Weight 865g

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MFJ-976 BALANCED LINE ATU

* 1.8MHz - 30MHz * 1500W PEP
* Matches 600 Ohm open wire, 450, 300 Ohm ladder lines, 300/72 Ohm twin, coax & random wires
* Size 310x180x410mm
* Weight 4kg

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MFJ-921 2m VHF ATU 200W NEW

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MFJ-924 70cms UHF ATU 200W NEW

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* Sockets: SO-239
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* Weight: 425g

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* 300W
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* 30/300W PEP power meter
* Size 260 x 190 x 83mm
* Weight 1.65kg

W&S £162.95 C

MFJ-949E 1.8-30MHz ATU / DUMMY LOAD

* 300W
* Large cross needle meter
* 30/300W PEP power meter
* Size 260 x 190 x 83mm
* Weight 1.8kg

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MFJ-901B 1.8-30MHz "VERSA TUNER"

* 200W rating
* Size 135 x 150 x 60mm
* Weight 760g

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* Less than 0.5dB loss
* SO-239 Sockets

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MFJ are the largest ham radio tuner manufacturer. The atu insertion loss is extremely low when compared with other models - something not a lot of people appreciate! So the largest manufacturer with the widest range and the lowest loss makes sense!

MFJ IntelliTuners™ from USA

"The world's fastest ultra wide tuning range"

All models offer coax, wire and balanced

MFJ-998E 1.5KW AUTO TUNER!

* 1.5kW SSB & CW * Digital & Analogue x-needle VSWR
* 1.8 - 30MHz • 12 - 1600□ * 20,000 memories
* Radio interfaces optional * Built-in antenna selector
* Field upgradeable firmware
* Auto bypass protection

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MFJ-926 AUTO TUNER 1.8 - 30MHZ 200W

New Tough all-weather tuner for hams and marineuse. Ideal for end fed wires, this is really fast! Requires 10W min input.

NEW

W&S £419.95 C

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LCD readout, 20,000 memories, long wire & coax, radio interface.

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MFJ-925 AUTO TUNER 1.8 - 30MHZ 200W

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MFJ-991B AUTO ATU 1.8-30MHZ

* Frequency: 1.8-30MHz
* 150W SSB, 100W CW
* Matches 6 - 3200 Ohms
* Cross needle SWR/PWR meter

W&S £209.95 C

MFJ-993B AUTO ATU 1.8-30MHZ

* Frequency: 1.8-30MHz
* 300W SSB, 150W CW
* Matches 6 - 1600 Ohms
* Cross needle SWR/PWR

W&S £249.95 C

MFJ-994B AUTO ATU 1.8-30MHZ

* Frequency: 1.8-30MHz
* 600W SSB, 300W CW
* Matches 6 - 800 Ohms
* Cross needle SWR/PWR meter

W&S £339.95 C

Branches: **Hockley**
Waters & Stanton, 22 Main Road, Hockley, Essex, SS5 4QS.
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Glenrothes
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Cushcraft Antennas

Cushcraft HF Antennas

MA6V	6-20m compact vertical	£329.95	D
MA5V	10-20m compact vertical 250W	£279.95	D
MA5B	10-20m 3 element mini beam with balun	£479.95	D
X7	10, 15 & 20m 7 element yagi 2kW Yagi	£979.95	D
X740	40m add on kit for X7	£399.95	D
XM-240	40m 2 element yagi 1500W	£919.95	D
A4-S	10, 15, & 20m 4 element yagi 2kW	£739.95	D
A-744	7 MHz/10 MHz add on kit for A4S	£199.95	D
A3-S	10, 15, & 20m 3 element yagi 2kW	£599.95	D
A3-WS	12 & 17m 3 element yagi 2kW	£499.95	D
A-103	10 MHz add on kit for A3-WS	£189.95	D
MA8040V	80/40m vertical antenna	£319.95	D
R-8	40-6m vertical 1.5kW 8.7m long	£559.95	D
R8-GK	Guy kit for R-8 vertical	£54.95	D
R-6000	6,10,12,15,17 & 20m vertical 5.8m long	£399.95	D
ASL-2010	13.5-32MHz 8 element log periodic	£899.95	D
D-3	14/21/28 MHz 2KW 7.86m long	£299.95	D
D-3W	10/18/24 MHz 2KW 10.37m long	£299.95	D
D-4	7/14/21/28 MHz 2KW 10.92m long	£419.95	D
D-40	40m 2KW 12.88mlong	£369.95	D
TEN-3	10m 3 element beam 8dBd gain 2.44m long	£259.95	D
AR-10	10m vertical 3.75db gain 5.36m high	£99.95	D

Cushcraft VHF/UHF Antennas

A6270-13S	6m/2m & 70cm yagi	£269.95	D
A270-10S	2m/70cms 5 element beam	£164.95	D
A270-6S	2m/70cms 3 element beam	£125.95	D
AR-270B	2m/70cms vertical dualband Ringo	£209.95	D
AR-270	2m/70cms vertical dualband Ringo	£139.95	D
124-WB	2m 4 element Yagi	£99.95	D
13-B2	2m 13 element beam	£239.95	D
17-B2	2m 17 element beam	£379.95	D
26-B2	2m 26 element beam	£629.95	D
A148-10S	2m 10 element beam	£139.95	D
A148-3S	2m 3 element beam	£64.95	D
A148-20T	2m 10 ele (each) crossed beam	£219.95	D
AR-X2B	2m vertical 7db gain 4.3m high	£109.95	D
AR-X2	2m vertical 5.5db gain 2.8m high	£69.95	D
AR-2	2m vertical 3.75db gain	£59.95	D
A430-11S	70cms 11 element beam	£109.95	D
719B	70cms 19 element beam	£249.95	D
A50-3S	6m 3 element beam	£129.95	D
A50-5S	6m 5 element beam	£199.95	D
A50-6S	6m 6 element beam	£349.95	D
AR-6	6m vertical 3.75db gain	£89.95	D

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∧ **Fully Automatic PLATINUM ANTENNA** ∧ **Side Kick**

The world's finest automatic mobile antennas with a radiation efficiency unmatched by any other!

The **SIDEKICK** fits any car in seconds **£399.95 D**
This antenna includes 12V electronic control box and cable. Mount it on our three-way mag mount - its that easy!

- *3.5-60MHz*
- *1.5:1 or less typical SWR*
- *200W to the antenna*
- *High-Q phenolic coil*
- *Black Hawk Motor™*
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- *Standard 3/8in base*
- *Remote control Box*
- *Stainless steel whip*
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- *Requires 12V DC*
- *Size: 1.2 - 1.37m*
- *Weight: 907g*

W-300T Three Way Mag Mount for Sidekick **£39.95**

The 2KW **PLATINUM** **£549.95 D**
From 80m to 6m with VSWR of 1.5:1 or better, it outclasses everything - includes control box and cable.

The HS-1800/Pro is High Sierra's very latest version of their "all-band" 80m to 10m variable frequency mobile whip. With a coil nearly 5cm (2in) diameter, and a matching unit built into the Universal Mount Bracket, nothing out performs it and nothing approaches its standard of engineering. This really does radiate a potent signal. With 100 Watts, contacts are as easy as from a base station. The secret is in its amazing efficiency. We measured up to 6dB power gain compared with a simple helical - and you don't have to get out of the car to change bands!

GAP Antenna Sale

Challenger-DX 8-band HF-VHF(illustrated)

- *Bands: 80, 40, 20, 15, 12, 10, 6, 2m. • 2kW PEP SSB*
- *VSWR: Better than 2:1 • 3/8 wave basic concept*
- *Height 9.6m (31.5ft) • Radials 3 x 7.6m (25ft)*
- *3ft drop-in ground socket supplied*
- *Can be mast mounted • Weight 8kg* **£299 D**

Voyager-DX 4-Band LF

- *Bands: 160, 80, 40, 20m • 2kW PEP SSB*
- *VSWR: Better than 2:1 • Height 13.72m (45ft)*
- *Radials 3 x 17.4m (57ft) • Requires guys - brackets supplied • 2ft ground pivot assembly included*
- *Weight 13.6kg* **£389 D**

Eagle-DX 6-Band

- *Bands: 40, 20, 17, 15, 12, 10m • 2kW PEP SSB*
- *VSWR: Better than 2:1 • GAP centre fed*
- *Height 6.4m (21ft) • 2m (80in) 3 x counterpoises inc.*
- *Support pipe user supplied (31.75mm max)*
- *Weight: 4.9kg.* **£329 D**

MFJ Compact Loop Antennas

MFJ- 1788X Loop **£489.95 D**

- *7 - 22MHz (40 - 15m)*
- *Size: <1m (36in) loop*
- *Feeder: 50 Ohms*
- *Power: 150W*
- *Remote control included*
- *Auto band selection*
- *Dual Fast/Slow tune buttons*
- *Built-in cross-needle VSWR/Wattmeter*

MFJ- 1786X Loop

- *10 - 30MHz*
- *Size: <1m (36in) loop*
- *Feeder: 50 Ohms*
- *Power: 150W*
- *Remote control included*
- *Auto band selection*
- *Dual Fast/Slow tune buttons*
- *Built-in cross-needle VSWR/Wattmeter*

£449.95 D

Watson Antennas Bargain Prices

Pre-tuned & Weather Sealed Fibre-glass encapsulation

W-30 2m/70cms 3/6dB length 1.15m 150W SO-239 **£49.95 C**

W-50 2m/70cms 4.5/7.2dB length 1.8m 150W SO-239 **£54.95 C**

W-300 2m/70cms 6.5/9dB length 3/1m 150W SO-239 **£74.95 D**

W-2000 6m/2m/70cms 2.15/6.2/8.4dB length 2.5m 150W **£89.95 C**

Hustler Antennas - New Low Prices!!!

Largest Stocks Of Hustler Antennas In The UK!

HF Vertical Antennas

Works amazingly well even without any radials. Just insert a 1m earth stake into the ground and enjoy DX from the smallest of gardens.

Spec.	6-BTV	5-BTV	4-BTV
Bands	6	5	4
Bands	80,40,30,20, 15,10m	80,40,20, 15,10m	40,20,15, 10m
Width	Full	Full	Full
Width 80m	100kHz	100kHz	N/A
VSWR	1.15:1	1.15:1	1.15:1
Power	1kW	1kW	1kW
Base (mm)	44.45	44.45	44.45
Height (m)	7.3	7.64	6.52
Weight (kg)	7.48	7.7	6.8

6-BTV Was: £289 **Now: £249**
5-BTV Was: £249 **Now: £219**
4-BTV Was: £209 **Now: £179**

Mobile Antennas

A complete range of single band antennas. Purchase a base whip section and then as many resonators as you need. These are amazingly efficient and rated at 200W.

Base Whip Sections

Model	Band	
MO-1	137cm Folds 1/3rd Up	£38.95 C
MO-2	137cm Folds Halfway Up	£38.95 C
MO-3	137cm Non Folding	£29.95 C
MO-4	67cm Non Folding	£26.95 C

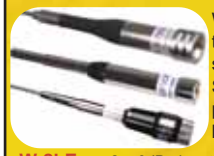
Resonator Heads

Model	Band	Bandwidth	
RM-10	10m	150-250kHz	£21.95 C
RM-11	11m	150-250kHz	£21.95 C
RM-12	12m	90-120kHz	£21.95 C
RM-15	15m	100-150kHz	£21.95 C
RM-17	17m	120-150kHz	£26.95 C
RM-20	20m	80-100kHz	£26.95 C
RM-30	30m	50-60kHz	£29.95 C
RM-35	40-30m	7-10MHz	£29.95 C
RM-40	40m	40-50kHz	£29.95 C
RM-50	60-40m	5-7MHz	£29.95 C
RM-60	60m	5MHz	£32.95 C
RM-80	80m	25-30kHz	£32.95 C

Fact Not Fiction –

We Stock The Range Of Hustler Products – We're Not Cherrypickers!

Watson Mobile Whips Bargain Prices!



Watson mobile antennas are made to a high specification and employ stainless steel whip sections with SO-239 receptors. All models are pre-tuned and will withstand at least 100 Watts RF.

W-2LE	2m 0dBv length 0.48m	£10.95 C
W-285	2m 3.4dBv length 1.33m	£14.95 C
W-77LS	2m/70cm 0/2.4dBv length 0.43m	£14.95 C
W-770HB	2m/70cm 3/5.5dBv length 1.1m	£19.95 C
W-7900	2m/70cm 5/7.5dBv length 1.58m	£31.95 C
W-627	6/2/70cm 2/4.5/7.2dBv length 1.6m	£34.95 C

"Quick Mobile" Dual Band Mag Mount whip.
Ideal for use with handhelds or for occasional mobile. Just place it on the roof of the car and connect the 3m thin RG coax cable (terminated in BNC connector) to your radio. (cable adaptors available for all radios - extra).
WSM-270 £19.95

SGC SG-237 Auto ATU

- *Frequency 1.8 to 60MHz*
- *Power input 3 - 100W (PEP) 40W max CW*
- *VSWR: <1.4:1 (typical)*
- *Antenna: Min length 2.4m 3.5-60MHz, min length 7m 1.8-60MHz*
- *Input impedance range 45 - 55 Ohms*
- *Output: Ceramic terminal*
- *DC supply 13.8V DC 0.3A*
- *Fully waterproof housing*
- *Size: 178 x 229 x 38mm*
- *Weight: 0.9kg*

£319.95 C

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- **IC-RP2D** 1.2GHz DD-Mode RF Module
- **IC-RP2V** 1.2GHz DV-Mode RF Module
- **ID-RP2000V** 144MHz DV-Mode RF Module
- **ID-RP4000V** 430MHz DV-Mode RF Module

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Homebrew

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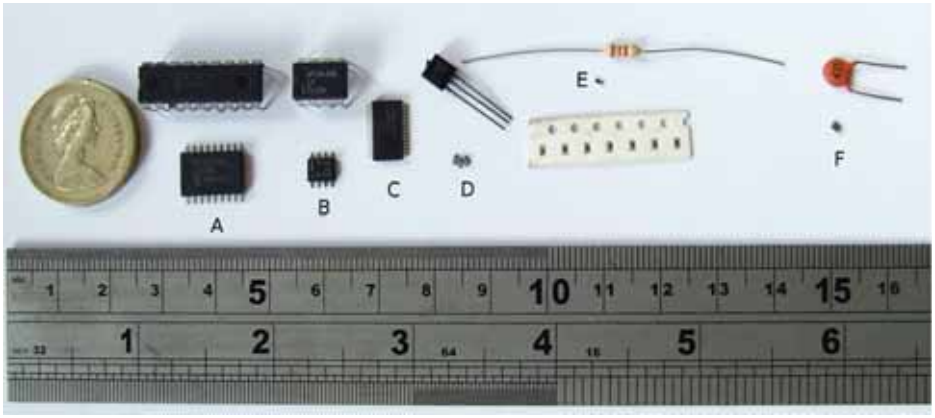


PHOTO 1: Traditional leaded components and their surface mount equivalents (see text).

IT'S NOT THAT NEW. Surface mount technology, or SMT, is well established as the most common form of circuit construction in use today. Most commercial equipment makers have been using SM components for more than 20 years. For various reasons, many amateurs have been reluctant to use this method of construction. Ordinary through-hole components are still readily available and will probably remain so for many years. Many of us are well equipped for handling through-hole components and see little reason to change to the newer technology. However, SMT offers some advantages for the home constructor. SMT tends to have superior performance at VHF, UHF and microwave frequencies. Because of their small package size and lack of connecting leads, SM packages have lower stray inductance and capacitance than other package types.

Some surface mount components are just as easy to use as their through-hole equivalents. SM chip capacitors and resistors are particularly easy to use. The smallest components are not so easy to work with, but larger devices like the 1206 series of chip capacitors and resistors are very easy to handle. These components are particularly well suited to Veroboard, dead-bug, Manhattan and other styles of point-to-point wiring. SM components are usually cheaper than through-hole components. SM component kits are available at extremely low cost. SM resistors typically cost a fraction of a penny each.

Any discussion about SMT should start with a few words about the terminology used. 'SMT' generally applies to the entire technology and not just individual components. SMD is a surface mount device like a resistor, transistor or IC. The term PTH (plated through hole) is often used to refer to conventional through-hole PCB construction that uses a drilled PCB and leaded components. This often leads to confusion because many single sided PCBs don't have plated-through holes. Most double sided and all multi-layer SMT PCBs do use plated through holes. To avoid confusion, I will use the term through-hole in place of PTH.

Photo 1 shows a selection of SM components and their through-hole equivalents. A is an 18 pin PIC microcontroller in a standard DIP package with the same device in a SOIC-W package below. B is an 8 pin op-amp in DIL and SOIC packages. C is a 28 pin AD9851 DDS in a SSOP (shrink small outline package). D is a TO92 transistor with a SM SOT23 transistor below. E is a standard 0.25W resistor with a tiny 0603 chip resistor below. F is a ceramic disc capacitor with an 0805 chip capacitor below. The SM components usually occupy a much smaller PCB area than through-hole components. The size, volume and weight reduction is even greater than the photograph would suggest because SM components also have a far lower profile than other component types.

Figure 1 shows the PCB footprint for a 28 pin DIP IC, a SOIC-Wide (small-outline integrated circuit, wide version), a standard SOIC package and finally the 28 pin SSOP package as used for the AD9851 DDS IC. The DIP package has 10 pins to the inch, a pin spacing of 2.54mm. Standard SM packages like the SOIC have a pin spacing of exactly half this value. Smaller SM packages have 40 (TSSOP) or even 50 pins to the inch! As a gentle introduction to SMT construction techniques, we will build a couple of simple circuits using SM components. The first project, a 6-pole SSB crystal ladder filter, uses only passive SM components on a simple single sided PCB layout. I used 9.216MHz crystals in a low profile HC49/SMT package. This was as near as I could get to the popular IF of 9.0MHz using low cost off-the-shelf crystals. (9.216MHz is a standard baud rate generator clock frequency). The filter was designed using the methods described in Homebrew for March and April 2006. I used a

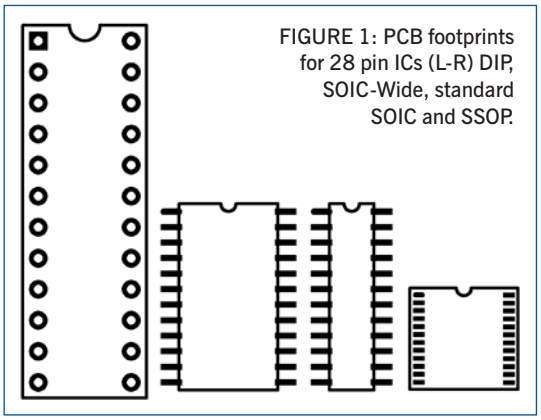


FIGURE 1: PCB footprints for 28 pin ICs (L-R) DIP, SOIC-Wide, standard SOIC and SSOP.

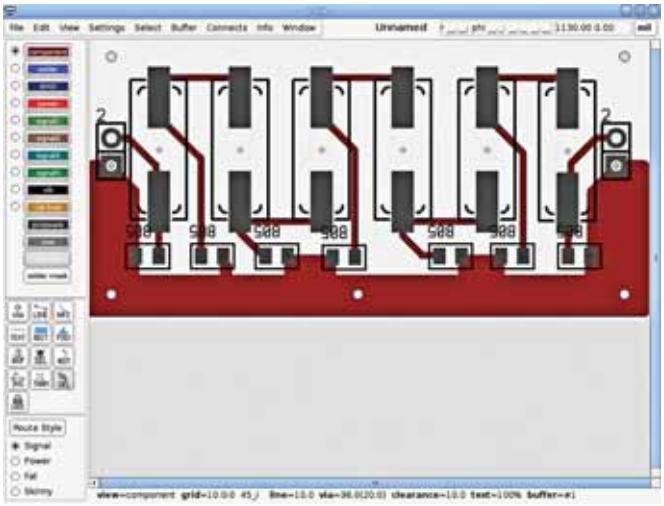


FIGURE 2: Typical PCB CAD software, in this instance 'pcb' running under Linux.

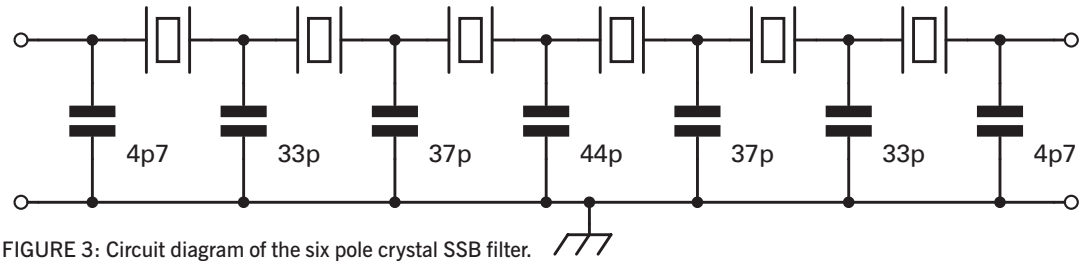


FIGURE 3: Circuit diagram of the six pole crystal SSB filter.

PHOTO 2: My not-so-high-tech PCB exposure system.

spreadsheet [1] to simplify the design process. Joachim Köppen, F/DF3GJ, has written a handy Javascript calculator [2] based on the same formulae. As this is not a PCB making or filter design tutorial, I won't go into much detail about how the filter was designed or how the PCBs were made. If you want more information then you could do worse than refer to the most recent edition of the *Radio Communication Handbook*.

PCB LAYOUT DESIGN AND ARTWORK. It is just about possible to draw very simple PCB layouts for some of the larger SM components by hand, but a computer and PCB CAD software is really the only practical way of creating PCB layouts for SM ICs and smaller components. Suitable software is available at little or no cost. Beware of some of the 'free' PCB CAD software that is available on the internet. The price might seem attractive, but some of these software tools are only capable of producing layouts in a proprietary file format instead of industry-standard formats. This effectively means that you have to pay the software provider to make the PCB for you. I use 'pcb' running on a Linux PC. This is a good combination for the homebrewer: home-made CAD software and home-made operating system. You can use a home-made PC too if you like. The freeware version of Eagle CAD [3] is a good alternative. Eagle CAD is available for Windows, Mac and Linux.

PCB layouts for SM components are created in much the same way as layouts for through-hole components. SM components are usually much smaller and track widths are narrower. Due to the small pin spacing of SM ICs, PCB tracks are not usually run between IC pins as is common practice with DIP. It would be difficult to do this with SOIC packages and impossible with SSOP and smaller packages. This limits the designers' options for designing complicated layouts on single-sided boards. It is possible to run a single track between the pads of some SM resistor packages. It is quite common to see zero ohm resistors where two copper tracks cross on SMT PCBs. This is less unsightly than wire links on through-hole PCBs. As the copper tracks are on the same side of the board as the components, there is no need to 'mentally reverse' the IC pins when looking at the track side of the board. Most commercially made SMT boards are double sided or multi layer. Double sided is not too difficult for the home constructor, but multi layer with plated-through holes would be a major challenge.

Figure 2 shows a screen capture of the PCB CAD software. Apart from the two pin connectors for input/output connections, the only components used are the six SM crystals and seven 0805 chip capacitors. PCB track widths are usually measured in mils (1 mil = 0.001 inch, or 0.0254mm). The 'pcb' software has three default track widths: Signal = 10 mils, Power = 25 mils and Fat = 40 mils. I used the Signal track width option, but since this is not a particularly small or cramped layout, I manually increased the track width by one step to 15 mils. There isn't much to be said about the layout. I left a lot of copper at the bottom edge, which makes an effective ground connection for the I/O terminals and

PHOTO 3: The completed SMT filter.

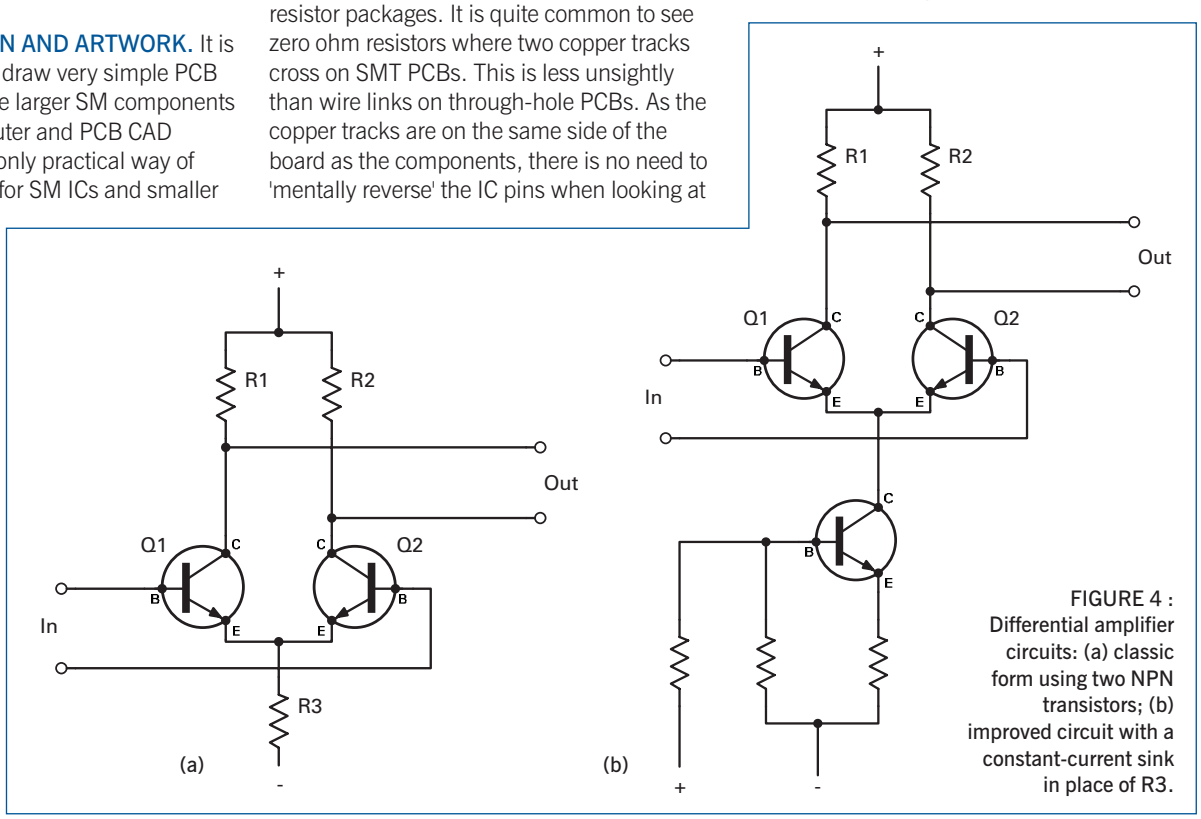


FIGURE 4 : Differential amplifier circuits: (a) classic form using two NPN transistors; (b) improved circuit with a constant-current sink in place of R3.

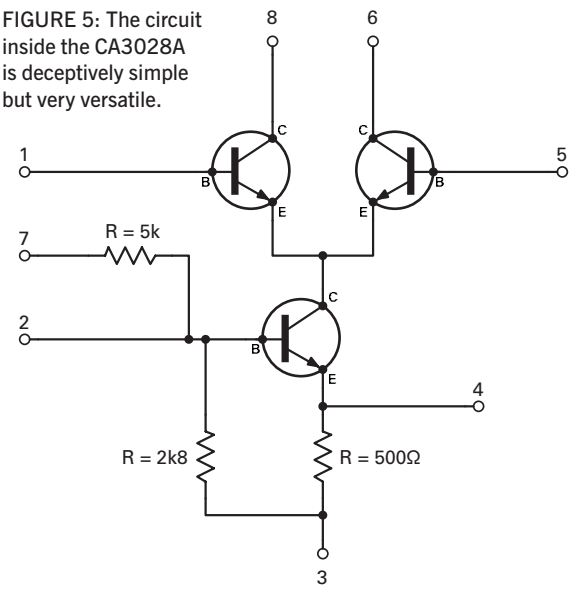


FIGURE 5: The circuit inside the CA3028A is deceptively simple but very versatile.

the shunt coupling capacitors between each crystal resonator. If an even smaller circuit was required, it would be possible to bunch the crystals closer together and trim off the unused top edge of the board. The filter schematic is shown in **Figure 3**.

Once the layout was finished, it was printed onto a sheet of Staedtler overhead projection film using an ordinary laser printer. This was used as a positive artwork for the UV exposure process. I used a 500W halogen lamp as the UV source and a small picture frame to keep the PCB and film in contact – see **Photo 2**. The PCB is standard single sided, pre-coated photosensitive PCB laminate (Maplin JP56 or similar). After the board was exposed to the UV source for 10 minutes, it was removed from the frame and developed in sodium metasilicate photoresist developer (a weak solution of sodium hydroxide also works). Finally, the board was etched in a ferric chloride bath. After rinsing, the remaining photoresist was cleaned off with some fine steel wool. Please be careful if you make your own PCBs as some of the chemicals mentioned here are toxic, caustic or at least cause nasty stains – read the materials safety data sheets from the chemical suppliers before use.

Soldering the crystals to the PCB is a very easy job. The SM crystal PCB pads are quite large. I used a pointed soldering iron tip for soldering the 0805 chip capacitors. These are not the smallest type of SM capacitor, but they are small enough that a good illuminated magnifier will make the soldering job a lot easier. As the capacitors are small and very light, they tend to stick to the tip of iron and lift away from the PCB when you extract the iron from the solder joint. Commercial PCB makers usually glue the components to the PCB so that they remain in place during soldering. One of the recommended ways of preventing this problem is to use a wooden toothpick to hold the SM component steady while you are soldering it in place. This is easy to do if you are one of the lucky few who has three hands. You will need one hand to hold the toothpick, another hand to hold the cored solder and the third hand to hold the soldering iron. I have found that the best approach is to tin just one of the component pads on the PCB very lightly and then tack one component terminal to this pad using a tiny blob of solder on the tip of the iron. This won't make a satisfactory solder joint, but it will be good enough to hold the component in place while you solder the other lead(s). The first pad is easily re-soldered once the other pad(s) are done. This method is not recommended for commercial PCBs where there is a requirement for good quality control. The very hard ceramic materials in chip capacitors and resistors can crack because one side of the device is soldered firmly in place and remains relatively cool while the opposite end is heated by the soldering iron. However, this method is perfectly adequate for home made PCBs. I have had very few failures using this technique over a period of many years.

Photo 3 shows the finished SSB filter. One advantage of SM chip components that is rarely exploited on commercial PCBs is the way that they are easily stacked one above the other to make a parallel connection. As 37pF is not a standard value, I used 22pF and 15pF in parallel – see the inlay at the top left of the photo. The standard textbook advice for soldering chip components is to use just enough solder to make a small, slightly concave 'fillet' of solder between the PCB pad and the component terminals. As you can see in the photo, I usually end up using far too much solder.

DIFFERENTIAL AMPLIFIERS.

One of the most useful and widely used circuits in the history of electronics is the differential amplifier. Figure 4a shows the classic form of differential amplifier based on a pair of identical NPN transistors. This circuit is often referred to as a 'long tailed pair'. This example has a pair of differential inputs and a pair of differential outputs. The circuit is extremely flexible in that it can be used as a single-ended input by simply using one input and grounding the other. If a single-ended output is required, you can just use just one of the outputs and ignore the other.

The operation of the circuit is quite easy to understand. A signal applied to either of the two inputs will produce an amplified signal at both outputs. If we consider the case of a rising signal applied to the base of Q1 only, an inverted and amplified version of this signal will appear at the collector of Q1. This is the standard behaviour for a common-emitter transistor amplifier. A non-inverted output will appear at the emitter of Q1. This is the standard behaviour for a common-collector amplifier (also known as an emitter follower).

The output at the emitter of Q1 is directly coupled to the emitter of Q2, which acts as a common-base amplifier. As the common-base is a non-inverting type of amplifier, the output at the collector of Q2 is 180° out of phase with the output of Q1. This circuit is known as a differential amplifier because the magnitude of the output depends on the magnitude of the *difference* between the two inputs and not on the *absolute level* of the input signals. If a signal is applied equally to both inputs, a perfect differential amplifier will produce no change at the output. As one transistor is an inverting amplifier and the other is a non-inverting amplifier, the equal currents of opposite polarity will develop equal voltages of opposite polarity across the identical pair of collector load resistors R1 and R2. This ability to reject common-mode inputs makes the differential amplifier ideally suited to amplifying weak signals in a noisy environment. If the input is driven from a balanced circuit, for instance a twisted pair of wires with a microphone at the other end, any

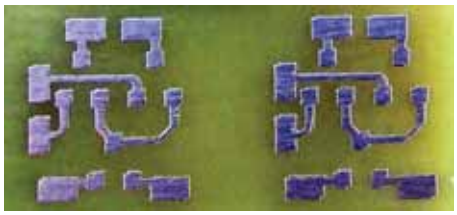


PHOTO 4: Making many boards at once on the same panel means they can be handled more easily.

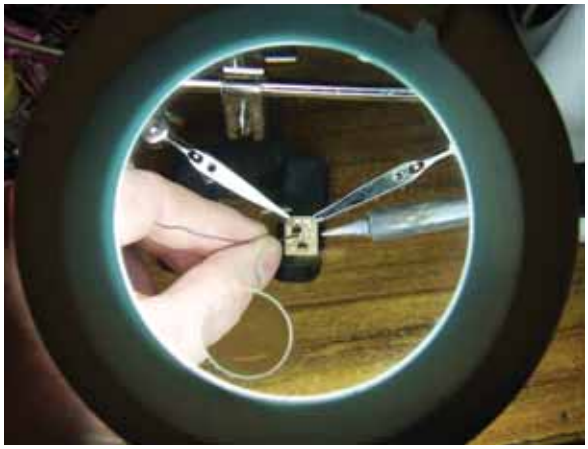
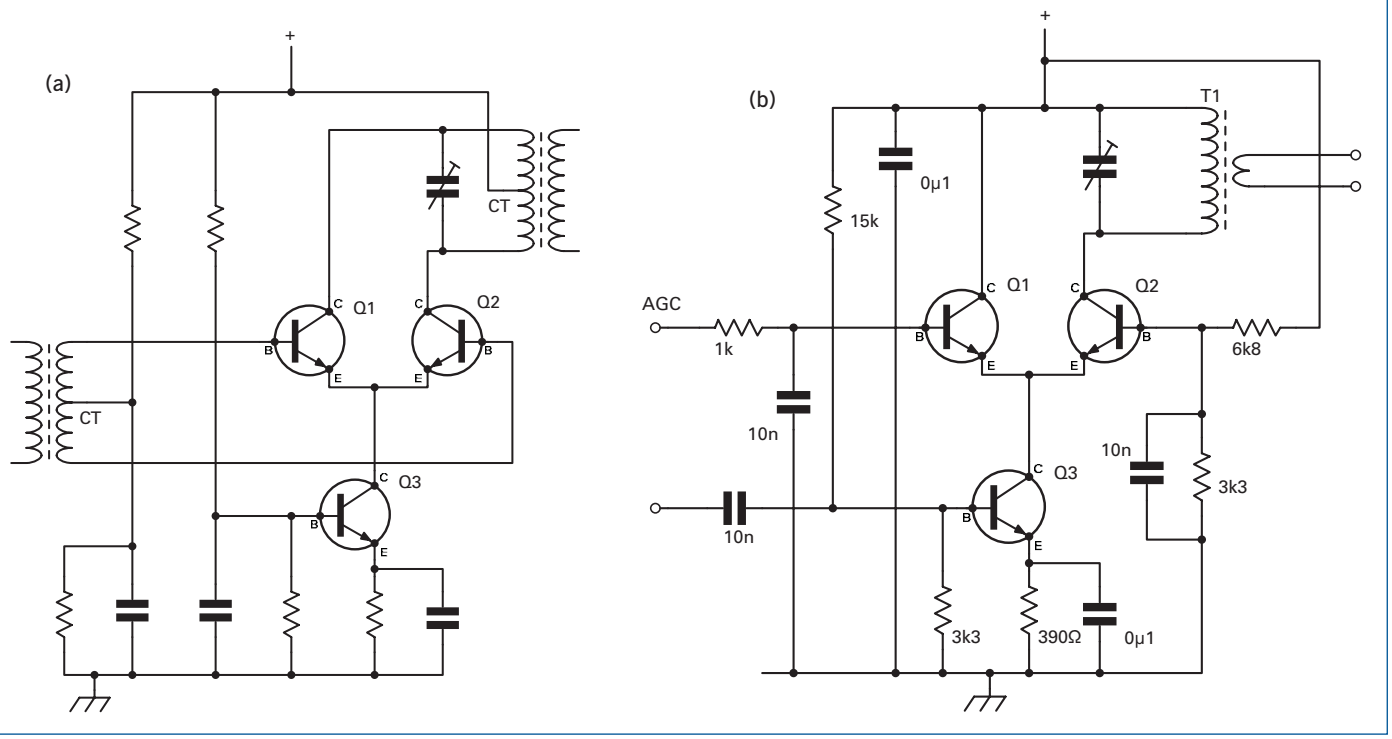


PHOTO 5: Soldering surface mount devices is often more easily accomplished with the aid of a strong magnifying glass.

FIGURE 6: Two applications for the differential amplifier board that will be discussed in a future edition. (a) IF amplifier, (b) Cascode amplifier.



electrical noise picked up along the cable run will be of equal amplitude and phase on both wires of the twisted pair. This common-mode signal will not be amplified by the differential amplifier, which will only respond to the differential voltages from the balanced microphone. The extent to which the amplifier can discriminate between common-mode and 'normal-mode' balanced signals is defined by its common-mode rejection ratio, or CMRR.

In order to achieve a high CMRR, there should be good current balance between the two transistors. The best balance is achieved when the value of R3 is high relative to the value of R1/R2. This usually means that R3 will be several thousand ohms. This is not an ideal situation, especially at relatively low supply voltages. Current in Q1/Q2 would be very low and dynamic range would be limited. The performance of the circuit can be greatly improved by replacing R3 with a constant-current source (or sink, for the pedantic). A high gain transistor with a fixed voltage on the base and a resistor in the emitter circuit makes a good constant-current source. The current through this transistor is largely determined by the base voltage and the voltage drop across the emitter resistor. This current will tend to remain constant regardless of the collector voltage. **Figure 4b** shows the improved circuit. This is the standard differential amplifier circuit which is so widely used in just about every op-amp IC. Transistors, JFETs, MOSFETs and valves have all been used in this configuration.

One of the all-time favourite devices of the radio constructor was the RCA CA3028A differential amplifier IC. This simple IC consists of just three transistors and a few resistors in an 8 pin package. **Figure 5** shows the internal configuration of the CA3028A. It can be used as a differential amplifier at frequencies from DC to VHF. It can also be used in 'cascode' configuration where the lower transistor is configured as a common-emitter amplifier and one of the differential pair is used as a second stage in the common-base mode. The remaining transistor can be left unused or it may be used for gain control of the amplifier. This circuit can be used in many different configurations as an RF amplifier, mixer, IF amplifier with AGC, balanced-modulator, product detector, audio amplifier, limiter… in short, just about every stage of a radio receiver or transmitter! The bad news is that the CA3028A is no longer in production and has recently become very expensive – typically over £10 each.

MINIATURE DIFFERENTIAL AMPLIFIER.

Our second project this month is a miniature differential amplifier consisting of three surface mount MMBT3904 NPN transistors on a small PCB. To save on consumables, and to avoid having to make very tiny PCBs, my artwork has 28 identical copies of the PCB layout. This means I can make 28 boards at the same time, then cut them up as required. **Photo 4** shows a section of the 28 board panel.

The MMBT3904 is the surface mount version of the popular 2N3904. Given the very small dimensions of the board and, particularly, the components, I use whatever aids I can to assist in assembly. **Photo 5** shows how I assembled the prototypes using a bench magnifier: if you look closely you'll see that the PCB is held by a pair of croc clips attached to a 'helping hands' mount.

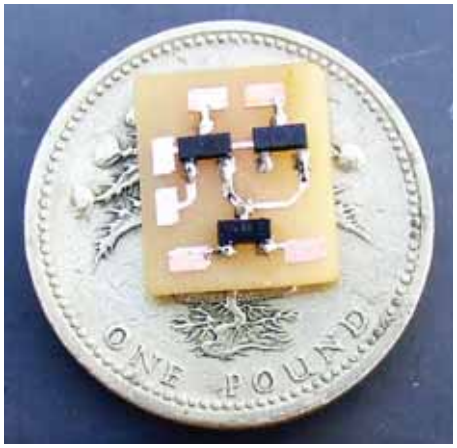


PHOTO 6: The finished differential amplifier module is quite tiny.

Photo 6 shows the finished amplifier module, which is about the same size as the IC it replaces.

It's sometimes useful to make more than one differential amplifier at the same time and to keep them attached. I have made a few pairs, which will be used as a two stage IF amplifier in a future project. **Figure 6a** shows how the module can be used in differential mode as an RF/IF amplifier. **Figure 6b** shows my test circuit as a 10.7MHz IF amplifier in cascode mode. Measured gain at 10.7MHz is 38dB and AGC control range is more than 60dB.

ERRATA. In the August 2009 Homebrew, the top line of Figure 3 should read "$X_{C1} = Q \times R1$".

REFERENCES:
[1] http://tinyurl.com/nvkymw
[2] http://tinyurl.com/lme7bm
[3] www.cadsoft.de/

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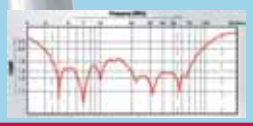

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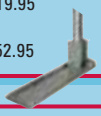

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A Contact that was Out of this World

Budbrooke School not only had the opportunity to talk to the International Space Station - they actually got to meet the astronaut they spoke to, Richard Garriott, W5KWQ.

A SIMPLE QUESTION. It all started so simply. "Dad, what can you do with your radio licence?" These were the words spoken by 10 year old Matthew, after Ciaran had passed his Foundation licence at the end of October 2007. Who would have guessed that around a year later Ciaran would be keying the transmitter at Budbrooke School and calling "November Alpha One Sierra Sierra this is Golf Bravo Four Oscar Bravo Sierra – are you receiving over?" The reply was "Golf Bravo Four Oscar Bravo Sierra this is NA1SS Richard Garriott, W5KWQ happy go ahead".

On 17 October 2008, fifteen lucky pupils at Budbrooke School spoke to Richard Garriott, W5KWQ whilst he was visiting the International Space Station as the world's sixth private astronaut. For approximately ten minutes, the 270 children and nearly 80 teachers, visitors and press where held spellbound as twenty questions were put to Richard by the children and the answers came back with unbelievable clarity. Ten short minutes that were the culmination of a huge amount of work by the school and the UK ARISS/AMSAT volunteers over the previous eight months left many, young and old, in tears.

THE BEGINNING. Rolling the clock back one year, Ciaran sat with Matthew and explained what amateur radio was and what you could do with it. Reading from the *Foundation Exam Manual*, he described all the different aspects of the hobby and, together, they read the sentence *"And you can even talk to the astronauts and cosmonauts onboard the International Space Station"*. A comment along the lines of "*Oh that sounds cool*" was mentioned but there was no further discussion on the topic – that was until Matthew brought home the minutes of his School Council meeting where they discussed how to celebrate the 40th anniversary of the School being on its present site. There in black and white was the record of the suggestion that Matthew offered in the meeting – *"My dad can talk to the International Space Station"* with the subsequent action assigned to Matthew – for Matthew, read Dad!

Initial investigations revealed that ISS to school contacts can and do happen and ARISS was the organisation that deal with such matters. A review of the ARISS website (www.ariss.org) showed that the documentation associated with a school contact was extensive and detailed. Ciaran realised that the first job was to sort out his licence – he realised that if this contact was to happen, he was going to need his full licence. January 2008 came and went and M3XTD became 2E0XTD.

A lot of the research kept turning up one name that appeared to be 'Mr ARISS' in Europe – Gaston Bertels. An e-mail to Gaston soon confirmed that he was the right person

but, more importantly, Gaston gave the names of two key amateurs in the UK who were the ARISS UK mentors – Howard, G6LVB and Carlos, G0AKI. Researching previous UK contacts, it was obvious that Howard and Carlos had significant involvement with other school contacts – as Howard's website showed [1].

The justification for wanting a contact is high and the school had to demonstrate how space as a topic was integrated into the curriculum. They then discovered that it was usual for applications to take up to two and a half years to come to fruition – and there was a UK based school already in the pipeline ahead of them. This was a big eye opener, but they did not give up. The school head, Carol Taylor, and lead teacher, Rachael Stevens, worked with the children and pieced together a range of activities that encompassed the Reception year children right up to the Year 6 children. The school had started to do its bit for the contact.

THE LINK TO RICHARD GARRIOTT. Richard Garriott, son of NASA astronaut Owen Garriott, was planning to become the worlds' sixth private astronaut in late 2008 and, due to his British roots (he was born in Cambridge), he wanted some involvement with some British schools. His father, Owen Garriott, W5LFL, was the first astronaut to take amateur radio into space, pioneering the way for an increasingly well developed amateur radio space programme.

Richard is an investor and Board member of Space Adventures, who had an agreement with the Russian Space Agency to launch Richard on the planned TMA-13 Soyuz mission to the ISS. Venture Thinking, the company handling the publicity, working with the British National Space Centre, had organised a number of primary and secondary school space-related competitions and were looking for a radio based contact to happen between Richard and a school in the UK. As luck would have it, they had contacted the AMSAT-UK president, Sir Martin Sweeting, asking for assistance and were, through a long chain of contacts, eventually put in touch with Howard Long. Howard, by luck or even good fortune, mentioned that Budbrooke School was applying to ARISS for an ISS based contact – break number 1!

Break number 2 came in March 2008 when Ciaran sat his Advanced exam. So, 2E0XTD became M0XTD! May and June 2008 saw continued work with the children and the space related activities. It was a whole school affair – the Year 6 children helped the Reception children and everyone played their part. Discussions continued with Venture Thinking and, during the course of May, there were indications that Richard and Space Adventures were possibly proposing to select Budbrooke School for what was called a 'Crewpick' – basically a term that meant that the crew of the ISS wanted to speak to a specific school. If this was to be the case it would be break number 3.

THE SUMMER MONTHS. The school year ended in the middle of July and all the children left for their summer holiday. Howard came to visit and did a survey at the school. Views of the horizon from West to East were excellent and there were no obstacles. July became August and August became September. The children were back in school and they knew that the contact would happen in sometime in October. Richard's flight was confirmed as blasting off on 12 October, docking with the ISS on the 14th and returning to earth on the 24th. Preparations at the school continued and it wasn't long before they started to get a series of proposed dates from Gaston Bertels.

It is always understood that ARISS school contacts, and amateur radio on the Space Station, take second place to operations so the scheduling of a direct contact is always tricky – the orbits of the Space Station need to match up with the location of the school and the ISS crew need to be available at that specific time. Of the dates/times that Gaston offered, the preference was for a weekday between 9am and 3pm – that being the normal school day. Fortunately, Gaston and his colleagues worked wonders and a date for the contact was confirmed – Friday 17 October at 1106UTC.

PREPARATIONS FOR THE CONTACT. A large display had been created at school and the centrepiece was a huge reproduction of the ARISS QSL card with its wonderful picture of the Space Station. Thursday 16 October saw what would become the 'Ground Crew' arrive on site – Howard with all the primary station equipment, Carlos with the new GB4FUN on it first ARISS deployment, Graham Shirville as support and BATC link and Ciaran. Most of the morning was spent setting the primary station up with the large directional antennas mounted on top of the school and with GB4FUN as the backup station. The children loved it and were amazed at the amount of equipment brought onto the school. The stations were set-up and operational and the question askers were put through the first of several drills with Carlos on the radio whilst Howard did his pretend astronaut act out in the playground with a hand held, answering their questions.

As part of the practice runs, the actual callsigns that would be in use for the contact itself were used (NA1SS for the Space Station and special event callsign GB4OBS for the station at the school). This was mainly so that the children knew what to expect and that they weren't surprised on the day with different callsigns being used by the station operators. The ISS made several passes during the day and Richard Garriott was heard on both voice and SSTV – something that amazed the children and teachers who happened to be present at the time.

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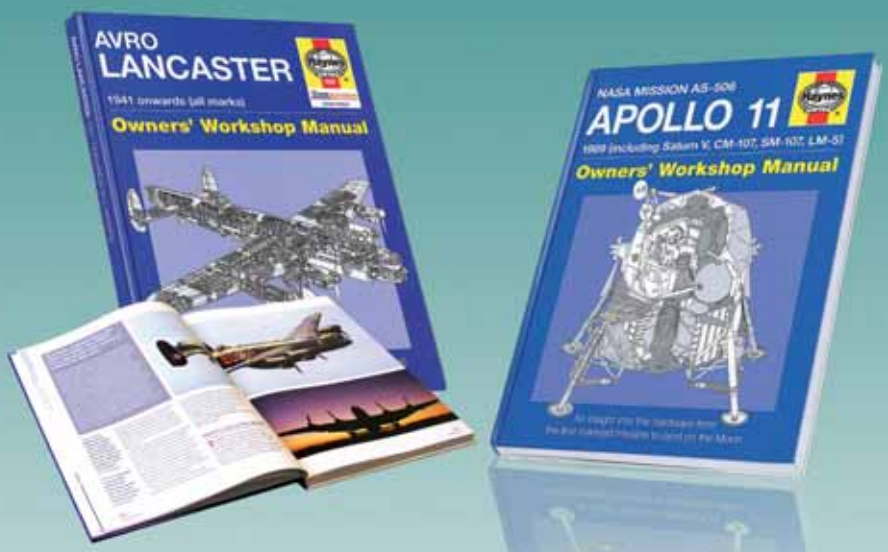

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THE DAY OF THE CONTACT. Friday 17 October dawned with what could only be described as the best possible conditions – it was sunny and there wasn't a cloud to be seen. The buzz around the school was unbelievable – the children were excited but unsure what was going to happen. Trevor Brown, G8CJS from the BATC arrived with all the video equipment and, with a functional internet link provided by a mobile satellite truck courtesy of National Grid, the live streaming facility was set up and operational.

The school had worked hard on the events on the day for the children and once the whole school were assembled in the School Hall, the head teacher Carol Taylor spoke to them – the children had even learned a special song that they all sang, much to the amusement and delight of the adults and local/national press that were present. The team spoke to the children to explain what was going to happen and that, sometimes, these contacts simply don't work at the last minute.

GO FOR CONTACT. When the ISS was well and truly over the Atlantic, Ciaran started calling a few minutes before the ISS was over the visible horizon in the hope that they would acquire the ISS early. On about the eight or ninth call, there were a few worried faces – was Richard Garriott going to respond? Suddenly a voice responded – it was Richard and the contact was on.

The children asking the question were simply brilliant; all questions were asked clearly and quickly and Richards' response was heard by all in the Hall, as well as most of Western Europe. The contact finished with a cheer from the children that probably didn't need the transmitters for Richard to hear it, and a promise that he would visit the school when he came back to the UK after his flight. It's a promise that the children didn't forget.

A considerable amount of press coverage for the contact was achieved, including the regional BBC and ITN TV news coverage, as well as most of the local print media as well. The school also has a permanent record of the day on its website **[2]**. The BATC video **[3]** is simply a stunning record of the contact itself and is highly recommended viewing for anyone interested in ARISS school contacts.

LIKE FATHER LIKE SON. Richard Garriott, W5KWQ, was the guest of honour at the Dayton Hamvention this year and he, and his father, took time out to talk to *RadCom* about the trip into space and talking to the school children. He was asked about his most memorable experiment set by a schoolchild. Richard had been asked to try and 'surf' in space using a towel or similar as a 'surf board'. He described how, initially, it had seemed a fairly easy task. The towel floated flat in the zero gravity but the problems came when he tried to stand on it – it required someone else to help lift him onto the towel It was an example of how a simple-sounding experiment can turn out to be more complex. The same applied to the questions he was asked by the school children. Many of them seem fairly easy to answer (as you'll read about later) but actually, when you started answering you realise that the answer isn't as simple as you think.

Richard was very impressed by the UK contact he had as it was well rehearsed, well timed and he felt that the school had made every effort to make best use of the time they had to communicate with him in space. He was looking forward to meeting the youngsters who had asked the questions as well as those who had sat by and heard all the answers. The value of his trip into space didn't stop when he got back to earth, Richard spends a lot of time talking to groups of all ages, educating them about space travel.

It was interesting talking to Owen Garriott too. When asked how he felt as he watched his son blast off into space, rather than hearing about the nerves you would expect, he described the pride he felt in watching Richard do something he had always wanted to achieve. Owen had been impressed with the training and the facilities of the Russian cosmonaut programme and felt there was no safer way for his son to follow in his footsteps and take amateur radio into space. He did confess to one moment of disquiet. During the training programme, all cosmonauts have to practice (and pass) safety tests in the event of an emergency landing. One of the first runs that Richard took part in lasted over 2 hours (they have to complete it in less than 45 minutes) and he had a few moments of concern for the health of the crew during the practice. Richard described how the cosmonauts have to help each other out of the bulky space suits and into the survival gear quickly and efficiently. But the longer it takes, the hotter and more tired the crew become – which is why it's so important to practice and get it right.

MEETING THE CHILDREN. Some eight months later, Richard Garriott travelled to Warwickshire to meet the children, teachers and parents of Budbrooke School. He first met with the youngsters who had asked the questions on the day of the actual contact, where they had the chance to put other questions to him about his time in space. Here a just a few of those questions.

Sam had asked the question 'is it hot in space?' and was able to hear how his question is being used in space talks. Richard explained that he used that question in every presentation he gives; even in talks to adults and almost every adult cannot answer the question properly. It was a good example of the really brilliant questions that kids have asked about the properties of space.

Another question was *'Did you feel comfortable to be in a space rocket?'* Richard replied. "You know your question about temperature in space? [asked on the day of the contact]. The rocket or space ship actually has big systems on board to protect you from the temperatures that would otherwise become very hot or very cold. In space, you or your space ship in the sunlight would normally get very, very hot to the point that you would actually cook – or, if you are in the shadow of the earth, in the shade, away from the sun you would get colder and colder and colder until you froze. The spaceship has to have

very complicated systems on board to keep the temperature comfortable to live. The equipment actually works very well and the whole time I was there the temperature was very comfortable, the air pressure was very comfortable, the amount of light that was available was very comfortable so all those comforts are managed quite well.

"Sleeping is interesting I have to say because you don't really have a bed to sleep in; you just actually relax and go to sleep. You sleep floating and there are problems with that. For example, if you were to fall asleep right now in this chair, your head would fall over and you would wake up. That's why it's more comfortable to lie down because that way when your body relaxes you don't wake back up. But, in space, it's pretty easy just to close your eyes and fall asleep by accident. If you don't tie yourself down you will float around inside the space ship and you end up against the air conditioning intake vent for example. The flows push you through the space station to the intake vent and so you always have to tie yourself down or you'll float away."

What's it like coming back into the Earth's atmosphere? "There's two parts to this answer. The first is the actual process of re-entry and the other is how does your body feel.

"Going into space and coming back from space you go from one gravity – the one you feel on earth – to zero gravity – the one you feel in space. Going in both directions has interesting challenges. When you go into space and you begin to float around and that, of course, is great fun. For 12 days straight you believe you are superman, you can fly around the space station, you can float around and you can do gymnastics like a professional! And that's actually a lot of fun. On the other hand, almost 50 – 80% of the people get sick when they go into space because they get an upset stomach – like you get sea sick or something. I, fortunately, didn't have that problem, although I did have a second problem that is very common. If you were to go out into the playground and you were to lie on a slide with your head down and your feet up, the blood would go through your body and would kind of pool in your head and you feel like you have a stuffy head. Well that's what it feels like and the stuffy head lasts for days and days, which is annoying. You do get used to it after a few days.

"When you come back to the ground, you have the reverse problems where suddenly because you haven't used your muscles for two weeks you feel very weak. Your brain has not had to balance to keep you upright for two weeks and so your sense of balance is destroyed. Even some of the involuntary actions your body does like keeping the blood pressure in your head whilst standing up is difficult and you tend to get very light headed. So you end up dizzy, light headed and weak when you come back to the ground."

How did it feel when you landed back on the earth? "The landing is interesting because for 12 days you are just floating and you have no sense of the pressure like you feel now sitting down where you can feel the pressure of the weight of your body pushing down on your feet on the floor. As soon as you re-enter the earth's atmosphere you begin to feel all that pressure for the first time. Coming down into the atmosphere, because you are slowing down – you are going from 17,000 miles an hour to the point where you literally hit the ground and you've actually stopped – you have what is called overload and you feel heavy, more heavy than actual gravity. When you reach the ground, if you remember the old Apollo capsules would splash down on the ocean and the space shuttle lands like an aeroplane on a runway, well the Russian Soyuz actually lands on the ground like a rock. I would describe it as a bit like a car crash. It really feels like you are in a 6000lb vehicle that hits the ground at 30mph. You are very well strapped into a seat with padded shock absorbers, so you actually feel just fine – it's pretty exciting though. Probably the most exciting moment is impact."

Do you think you'll go back up into space? "I believe so, In fact, not only do I think I'll get to go into orbit again, I think the next chance I get to go back into space will probably be in some of the new sub-orbital vehicles that are being developed. All around the world there are people building these sub-orbital vehicles and I would like to help on some of those test programmes. I'm also very interested in doing something called space skydiving – going up in a rocket and then jumping out in a spacesuit with a parachute."

After this question and answer session the press were given time to interview Richard and the children in the GB4FUN education module. This gave Richard the chance to show the children the various orbits the craft had taken and how complicated it is to hook up a contact between the Space Station and earth. He also had the chance to talk about the equipment used for the contact and the types of antennas involved.

A whole-school assembly had been arranged and Richard Garriott spoke to all those assembled about his trip into space as well as presented awards to those who had been directly involved in the radio contact. The children were very excited when they heard Richard repeat the opening lines of the contact as he walked into the school hall. 'Golf Bravo Four Oscar Bravo Sierra this is NA1SS, Richard Garriott W5KWQ very glad to hear you'. Richard described how he's always wanted to go into space and had been the 6th private citizen who had arranged their own private trip into space. They were particularly amused by the description of what would happen to your drink if you tried to pour one out in space, which is why all the drinks are in bags –and the story of having to float around catching the crisps that escaped from too large an opening! He also had the chance to describe his experiments like the photographs he took that showed how the earth had changed over the last 35 years since his father took his photographs from space. That data is now being analysed. The biological experiments were also talked about where he studied the protein molecules that are inside the body for medical research.

It was good to see the enthusiasm from the young people in the assembly – even the very young ones – and see how that enthusiasm was returned by the astronaut. It's been a year that the school won't forget in a hurry and one that has encouraged many of the young people to discover more about science.

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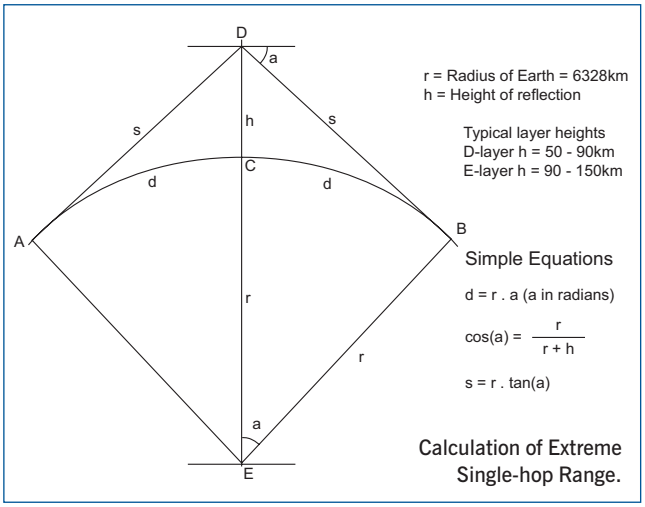
Understanding LF Propagation

Having dealt with the HF side we move lower in frequency to look at propagation there.

LONG DISTANCE AT LF. Most LF (below 300kHz) propagation information is aimed at commercial users. In contrast to commercial radio users, the radio amateur, often working at the threshold of possibility, is willing to wait for – and use – whatever short-term effects are available to achieve his ambition of long distance communication. This means that the priorities of the radio amateur are very different to those of commercial operator.

The signal from a transmitter may reach a receiving site in two ways. First by way of waves that follow the curvature of the Earth to some extent, known as ground waves; secondly by the return of skyward travelling waves by the ionosphere, referred to colloquially as sky waves or, more correctly, ionospheric waves.

GROUND WAVES. The so-called ground waves follow the curvature of the Earth because the speed of the wave is slowed slightly by the dielectric constant of the ground. This has the effect of tilting the wavefront downwards and allows the signals to be detected far beyond the normal visible horizon. Unlike higher frequencies the strength of the ground wave signal is not reduced significantly by absorption. As a result there is no 'dead zone' on low frequencies (LF), except for very low power transmissions and ground wave signals can be detected at over 2000km from the transmitter.



Calculation of Extreme Single-hop Range.

SKY WAVES. Because most amateur sized aerials are small compared to the wavelength, considerable amounts of the radiated power are launched at higher angles and rapidly leave any influence of the ground. These waves travel upwards until they reach the ionosphere at around 50 to 100km altitude. Vertical incidence signals will penetrate deeply into the ionised regions but will suffer a great deal of attenuation, but at lower angles the waves will be gently 'bent' (refracted is the correct technical term) back towards the ground. Sky wave returns have been detected at as little as 300km from the transmitting station and result is a slow shallow fading in the strength of the signal.

The change in strength of the signal is due to the change in the distance that the sky-wave travels as the altitude of the 'bending' region alters. The sky-wave arrives at the receiver with a different phase to that of the ground wave, and the two waves may either add, to reinforce the signal, or cancel to reduce it. Complete cancellation only occurs if the ground and sky-wave are the same strength as well as 180° out of phase. Most of the published data suggests that the sky-waves become approximately equal in strength to the ground-waves at around 700km from the transmitter. Beyond this distance the sky wave is stronger. A case of 'dead zone' can appear when of very low power signals are transmitted. In this situation the ground wave, is weaked by the nature of its outwards spread, to levels below the detection level of the receiver, before the angle of the sky-wave becomes low enough to cause them to return, This is often experienced by US FCC Part 15 stations, who are limited to 1 watt input power and a maximum 50 foot long antenna.

A simple geometric construction shown in **Figure 1** allows us to calculate the maximum distance covered by a single ionospheric 'bounce' provided we know the height at which the signal is bent back towards Earth. For simplicity we can consider a mirror like reflection from an altitude we will call the 'apparent reflection height', and we will assume that the signal leaves the transmitting site tangentially to the ground. Experience suggests that the daytime 'reflection level' is around the lower levels of the D-layer at about 50km altitude whilst at night the reflection level is in the upper D-layer near the bottom of the E-layer at around 100km altitude.

Our calculations then show that in daytime a single hop will be of around 1000km, whilst at nighttime a single hop will be around 2000km. It is important to realise that the returning sky wave at extreme range approaches the ground at grazing incidence or tangentially, it does not bounce at high angles like a tennis ball as shown on many sketches. Thus the wave does not need to be 'reflected' from the ground to go upwards for a second hop, it merely slides past, barely touching the ground.

Low frequency radio paths can comprise several such 'hops'. The regular signal heard from VO1NA during 2003 and 2004 at 3600km was probably a two-hop path, whilst the record QSO between Quartz Hill in New Zealand and Vladivostok in Asiatic Russia at over 10,000km was probably around 5 hops. One-way signals from Quartz Hill were detected and identified in western Russia at 16,000km. These exceptional distances were achieved at night with the path in full darkness. The daytime path lengths are usually restricted to around 2000km, due mainly to the higher signal absorption (attenuation) levels in daytime and the loss at each 'hop'. Nevertheless, under exceptional circumstances VO1NA has been copied in the UK at 1200Z, but this is a rare event. Even the powerful (20kW ERP) Naval station, callsign CFH, at Halifax, Nova Scotia, is not often heard in daytime. Fading still occurs on these path although the ground wave signal is now below audibility. In this case the fading is due to interaction between signals from the 1-hop and 2-hop paths.

In practice, the situation is a little more complicated. The 'reflection' of the waves is not without loss. At lower altitudes the daytime ionisation of the D-layer produces a belt of ionisation below the 'reflection height' that absorbs power from the radio waves. At the lower HF frequencies (160, 80 and 40m) this shows as a severe restriction in day-time range, because the sky waves are completely absorbed by the D-layer. After sunset this ionisation in the D-layer quickly decays and the lower HF waves can pass through to be reflected from the F layer and so called 'skip' signals appear. In the LF frequency range the daytime absorption is not so complete and it is possible to receive daytime sky-wave signals at distances of about 2000km, which probably requires two hops. For a given path these signals are never as strong as those received after dark.

In the next part we will consider the effects of solar activity on LF propagation.

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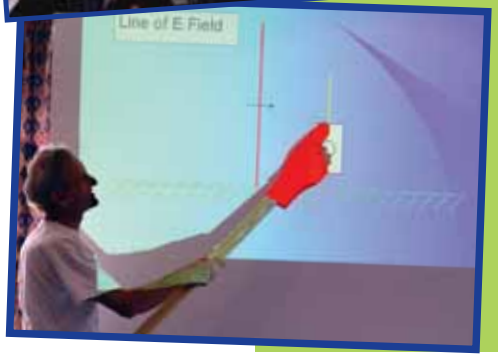

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Antennas

Chasing the mobile Holy Grail

PHOTO 1: The G3LDO bike mobile with the IC-707 Mk2, which provided 10W of RF for the tests. The antenna shown is a cut-down version of the Texas BugCatcher antenna, which was used as a reference. The RF current meter can be seen at the base of the antenna.

LIGHTWEIGHT HF MOBILE ANTENNAS. One of the holy grails is to find a small HF antenna that will perform as well as a large one. Because of the restricted size of modern dwellings many of us have to address this problem. But perhaps the greatest challenge to the mobile operator is that not only does the antenna have to be small but it has to be fairly rugged. For pedestrian or bike mobile a further limitation is that the antenna has to be lightweight.

LIGHTWEIGHT MOBILE ANTENNAS. My particular interest is bicycle HF mobile. For this I have favoured the helically wound antenna that found much favour with CBers in the past. My recently acquired mountain bike used as a mobile base is shown in **Photo 1** using a cut down version of the Texas BugCatcher antenna. Although this is a well-regarded antenna it is rather cumbersome for bike mobile. Is there lighter, and probably safer, antenna that could be used?

Over the years I have collected a few mobile antennas and the ones chosen for the tests are shown in **Photo 2**. These include a cut down Texas BugCatcher as a reference standard; two helically wound commercial mobile antennas of unknown pedigree, a modified CB FireStik and an MP-1 portable manual 'screwdriver' antenna.

The tests were performed on 18MHz because this is my favourite mobile operating band – and two of the test antennas were already pre-tuned to this frequency. The parameters measured were antenna current (at the base of the antenna), field strength and SWR bandwidth.

TEST EQUIPMENT. The current meter I used was designed to measure RF current in the presence of strong electrical fields. It was built to measure RF current distribution over the whole length of the antenna so it contains as little metal in the construction as possible, eg by using a plastic-bodied meter. For constructional details, see **[1]**. In this case I was only concerned with the current at the base of the antenna where the current is maximum and the electrical field is minimum so the more common clip-on RF current meter would probably have worked just as well in this application.

Field strength measurements were made using a Bruel & Kjaer heterodyne voltmeter type 2006.

It was important that each antenna was equally well matched to the feedline and that the power level was the same for each antenna. This was monitored using a power/SWR meter although an MFJ-269 was used to assist in the initial tuning of the antennas.

TESTS. Each antenna was tested with 10W of RF at 18.12MHz and the results are shown in **Table 1**. These results are purely comparative because both the current meter and the heterodyne voltmeter were uncalibrated. Furthermore, it took some practice obtaining the meter readings without affecting the results. The results in Table 1 were obtained using three sets of measurements and taking the average.

ANTENNA DESCRIPTIONS & ANALYSIS. It came as no surprise the Texas BugCatcher gave the best results with the large high-Q coil presenting the lowest losses, even though the stinger **[2]** was only half the recommended length. The 2:1 SWR bandwidth was small compared with the other antennas.

The mobile helical is a commercially produced antenna using what is known as continuous loading. It is constructed by winding a helical coil along much of the total length of an insulating support, with a coarse pitch being used for the lower high current area and close wound at the top (higher) end. Finally, the antenna is resonated using stinger. Mobile antenna 2 has a facility for plugging in stingers of different lengths for different bands and locking them in place.

The modified CB FireStik antenna is one that I have used for many years. This CB antenna was originally resonant on 27MHz and was designed to work with a long close-

PHOTO 2: (r-l) a cut down Texas BugCatcher; helically wound commercial mobile of unknown pedigree; a modified CB FireStik, another unknown commercial helical; and an MP-1 portable manual 'screwdriver' antenna.

wound coil at the end, rather than a stinger.

It was easy to modify this antenna to operate on 28MHz by simply removing some of the turns. A stinger was required to enable this antenna to resonate on the lower bands. One was constructed from 14SWG hard-drawn copper antenna wire and fixed using small jubilee clips to the top of the insulated rod that supports the helix, as shown in **Photo 3**. Different stinger lengths enabled the antenna to be resonated at 24 and 21MHz but for the lower bands the stinger was becoming impractically long.

The problem was fixed by adding additional wires as shown in Photo 3, effectively making a capacity hat. This had the additional advantage of making the stinger/hat capacitance variable by aligning the additional wires along the stinger for minimum capacitance or bending them into the horizontal position for maximum capacitance. This, in turn, gave the antenna wider resonance range, which can be useful.

Mobile antenna 4 also used the variable pitch helix wound arrangement. The only difference was that the windings comprised three wires in parallel, wound flat against the insulated rod support, which gave the effect of being wound with copper tape.

I am not sure of the origin of this antenna; it is a multiband arrangement as already described but only had one stainless steel stinger that resonated the antenna on 21.2MHz. I made a variable capacity hat of copper wire, which was fixed to the stinger by soldering it to a connector removed from a

PHOTO 3: The top portion of the CB FireStik antenna, showing the method of fixing 14SWG copper wire top loading.

TABLE 1: Relative antenna performance. Current and field strength figures are relative and uncalibrated.

No.	Antenna	Antenna current	Field strength	1:2 SWR bandwidth
1	Texas BugCatcher	82	90	180kHz
2	Mobile helical	50	65	240kHz
3	FireStik	55	75	360kHz
4	Mobile tri-helical	56	70	450kHz
5	MP-1	52	55	-

screw connector block as shown in **Photo 4**. The capacity hat can be moved to any part of the stinger to vary the capacitance and locked into position with the screws shown in Photo 4. The remarkable characteristic of this antenna is the wide 2:1 SWR bandwidth which, if Table 1 is anything to go by, is achieved without loss of performance compared with antennas of a similar design.

Finally, included in the test was a MP-1, which is a lightweight manual 'screwdriver' antenna, designed for pedestrian portable operation. It was included in the test because I was curious as to how well it performed in comparison to the other antennas.

BICYCLE COMPUTER MODEL. While it is easy to work short skip EU stations from a bike mobile, working DX was a little more difficult than operating from the main station – as you might expect. A computer model was made of the Photo 1 bicycle installation. I felt that this was an interesting exercise to see if it would give some idea of the performance of the bike mobile set up.

The model is shown in Figure 1. I had to take some liberties with the shape of the modelled bicycle with what were considered to be non-critical dimensions. Square wheels would make for a very impractical bumpy ride but should not make much difference to its electrical characteristics. A further concession to the model is that the wheels are offset so that they are not in contact with the frame. The reason for this is that contacts with the 'wires' of the model are only allowed at 'wire' ends.

A more critical dimension is the antenna itself. A centre-loaded antenna based on the Texas BugCatcher was used because the structure of a variable pitch continuously loaded FireStik was an impractically complex item to model.

The green line shows the current distribution throughout the antenna and the bike and the blue line is a section of the elevation plot. It predicts a gain of -2.3dBi over average ground when using a centre-loaded antenna. From Table 1 it can be seen that the gain will be down by about 30% in terms of antenna current and field strength less when using a continuously loaded FireStik.

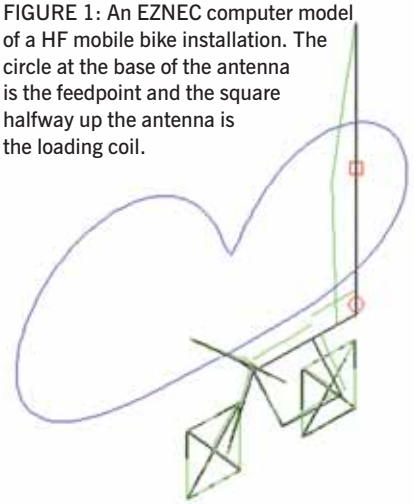
I have used this method of assessing the performance of an antenna using a mixture of computer modelling and measurement with LF antennas.

FINALLY. Clearly the BugCatcher type of antenna, or any antenna with a large, high Q coil has the edge regarding performance. However, the tests show that a lighter and more practical continuously loaded antenna will give a reasonable performance provided it has a good top loading arrangement.

PHOTO 4: Method of adding 14SWG copper wire top loading to an existing stainless steel stinger.

REFERENCES
[1] Building a low capacitance, voltage immune RF current meter, W8JI: www.w8ji.com/building_a_current_meter.htm
[2] An American term to describe the whip section above a loading coil on a short centre fed antenna or on a continuous loaded antenna.

FIGURE 1: An EZNEC computer model of a HF mobile bike installation. The circle at the base of the antenna is the feedpoint and the square halfway up the antenna is the loading coil.



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Short Circuits

Self protection and fail safe system design

FAILING SAFE. This month we look at building reliability and fail safe operation into the sorts of radio equipment that is made up from many interconnected units that may have to be assembled and disassembled in a hurry, often in adverse conditions. A typical example is a UHF contest station. As many /P contest operators know, it can be a recipe for disaster.

A high performance UHF station is quite often made up from a number of units as shown in **Figure 1**. Typically, a transceiver drives a transverter, which may feed a separate high power amplifier and, often, a masthead preamplifier with associated RF changeover relay. Two relays are shown, so that the preamp is terminated in a safe load when high power RF is present on transmit. Thus, any leakage across the contacts is reduced to a safe level to prevent preamp damage. These days, with the rapidly falling cost and size of high power solid state power amplifiers, it is not unusual to find that this item also placed at the top of the mast to reduce feeder loss to the antenna.

All the units have to be switched between transmit and receive, and most transceivers provide an output connection for this purpose. Often this is in the form of a switch closure to ground on transmit, or a positive voltage on a connector pin. The simplest and crudest way is to distribute this connection to all the associated equipment, with changeover relays connected in parallel so that everything just switches altogether when the PTT is pressed. This way leads only to guaranteed disaster!

First: consider what happens if the PTT connection to the masthead fails (that flimsy bit of twisted pair carrying the relay and preamp power got caught in the rotator when the wind blew). Depending on switching polarity, the masthead unit will fall permanently into one state. If the relays fall into the Rx position and the preamp powered, then when the transmitter is activated, high power RF travels up the coax, into the open circuit on the non energised RF changeover relay, jumps across the contacts and blows up the preamp. The mismatch on the Tx feeder stresses the PA and it eventually dies. Or something like that.

Next: the power amplifier is enabled before the relays have fully changed over, with the resulting mismatch causing brief spurious bit of RF to be generated. During changeover, RF relays have poor isolation, so this spurious oscillation destroys the preamp. Or, the ultra modern equipment changes from Rx to Tx so rapidly, it is going before the relays have fully switched - then see above… In fact, on the microwave bands, waveguide relays can take up to 300ms to change over so something has to be done to protect the system. All these scenarios can, do and have happened. Usually when they occur on a portable contest station it is the middle of the night, necessitating getting the mast down and replacing GaAs FETs.

A favourite and well-established solution is the sequencer. This separate, dedicated box intercepts the 'Demand to Tx/Rx' signal from the microphone PTT and generates individual control signals for each critical unit. The signals are suitably delayed, or sequenced, so that no RF can be applied before relays have changed over with DC supplies to preamps and power amps only applied after it is known to be safe to do so. **Figure 2** shows a typical switching sequence and also illustrates how an additional feedback signal from the masthead unit is used to show the relays have switched over properly and no wires have broken. On a home station only used by one operator, this solution will give a long, trouble-free life. Provided it can be disassembled and put together again in the same way it will also allow to a reliable contest station for /P operation. In the real world, and particularly on portable contests, things are not so simple.

MANY COOKS. With several different club members assembling a complex NFD station, in the heat of the moment mistakes will be made. Connectors can be left off, the wrong ones mated (phonos and jacks get used for many different purposes), separate power supplies forgotten or even the wrong rig used. All a potentially

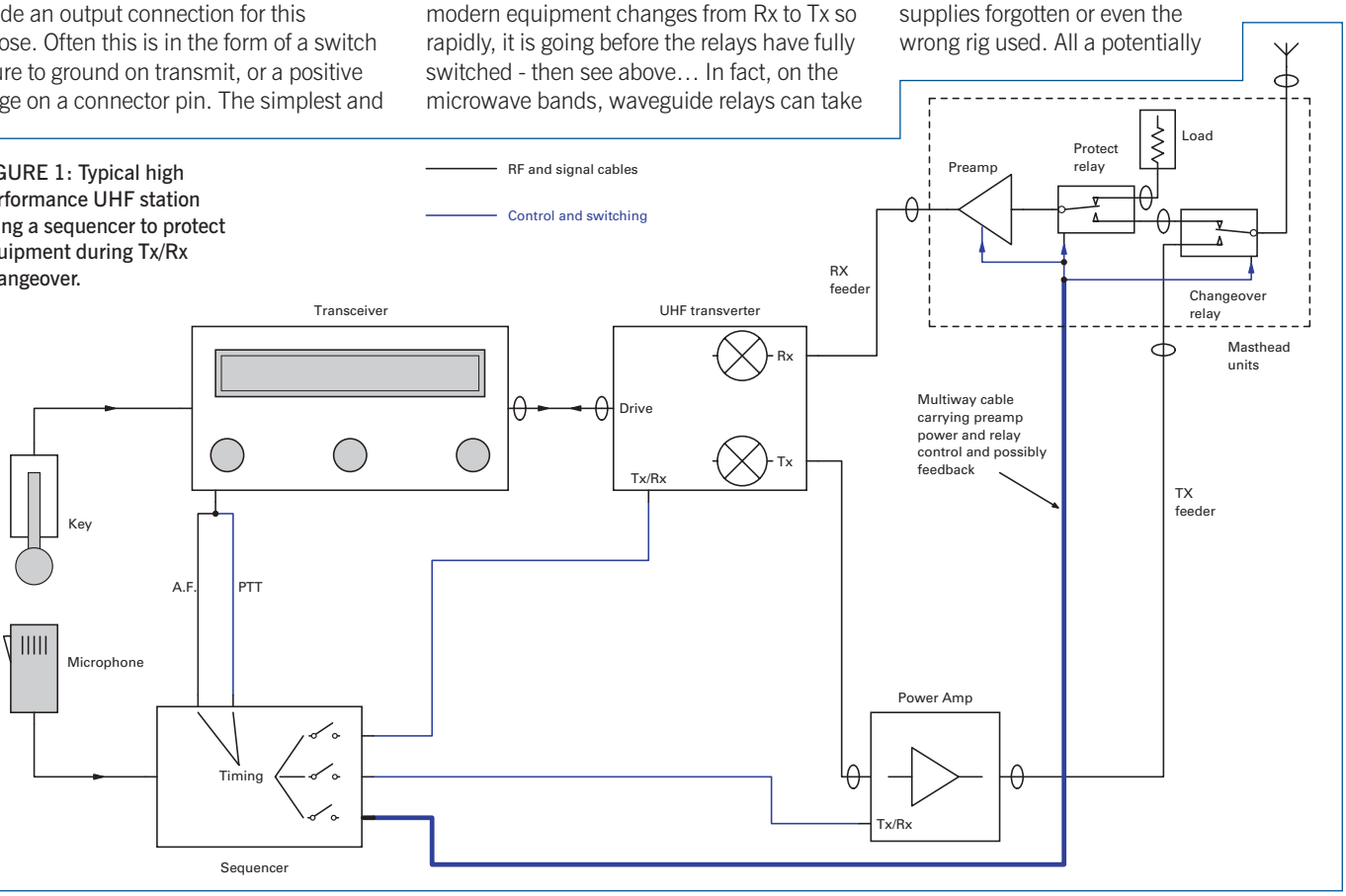

FIGURE 1: Typical high performance UHF station using a sequencer to protect equipment during Tx/Rx changeover.

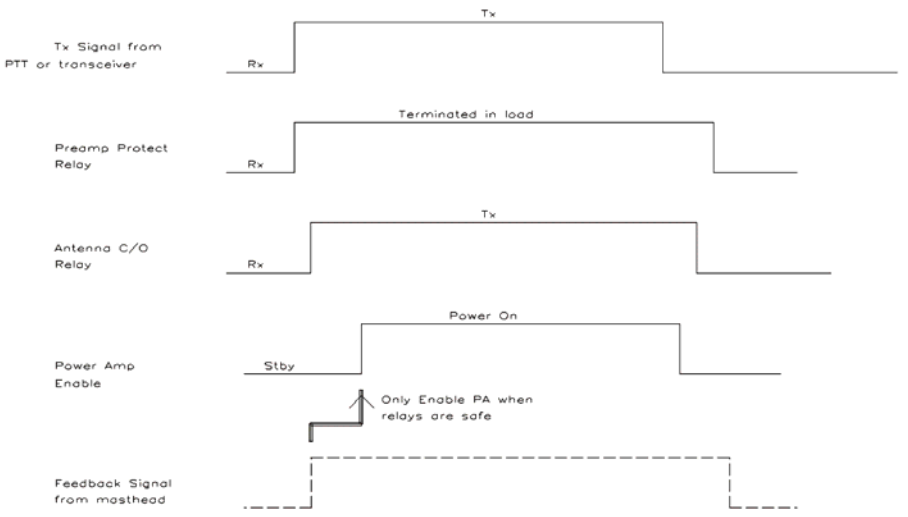

FIGURE 2: Switching sequence timing diagram including feedback information.

big trouble. Many problems arise as the sequencer intercepts the PTT between microphone and transceiver. How do we cope with CW, where VOX is generated in the rig – do we bring out a separate lead and trigger the PTT, or hand switch the microphone when sending? And as we're intercepting the microphone connector, the low level audio passes through additional wiring and can get interference from RF pickup and hum loops. The birds-nest of wires and interface cables between a separate sequencer box and the many peripherals it controls really ought to be done away with, and everything designed to look after itself. So, would it be possible to organise a transceiver / transverter / PA / masthead preamp / isolation relays so that Tx/Rx signals can be cascaded or run in parallel to each without having to worry about routing cables? And even to ensure every item looks after itself with regard to timing and sequencing and to make sure broken or shorted connections cause no damage anywhere? By taking a systems-engineering approach and generating a concept design, it can.

OUTLINE DESIGN. First, rather than run a separate Tx/Rx cable and a feedback cable to the masthead units, why not run them as controls signals along the RF cables? If separate Tx and Rx coax cables are used, the Tx signal can travel on the transmit feeder, and the feedback on the Rx downlead. That way, if a cable gets broken or shorted, the RF is lost as well as the control and lessens the options for causing any damage. If DC power can be supplied along the feed as well, even better. Bias tees at each end will be needed to separate out RF from the DC and control.

As we've now done away with a dedicated sequencer, each unit has to look after itself for timing and protection – monitoring the Tx/Rx line and generating its own delay appropriate to the Tx-Rx or Rx-Tx edges. More complex circuitry will be needed at each point, but this is a small price for an inherently reliable plug-and-play contest station, ready to be put together in the stress of VHF-NFD with the knowledge it won't go bang if thing are put together wrongly.

If the Tx signal from the back of the transceiver is used as the trigger to everything else, each of the units of Figure 1 can be designed to operate as follows:

Unit	PTT pressed (Rx > Tx)	PTT released (Tx > Rx)
Transverter	- Tx signal to masthead units - Wait for the feedback to show the relays have changed over (or wait a suitable time) - If valid, go to transmit - Enable the PA	- Remove PA control signal - Inhibit RF generation - Rx signal to the masthead units - Wait for the feedback OK (or wait a suitable time) - Go to Rx mode
Power Amplifier	Tx signal arrives: - Activate any internal relays - Short start up delay - Enable amplifier	Rx signal arrives: - Disable PA immediately - Change over any internal relays
Masthead Relays	When the Tx signal arrives: - Remove Preamp power - Protection relay to safe state - Antenna relay to Transmit - Send the feedback signal back to the transverter	When the Rx signal appears: - Short delay - Antenna relay to Receive - Protection relay to Normal - Apply preamp power

All control and feedback signals need to of a type such that if the coax or multiway cable is broken or shorted, an error condition should be indicated and everything must fall into a safe state. A simple DC voltage for signalling will suffice in most cases but, for added security, a two-voltage system provides double-edged safety. For example, +6V on the feeder for Rx, rising to +10V for Tx may be a valid pair for equipment running from a 12V power supply. If any voltages outside these limits are present, the transverter PA and masthead equipment should fall into safe mode. In some cases, the control voltages can even be chosen to provide Rx preamp and relay power: 12V for Rx and 28V for Tx may be a suitable pair in this case. It is even possible to send the feedback along the same feeder – a situation that could be met if only one coaxial cable is run to the masthead. By supplying the signalling / power from a current limited supply at the lower end, the masthead unit could signal back by briefly shorting it to ground. Different feedback signal can be indicated by multiple pulses, or altering the duration of the short. The reduction in voltage on the coax can be detected and if the pulse count or duration is correct, the feedback is assumed to be valid. Short or open circuits can be detected when the zero-voltage pulse timings are outside what is expected.

MULTI-FUNCTION REMOTE CONTROL.

Signalling over coax can be extended if some sort of remote control coding is used. Since we will probably want to send power over the coax as well, a carrier at a few tens or hundreds of kHz can be modulated with codes to control the different functions. Ian White, GM3SEK, suggested for his remote control system the RC5 system used for TV remotes [1]. In standard form, that offers six bits for controls and another 5 or 6 bits that could be used to add more channels and/or additional data security. The original IR system uses a keyed 36kHz carrier which could easily be fed into the coax, superimposed on the RF and DC. Transceiving along the cable isn't too difficult either, and it would also be possible to use a conventional IR link for local control outdoors.

Running control signals and even power along the same cables as the RF is a concept that is used a lot in military radio installations. These also often have to be assembled and disassembled rapidly, in far-from-ideal conditions. In some cases it is not unknown for there to be several control signals being carried in both directions along the coax, superimposed on RF carriers, for data, tuning, remote monitoring and DC, sometimes over tens to hundreds of metres of LDF-450!

The ideas presented are just a few thrown into the 'melting pot' to stimulate thought. Individual circumstances will require custom solutions, but any station that may have to be assembled by others, really ought to be completely self protecting even if appreciable extra hardware is needed for control and monitoring. It will pay dividends in the end.

REFERENCES

[1] RC5 remote Control - www.educypedia.be/electronics/televisionrc5.htm
[2] Current Monitoring - www.edn.com/article/CA434873.html or www.edn.com/contents/images/72204di.pdf

National Hamfest

2 & 3 October 2009

10am to 4pm each day

If you plan to visit just one major radio rally this year, make sure it's the National Hamfest!

A Luso tower complete with impressive array of antennas. The one at the National Hamfest will be laid horizontal, yet it's still 12.5m in length fully retracted.

CREATING AN IMPRESSION. Luso Towers have created huge interest at Dayton and Freidrichshafen amateur radio shows with their enormous towers. They will be visiting the National Hamfest with a 36m version and when you see this huge tower up close, you will be impressed. In its compact state, the four sections still take up 12.5m of floor space and the base is 1.7m across! To carry the rated 150kg of antennas, this tower will need a concrete base that measures 2.3 x 2.3 x 2m. It comes with an outside platform for easy access to the antennas as well as steps. It is computer controlled to raise and lower the mast and has a host of other features such as wind speed indicator, one touch height memory and automatic wind speed descent control. These are just a few of the features you can expect from a Luso tower, for further details it's best to check out their website www.luso.us. Luso Towers have said that the tower is, as yet, unsold and that they are willing to negotiate a very special price to any UK amateur wishing to buy it.

EVEN MORE TRADERS. As we went to press, even more traders have booked their place at the National Hamfest. You will be able to see all the latest radios on display by Icom, Kenwood & Yaesu – and talk to the staff who know the radios well. This is the only two-day show in the UK where the three main manufacturers will be seen together. All the major dealers will be in attendance with a huge variety of radios, antennas and accessories for sale.

The RSGB will be in attendance with many of their committees ready to talk to members and non-members alike about their

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Yaesu

National Hamfest - the ONLY place you'll see all these organisations together!

One of the more unusual prizes available in the prize draw is an autographed T-shirt! Kelvin Wade from ML&S Despatch had a big grin on his face after Katherine Kelly (who plays Becky Grainger in Coronation Street) kindly autographed one of Lynch's new 'I've been Lynched' T-Shirts.

concerns and questions. Regular readers of *RadCom* will be interested to know that Steve Nichols, author of the popular Understanding Propagation column, will be on the Propagation Committee stand. Other groups to look out for are the very popular IOTA programme, the EMC Committee, Sport Radio, ARDF, Emerging Technology, Planning, Exams department, QSL Bureau and the Regional team. If you want to know more about the best special interest groups in amateur radio, then this is the ideal place to visit and chat to them.

The new 2010 RSGB Yearbook will be launched on Friday 2 October at the show. There will be a great Bring & Buy too– no better time to turn out that unused equipment!

There will be plenty of 'flea market' and car boot traders with items of interest at the show.

PRIZES GALORE. There will be a free prize draw for visitors to the show as well as a Yaesu VX-8 daily draw. Visitors could win an Icom IC-7200, SuperAntennas Beam in a Bag, Heil Quiet Phone and many more excellent prizes. Your entry ticket can be filled in and placed in the main draw before mid-day on Saturday 3 October. The draw will take place at 1pm.

Tickets for the Yaesu draw can be picked up at the main entrance or the *RadCom* stand. The draw will take place each afternoon for a VX-8.

MORSE PROFICIENCY. Jim Stevenson, G0EJQ, Regional Manager for Region 13, tells us that Morse Proficiency tests will be available on demand during the National Hamfest.

National Hamfest – brought to you by the RSGB and the Lincoln Short Wave Club.

Portable

Trying portable microwave operation from a hill top

Dave, G0DJA operating portable on 10GHz.

MICROWAVE EXPERIMENTS. A few years ago, some people doing SOTA started to experiment with 23cm (1.3GHz) hill top operation. They decided to use FM hand portables and several got equipped. Although they made some contacts (and still do), the results often seemed mediocre to me with a handful of contacts over short line-of-sight paths (mostly just a few tens of kilometres). For my own foray into microwaves, I decided to look at a more ambitious approach. First I reviewed what equipment was available and what could be done before choosing which bands and modes to investigate further.

The microwave spectrum includes all the bands above 1,000MHz. The propagation characteristics of these bands varies, as does the level of activity. I quickly realised that there was little activity above 24GHz. Of the remaining bands, only 1.3GHz and 10GHz have significant activity. Of those, I decided on 10GHz as it allows the use of smaller aerials and has more unusual propagation modes including the very effective rain scatter mode.

EQUIPMENT. At 10GHz there are no 'black-box' transceivers available, so the options all require some engineering to turn them into a viable system. Possibly the most popular option is the Kuhne 10GHz transverter. These are small, light and offer excellent performance – but at a price. The Kunhe transverter has a power output of under 300mW, which will be adequate for use over lightly obstructed paths of up to about 200km. In addition to the transverter, you will need to engineer an aerial changeover system.

Other options are the Down East Microwave 10GHz transverters, which are available as kits or ready-built with power levels approaching 3W output. Finally, it is also possible to build a low-budget 10GHz system using surplus satellite TV LNBs, an approach championed by Bernie, G4HJW.

System performance will be related directly to transmit power levels, receive sensitivity and aerial gain. At 10GHz, attention to detail is important for good results. This includes careful electrical and mechanical design to minimise unnecessary losses in cables and connectors. Most people will be satisfied with portable power levels of between 1 and 5 watts, which will allow contacts to be reliably made over obstructed paths longer than 300km.

AERIALS. If, like me, you envisage carrying your equipment up a mountain, your choice of aerial will be limited to a horn or small dish. A 20dB gain horn is easy to construct, is light and robust. It does not require particularly critical alignment and will give good results.

The smallest dish size that will be useful is about 40cm diameter. With a good feed arrangement, gains of 30dB are possible. Lightweight camera tripods make an ideal mount for small dishes and horns. Tripods will need to be guyed in all but the most perfect of weather conditions.

OPERATING – INCLUDING TALK-BACK. Unfortunately, calling CQ on 10GHz is most unlikely to get any response. There are two reasons for this: the first is that activity is quite low and the second is that the aerials used are so directional that only a near-perfect alignment will yield contacts. Thus many contacts are pre-arranged in some way and may require more than one attempt before they are successful. This normally needs another method of communication to be available for 'talk-back'. There are three ways that are useful for portable operating.

The first and in some ways simplest is to use a mobile phone. This may seem like cheating but it is an easy (if costly) way to set up an occasional contact. Beware though as mobile phones often fail to work on hilltops as they can see so many base stations they suffer from co-channel interference.

The second way (and the way preferred by many portable operators) is to use another amateur band for talk-back. 2m SSB is popular, with 144.175MHz being designated as the microwave calling frequency. As a 'rule-of-thumb' you should aim to have a similar level of effective radiated power on 2m and 3cm. Theory and practice don't always agree here and it is not at all unusual to find signals stronger on 10GHz than on 2m!

Figure 1 shows how a simple 2m talkback system can be engineered using an FT-817 for both talk-back and as a driver for a 10GHz transverter. This method of operating relies on the ability of the FT-817 to switch different bands to its front and rear connectors. In this case, 2m is set to route to the rear connector and 432MHz (transverter drive) to the front connector. Done this way, switching from 10GHz to 2m talk-back requires just one button press (band up/down) on the FT-817.

The third talk-back method is to use the ON4KST system. This internet system will require you to have a laptop and an internet connection. The screens on most laptops are very hard to see in outdoor conditions. Wireless internet is relatively easy to set up using a mobile phone. I carry a small corner reflector made from tinfoil and cardboard, which greatly improves the reliability of the mobile phone internet connection.

Once you have got talk-back sorted out you will need a compass to align the 10GHz aerial accurately. I have a spreadsheet that automatically calculates bearings for active stations and beacons on 10GHz. I print this off beforehand for my chosen location so that I have all the most likely bearings to hand.

RESULTS. 10GHz is a surprising band; achievable ranges are often similar or better than you would expect on 2m. Reflecting 10GHz signals from the tops of distant thunderstorms can also be a lot of fun – I have managed contacts of nearly 700km like this. During a 10GHz activity day it is quite possible to make 10 or more contacts in a couple of hours operating (10GHz activity is quite relaxed!).

CONCLUSIONS. Lightweight portable operating on 10GHz using modern high-performance equipment is a practical proposition. There is sufficient activity on 10GHz to ensure contacts most of the time – especially on activity days. Above all, lightweight 10GHz portable represents an engaging and satisfying challenge – why not have a go?

WEBSEARCH

Kunhe: www.kuhne-electronic.de/
Down East Microwave: www.downeastmicrowave.com/
10GHz using satellite LNBs: www.g4hjw.metahusky.net/
ON4KST Microwave Chat: www.on4kst.com/chat/start.php

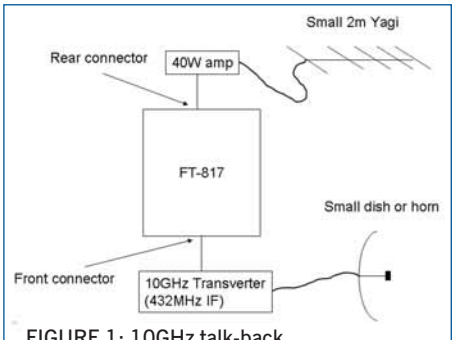

FIGURE 1: 10GHz talk-back system using an FT-817.

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- There were NO FAILURES during 18 days of continuous 24 hour operation during 3B7C.
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Yaesu CT-136 GPS Antenna adapter for FGPS-2 .....£26.94
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- Simple bandscope
- Keypad navigation
- 5 Watts (typical) output in V/U bands
- Water resistant construction equivalent to IPX4
- Modern design trend follows on from the IC-E7
- D-STAR DV mode ready (Digital Voice + data) with UT-121
- One touch reply button (DV mode)
- Built-in voice recorder and auto reply voice message (DV mode)
- Optional PC remote control capability.

Only £199.95 or buy with UT-121 D-Star Board for only £289.95.

ALL AVAILABLE EX-STOCK

Icom HF products

IC-718	Basic HF Radio, 12V, 100W output	£449.95
IC-703	Ideal M3 Licence holder 10W HF+6m radio	£539.95
IC-706mk11G	100W HF/6m + 2/70 Multimode Mobile	£739.95
IC-7200	Mr T's choice for tough HF/6M Operation	£779.95
IC-7000	Full DSP, TFT Screen, 100W HF/6m + 2/70	£939.95
IC-7400	100W HF/6M/2M Base, full DSP, Auto ATU	£1199.95
IC-756Pro111	Run out of this excellent HF Transceiver	£1799.95
IC-7600	100W, Twin RX, Huge Display. No psu	£3369.95
IC-7700	Superb 200W HF/6M Base, PSU/ATU	£Call!!
IC-7800	Icom's Flagship radio has gone up again	£Call!!
IC-PW1Euro	1kW Fully automatic HF/6m Linear Amp	£Call!!

Icom V/U Products

IC-E91	Full Dual Band 2/70 with D-Star as option	£199.95
IC-E92ED	As above c/w D-Star fitted & splash–proof	£369.95
IC-E208E	Brilliantly easy to use 2/70 remote-head	£269.95
IC-E2820	Proper dual band, dual display, remote etc	£395.95
IC-E2820+D	Supplied with UT-123 D-Star board	£539.95
IC-910H	Multimode 2/70 Base Station	£1249.95
IC-910X	As above but with optional 23cm UX-910	£1449.95

Icom Receivers

IC-R9500	Flagship Base Receiver, 50kHz-3335MHz	£Call!!

PC Controlled Receivers from ICOM

Icom IC-PCR1500 & IC-PCR2500

All Windows XP & Vista Controlled via USB with four models to choose from:

IC-PCR1500	10kHz-3300MHz All Mode	£389.95
IC-R1500	As above but with remote head	£449.95
IC-PCR2500	Twin Receiver version of PCR-1500	£509.95
IC-R2500	As above but with remote head	£559.95

ICOM IC-7600

NOW AVAILABLE FROM STOCK

See our website for first full detailed review by Adam Farson VA70J

Special introductory offer: £3369.95 (RRP: £3895.95)

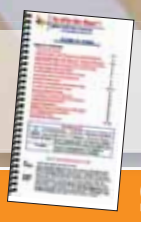
The successor to the IC-7565Pro111, the eagerly awaited new mid-range HF/6M Transceiver will try and set another bench mark like that of its predecessor.

ICOM IC-7000

Only £939.95

Whilst the price has gone up it's actually cheaper now than it was when first introduced!
The only full feature all-mode, all band Mobile/Base Transceiver with full colour TFT display.

ML&S carry the largest stock holding of Icom equipment in the UK!



Nifty Equipment Manuals and Quick Reference Cards for Yaesu, Icom, Kenwood, Elecraft & Ten-Tec radios. See Web for details.

Nifty Handy Stand

Get double duty out of your HT, add an external microphone and use it as a Base Station.....£34.95

See www.hamradio.co.uk for more details on all of these items ... and much, much more! E&OE

Used equipment sitting at home gathering dust?

MAXIMUM PRICES PAID

For genuine good condition equipment

Call us now and get an instant quote to buy & collect from your home. Or send your list to: sales@MLandS.co.uk

To Finance or not to Finance? That is the question!

Having many years of experience offering specific finance packages for our customers, we can now offer various options on payment, including 36 and 60 months on selected products. Please note that interest is calculated from the date of the original agreement at 19.9% APR. Minimum purchase available for finance is £350.

Finance Example IC-E2820 with UT-123. Discounted price of £519, £52 deposit, then 36 x £16.86p/m. TAP £658.96, APR 19.9%. E&OE.

THE WORLD'S BEST ANTENNA TUNERS FROM ML&S

FACT not FICTION: Did you know that ML&S sell MORE of the excellent LDG Auto Tuners than any other dealer outside the U.S.A.?

LDG Auto Tuner Range

AT-100pro	Desktop tuner covering all frequencies from 1.8-54 MHz	**£189.95**
AT-200pro	Designed for new generation of rigs	**£209.95**
AT-1000Pro	1kw 160m-6m (1.8-54MHz) High speed Auto ATU, tuning range 6-1000Ohms	**£499.95**
AT-897	Bolt-on Alternative Auto Tuner for the FT-897. Wider tuning range and cheaper too!	**£179.95**
IT-100	New version of the AT-7000	**£149.95**
YT-100	NEW AUTO ATU for FT-897/857 or FT-100 with additional Cat Port Control	**£169.95**
Z-817	Ultimate autotuner for QRP radios, including the Yaesu FT-817D	**£119.95**
Z-100Plus	Ultimate autotuner for Yaesu FT-817D	**£139.95**
Z-11Pro	Portable compact & tunes 100mW to 125W	**£154.95**
RCA-14	4-way DC Breakout Box	**£49.95**
KT-100	Dedicated tuner for Kenwood radios	**£169.95**
RBA-1:1	Probably the best 1:1balun out there	**£34.95**
RBA 4:1	Probably the best 4:1 balun out there	**£34.95**
TW-1 & TW-2	Talking Wattmeters! TW-1 HF 0-2kW TW-2 6/2/70 250W	**£129.95** each
DTS-4 + 4R & DTS-6 + 6R	Remote Antenna Switchers. 1.5kW 1-54MHz. Either 4 or 6 way	**£69.95 + £34.95 / £87.95 + £43.95**

NEW FTL- Meter **Jumbo size meter for your FT-857/FT-897.** LDG's new version of the its popular Yaesu meter is the FTL-Meter. It's a highly readable 4.5 inch meter face with calibrated scales for signal strength or disc on receive; power out, SWR, Mod, ALC or supply voltage on transmit. Each function is selected from the radio's meter menus. RRP: 79.95 **INTRO PRICE: £67.95**

MyDEL CG-3000

ML&S: £279.95

With 200W and 200 memory channels.

- Tunable frequency: 1.8 - 30 Mhz with long wire antenna from 8 meters
- Input impendence: 50 ohms
- Input power: 10 - 200W PEP
- SWR: <2:1
- Power supply voltage: 12V +/- 10%
- Current consumption: <0.8A
- Auto tuning time: Approx. 2 seconds (first time tuning) Less than 1 second (return to memory frequency)
- Memory channels: 200
- Weight: 1.8 KG
- Size: 310 x 240 x 72mm (L - W - H)

NEW! Remote control for the CG-3000 and CG-5000. £39.95

CG-3000 shown with optional remote switch.

As reviewed by Steve White in Radcom
"A real bargain when compared to its obvious USA competitor" "Well built & performs impressively"
Steve White, Radcom November.

CG-5000MkII

At last! 600W PEP High Speed Remote Tuner from MyDEL

Specifications:

- Tuneable frequency: 1.8 - 30Mhz with long wire antenna from 8 meters
- Input impendence: 45-55 ohms
- Input power: 10 - 600W PEP
- SWR: <2:1
- Power supply voltage: DC 13.8V
- Current consumption: <1.5A
- Memory channels: 800
- Auto tuning time: 0.5-6 seconds (first time tuning), less than 0.2 second (return to memory frequency)
- Weight: 3 Kg.
- Size: 385mm x 280mm x 110mm (L - W - H)

ML&S: £549.95

PALSTAR AT-500 600 Watt PEP Antenna Tuner

Covering 160 to 6 Meters, the AT-500 features a differential tuning capacitor with 2 stators and 1 rotor, a precision ceramic body roller inductor, and a 4:1 ferrite current balun for balanced line feeds.

The AT-500 utilises only 2 controls to operate for tuning, providing maximum ease of use in a manual tuner. A small-sized roller inductor operates all the way up to 6 Meters, while a relay-switched add-on inductor allows 160 Meter operation. The AT-500 also features Pastar's active Peak and Peak Hold dual cross-needle metering, chem-film treated aluminum metalwork and durable powder coated finish on the front panel and top cover. You'll have a tuner that will grace your shack for years to come.

SPECIAL PRICE THIS MONTH ONLY: £329.95

PALSTAR AT-2KP 2000 Watt PEP Antenna Tuner

A newly-designed, smaller roller inductor allows the AT2K to tune 6 Meters, while a relay-switched toroid adds the extra inductance needed for 160 Meter coverage. Newly designed capacitors feature lower minimum capacitance for improved high band performance, while maximum capacitance has been increased to 400pF for better low band performance. In addition, the Peak/Peak Hold metering from the PM2000 has been incorporated into the AT2K.

ML&S PRICE: £399.95

PALSTAR BT-1500A Balanced Antenna Tuner

The BT1500A is a dual-roller balanced L antenna tuner that fills the void for a matching network up to 1500 watts pep for balanced line antennas. For ease of use the BT1500 utilises only 2 controls to operate for tuning with two direct-coupled precision ceramic roller inductors.

ML&S PRICE: £659.95

Full range of PALSTAR now in stock.

AT-Auto	Automatic 1500 Watt ATU	**£1179.95**
AT-1KP	1200W Antenna Tuner	**£369.95**
AT-1500DT	1500W Differential Antenna Tuner	**£449.95**
AT-2K	(2000W) Antenna Tuner	**£399.95**
AT-4K	(2.5kW)Antenna Tuner	**£735.94**
AT-5K	(3.5kW) Antenna Tuner	**£1079.95**
BT-1500A	Balanced Antenna Tuner	**£659.95**
ZM-30	Antenna Analyser	**£359.95**
PM-2000AM	Power/SWR Meter	**£149.95**

Palstar Dummy Loads

DL-1500	(1.5KW)	**£109.95**
DL-2K	(2kW)	**£229.95**
DL-5K	(5kW)	**£359.95**

Palstar Receiver

R30A Receiver	Palstar R30A, fitted Collins filters for SSB & AM	**£549.95**
MW550P	Active preselector & ATU for AM & 160M reception	**£279.94**
SP30	Matching Desk Speaker	**£69.95**
AA30	Active Antenna Matcher 300kHz-30MHz	**£99.95**

See www.hamradio.co.uk

See www.hamradio.co.uk for more details on all of these items ... and much, much more! E&OE

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MyDEL Interconnecting Leads

At last! Three interconnecting leads to make your life easier

Two have 6" (140mm) of cable and the SO-239 version 24" (600mm) of RG-58CU coax.

These are idea for all handies/ scanners where using a standard converter may damage the radio due to the weight and inflexibility of larger coax cables.

MyDEL bring you three different leads with the following configuration;

1. Part No: CAB/BNCF-SMAM, BNC socket to SMA Plug **£14.95**
2. Part No. CAB/NF-SMAM, N-Type Socket SMA Plug..... **£14.95**
3. Part No. CAB/SO239-SMAM, SO-239 Socket to SMA Plug..... **£19.95**

HUSTLER Factory Authorised Distributor
Hustler antennas

Base Station Range free standing, max 7.3m tall, 1kW

4-BTV	40/20/15/10m	£178.95
5-BTV	80/40/20/15/10m	£218.95
6-BTV	80/40/30/20/15/10m	£239.95
17-BTV-S	17m add on for 5-BTV or 6-BTV	£53.95

Mobile Range

200W or 1kW, both stocked. RM10 to RM-80

10M to 80m single-band whips..... £24.95 to £56.95

Hustler are one of America's oldest manufacturers of Ham Radio antennas. The famous "White Whips" have been seen on many cars operating HF mobile. Their HF base range of 4 5 or 6-BTV antennas are probably the easiest to assemble and get going and of course are ground mounted, operating with just an earth spike mounted close to the base.

The full mobile and base range and accessories available from stock, including the high power 1kW mobile range.

NOW BACK IN STOCK!

NEW - Transworld Antennas

Built in the USA

ML&S are pleased to announce their appointment as sole European Distributor for the innovative Transworld Antennas fully automated remote antenna systems.

At last you can finally buy a fully automatic antenna that can be controlled via your modern Icom, Yaesu or Kenwood HF Transceiver.

The Transworld TW2010L "Backpacker" antenna system offers 5-Band coverage (10-20m inc WARC) and is the little brother of the famous TW2010 "Adventurer". It's especially suited for the amateur operator who loves backpacking, cycling, camping, or otherwise being on the go with his station.
Pricing includes Backpacker, quadra-stand & carrying bag. £379.95

The Transworld TW2010 "Adventurer" is the perfect antenna for high performance DX communications in a portable package.
Pricing includes Adventurer antenna, quadrapod. £599.95. Transport bag extra

The Transworld TW4040 "Adventurer" 40 meter Monoband Antenna is ideal for camping, emergencies, or permanent installations. The 4040 switching array box covers the entire 40 meter band (i.e., 7.0-7.3 MHz) without the necessity of either manual band changing or the need for a controller! Just attach a feedline and you are ready to talk. **Pricing includes Antenna, stand and travel bag. £319.95**

For more information on this exciting range of quality built products from Transworld Antennas see: www.transworldantennas.co.uk

Super Antennas USA

Super Antenna ChapStick MP-1 80m-10M Portable Antenna supplied complete with tripod & 80m coil. ..... **Only £155.85**

Super Antenna ChapStick MP-2 40m-10m Motorised version of MP-1. Ideal for remote control where antenna cannot be seen. **£149.95**

Super Antenna MP-1 Rotary Dipole. 10-80M with (Incl. 80m Coils) Collapses into a small carry bag. ..... **Only £299.95**

Or Deluxe version with Tripod. **£389.95**

Super Antenna YP-3 "Beam in a Bag" 80-10M (inc WARC) 3 ele portable beam supplied with carry bag..... **£389.95**

The complete range of Super Antenna products and accessories can be found on our web site

Little Tarheel II

Motorised Mobile Antenna

- Freq: 3.5 to 54MHz continuous
- Power rating: 200 watts p.e.p
- Vswr: typically 1.5 or less
- Weight: 850g
- Mast size: 1.5" diameter
- Mast length: 16 inches
- Whip length: 32 inches
- Total length in 54MHz position 48 inches
- Total length in 3.5MHz position 54 inches
- Includes 20ft of plug & play control box, ferrite decoupling core and 3/8 stud

only

£349.95

MyDEL Power Supplies

New MyDEL PS-30SW11

Latest high performance switch mode PSU. Die-cast Alloy chassis, full over-voltage protection and short circuit design. **RRP £119.95.**
Introductory offer only £69.95

SPS-8250	25A continuous, fully metered power supply	£79.95
MP-9626	120A, 13.8V DC power supply	£ 299.95
MP-8230	13.8V DC, 25A power supply	£69.95
MP-925	Linear 25-30A, 13.8V DC power supply	£99.95
MP-9600	60A switch mode power supply	£179.95
MP-6A	13.8V DC, 6A power supply	£29.95

Optibeam Antennas

Serious HF Antenna arrays for serious DX'ing.
The OptiBeam OBW10-5. 10 element 20m, 17m, 15m, 12m & 10m (14MHz, 18MHz, 21MHz, 24MHz, 28MHz) wire beam.
Gain: 11.5 dBi/12.0 dBi/11.8 dBi/12.3 dBi/12.6 dBi; Length: 7.70m, Weight: 14 kg. Price: £CALL with balun & UK mainland delivery..... **£CALL**

The complete range of Optibeam Antenna products can be found on our web site

COMET

Comet SWR/Power Meter

CMX 2300 2 separate SWR/Power Meters in one box! £149.95

Comet Antenna Tuner

CAT-300 300W Antenna Tuner £189.95

Comet Wide-Band Vertical

CHA 250B 80m to 6m with no ATU and no gaps £299.95

Comet Rotary Dipole

H422 4 Band trapped dipole £269.95

Comet HF/VHF/UHF Base Antennas

CWA1000	80,40,20,15,10 trapped dipole	£99.95
GP1	144/430 MHz 3.0 / 6.0dbi 1.25m	£59.95
GP3	144/430 MHz 4.5 / 7.2dbi 1.78m	£69.95
GP6	144/430 MHz 6.5 / 9.0dbi 3.07m	£99.95
GP9	144/430 MHz 8.5 / 11.9dbi 5.15m	£139.95
GP15N	50/144/430 MHz 3/6.2/8.6dbi 2.42m	£99.95
GP98	144/430/1200 MHz 2.94m long	£139.95
VA250	Compact HF antenna 3.5 - 70 MHz	£299.95

Comet Handy Antennas

BNC-750	BNC HF whip 7-50MHz TX/RX	£79.95
CH32	BNC 144/433/900Mhz 45mm	£19.95
CH99	BNC Tel Whip 70-1000MHz 195-1135mm L	£14.95
CHF816	16 3.5/28/50MHz 74cmL 10W/Yaesu FT817	£49.95
RX5	144/430/900MHz 44cm L 8W SMA	£29.95
RX7	144/430/900MHz 44cm L 8W BNC	£29.95
SH95	144/430/1200MHz 37cm L 10W BNC	£29.95
SMA3	144/430/900MHz 25cm L 10W SMA	£24.95
SMA99	70-1000MHz 1.1mm max L Tele SMA	£16.95

Comet Duplexers

CF360A	28/50MHz w/leads SO239 - PL259/PL259	£39.95
CF416A	44/430MHz w/leads SO239 PL259/PL259	£34.95
CF416B	144/430MHz w/leads SO239 PL259/N male	£34.95
CF503C	50/144MHz Sockets SO239 - PL259/PL259	£44.95
CF530C	50/144MHz w/leads SO239 - PL259/PL259	£44.95
CF530A	50/430MHz w/lead PL259 SO239/SO239	£39.95
CF4160B	144/430MHz Sockets SO239 PL259/PL259	£32.95

Comet Triplexers

CFX431A	144/430/1200MHz N socket/PL259/N/N	£49.95
CFX514N	50/144/430/MHz SO239/PL259/PL259/N	£49.95

Mini VNA PC Controlled Antenna

The mRS miniVNA is a compact 100kHz to 180MHz antenna analyser interface that is operated via a PC powered by a single USB connection. You can see at a glance where the antenna is resonant, what the SWR and the return loss is. The best (minimal) SWR frequency is automatically found and displayed. An optional internal RS232 connection is also available.

ML&S: £259.95

DIAMOND

Base Antennas

X-30	2/70, 3/5.5dB, 1.3m Long	£49.95
X-50N	2/70, 4.5/7.2dB, 1.7m Long	£64.95
X-300	2/70, 6.5/9dB, 3.1m Long	£99.95
X-7000	2/70/23, 8.3/11.7/13.7dB 5m Long	£199.95
V-2000	6/2/70, 2.15/6.2/8.4dB, 2.5m Long	£99.95

Mobile Antennas

NR-770R	100W, 2/70, 3/5.5dB, .98m Long	£34.95
NR-770RSP	As above but spring loaded	£39.95
NR-7900	2/70, 3.2/6.4dB, 1.46m Long	£49.95

Duplexers/Triplexers

MX-72N	1.6-150/400-460MHz Duplexer	£44.95
MX-62M	1.6-56/140-470MHz Duplexer	£67.95
MX-610	HF/6+2+70 (for FT-8900)	£71.95
MX-2000	6/2/70 Triplexer	£83.95
MX-3000N	2/70/23 Triplexer	£80.95

Switches

CX-210A	2-way, SO-239 Die Cast	£46.95
CX-210N	2-way, N-Type, Die Cast	£72.95
CX-310A	3-way, SO-239, Die Cast	£81.95
CX-310N	3-way, N-Type, Die Cast	£106.95

SWR/PWR Meters

SX-100	1.6-60 MHz, 30W-300W-3KW	£129.95
SX-200	1.8-200 MHz, 5-20-200 Watts	£89.95
SX-1000	1.8-1300 MHz, 5-20-200 Watts	£225.95
SX-40C	144-470MHz X needle Mobile Meter	£86.95
SX-20C	3.5-150MHz X needle Mobile Meter	£86.95
SX-27P	COMPACT 144/430, 60W Portable Meter	£44.95

Power Supply

GSV-3000 25Amp 5-15V Variable Metered £169.95

Huge selection of Diamond products always available ex-stock.

See www.hamradio.co.uk for more details on all of these items ... and much, much more! E&OE

Used equipment sitting at home gathering dust?

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For genuine good condition equipment

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NEW PRODUCTS FROM ML&S

MyDEL VENTUS G730 GPS-LOGGER

This USB memory stick sized unit is a fascinating pocket device with multiple commercial and personal uses for individual movement tracking. It's very light, extremely easy to use and logs your route automatically. It also adds your GPS location to digital pictures. It presents the route you have taken in 3D via Google Earth™ on your PC and it can export in different formats.

An example:
At the start of your walk, car or cycle ride turn on the G730 and when you finish your journey, turn it off. Once home plug the G730 into your PC, open the software, click on two icons and the route and pictures you have taken are viewed on Google earth/maps.

The G730 records your speed, altitude, distance etc., even showing how long you have stopped for during your journey. You can even use your digital images taken on route for future reference. How good is that!

Accuracy is to within 5 metres and you get up to 18 hours continuous use after a 2 hour charge via your USB port on your PC. Use the MyDEL VENTUS GPS-logger for cycling, rambling, jogging, skiing, trekking, sailing etc.

Features and Functions
Acquire and track 65 satellites simultaneously
SKYTRAQ low power chipset
Signal detection better than -160dBm
Reacquisition sensitivity –155dBm
Cold start < 30 seconds at –147dBm
Hot start < 1sec under open sky
5m CEP accuracy
Support A-GPS function
SBAS (WAAS, EGNOS) support
2M Bytes flash memory for data logging, with 16 bytes binary data per record that stores up to 256K data records
Log data can be exported to mapping software such as Google Earth and TrackMaker
Logging data interval programmable: by time or distance
18 hours of operation
Including software on CD

ONLY £49.95

ML&S are the sole UK distributor for the Ventus G730 and W-831

MyDEL Ventus WX-831

Introducing the next level of professional weather stations

This new much improved wireless Weather Station is built to a very high standard and even includes O-Ring seals on battery compartments that are mounted externally. The quality of external hardware is built to last for years and really moves the game on when it comes to "Professional Weather Stations"

RRP £169.95.
Introductory offer only £99.95.
Options: Additional wireless temperature monitors: £24.95. PSU to run the WX-831 from 240V: £19.95

Specifications
PC-Software
Wind Speed
Wind Direction
Wind Gust
Wind Chill
Rain Gauge
Barometric forecast
Pressure Read out
Bar charts
Trend indicators
Dew Point
Heat Index
In/Out Temperature
Radio Controlled clock
Humidity
Calendar
Alarm
Blue backlight
Extra channels for additional sensors

Yaesu Rotators the best available at very special prices.

G-250 – SPECIAL PRICE!
Ideal simple to use remote control Antenna rotator for light weight antenna installations. Ideal use for turning 4/6/9 element Tonna 2m antennas, 9/19/21 element 70 cm antennas. Also V/U Log periodic (i.e. Maldol LP-1300) and small single and HF dipoles.

G-450C Medium duty. Supplied with 25M control cable. ..... **Only £299.95**

G-550 Elevation rotator for satellite operation ..... **Only £259.95**

G-5500 Heavy-Duty PC Controlled Vertical rotator for satellite and EME applications. ..... **Only £469.95**

G-650 Medium duty with higher brake torque than the G-450. Supplied with 25M control cable..... **£339.95**

G-1000DXC Extra heavy-duty. Slim-line construction is ideal for many crank-up tower installations. Rotation range: 450°, with presets. ..... **Only £399.95**

G-2800DXC Yaesu's top-of-the-line rotator is for extra-heavy-duty antenna installations. It includes Auto Slow Start and Auto Slow Stop features to avoid sharp jolts to the antenna array and tower. The G-2800A includes a mast clamp and 40 meters of control cable, to simplify installation. Total rotation range: 450°, with presets. **£799.95**

ML&S: £99.95
(Subject to stocks)
(RRP £159.95)

For the full range of the worlds most reliable Yaesu Rotator products, see our website.

Tigertronics SL-USB

ALL sound card Digital and voice modes are supported by the SignaLinkTM USB. This includes traditional modes such as RTTY, SSTV and CW (to name a few), as well as today's hottest new modes like PSK31, MT-63 and EchoLink.

From only £99.95
Call to discuss your rig-to-cable requirements.

MyDEL CG SB-2000 USB Radio Interface

Only £99.95

A one stop solution to your data and radio control. It employs a CAT/CIV interface as standard and supports CAT with RS232 protocol.

The MyDEL CG SB-2000 Interface connects to your PC via USB and Sound Card and connects to your radio via Custom leads. Once connected and configured you have Computer Control via USB and decoding via your soundcard using HamRadio Deluxe or other packages.

Intro price of only £99.95 High quality ready-made leads for most rigs available at only £18.95.

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For the entire range with choice of bases and contacts and prices please see our website.

The finest range of keys available today.


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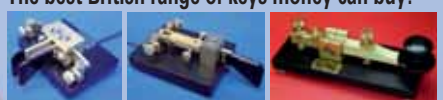
Kent Morse Keys

The best British range of keys money can buy!



The Kent twin paddle Morse key. £84.95. Kent Single Paddle Key. £72.85. Kent KT-1 Professional. £79.90.

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In Practice

Buying components in the internet age

PHOTO 1: Yellow outline shows organised storage for small resistors – see Figure 1 for labelling.

DOING IT ON THE WEB. Online ordering has given us access to a whole world of components, from suppliers both large and small. The barrier between 'amateur' and 'professional' customers has almost completely gone, so you can now deal directly with almost all the major component distributors and use their websites to place orders in your own name. Better still, those websites have now become your online technical library where you're welcome to browse, download data sheets and research whatever you want want to buy. However, you still aren't obliged to buy from those large suppliers, for the online revolution hasn't been all about big business.

Many small component suppliers are now enjoying a new lease of life online, and home micro-businesses are springing up that wouldn't have been viable before. Individual radio amateurs are able to trade on their personal expertise and create their own niche markets. The Web is a great leveller and the smallest suppliers often have the greatest advantages in terms of knowing their specialised markets and delivering personal service.

As a customer, you've never had it so good. It's merely a matter of knowing where on the Web to go… and, of course, what to do when you get there. Early websites for buying components were primitive and difficult to use and so too were the facilities for online payment. But all that has changed and the Web is now *the* easiest way for amateurs to buy components and tools. I maintain a web page of UK component and tool suppliers, listing sources that I and others have found useful **[1]**. It is kept up-to-date by real-life information from 'In Practice' readers.

NEW BUYING HABITS. Ordering from a distance is forcing us to plan ahead more. Very small orders may involve shipping and handling costs that can easily exceed the value of the components themselves and it's perfectly fair that the suppliers charge those costs back to you. So we now need to plan further ahead, order less often and make ourselves more self-sufficient by keeping some parts readily to hand.

It has always helped me to keep permanent stocks of some basic parts. The components you'll find useful to stock will depend on your own personal kind of amateur radio. As a bare minimum I'd suggest the essentials to keep your station on the air and make small routine changes. The key word is 'routine': notice which items you're constantly running short of and start buying them ahead in large enough quantities to ensure that doesn't happen. Don't be stuck for a few small parts – give yourself the freedom to get on with your hobby and enjoy it!

I recommend you always have a few coax connectors on hand (whichever ones your station uses) and keep about 10m of RG58 available for cutting into shorter lengths around the shack. Also have a few metres of 12V DC power cable, so you can rearrange the transceiver and/or power supply if the mood takes you. Add to the list some 10m lengths of thin screened cable, both single and multi-core, for making up connecting leads between the transceiver, computer and other accessories. Then think about the jacks, phono plugs and multipole connectors that you need to fit those items. And don't forget the tools you use for these routine small jobs – when you're not struggling with the wrong tools, everything becomes so much easier and more pleasurable **[2]**.

Another essential freedom is the ability to do simple construction and modifications without being stuck for some particular value of resistor or capacitor. They may only cost pennies each, but a notable feature of online ordering is that small, low-cost components are subject to minimum order quantities (MOQs). For example, you may need a couple of 10k resistors for your project, but the MOQ may be 50 for £1. For 0.25W resistors in particular, there's a very good way around that problem: invest about £10 in a mixed pack of 1000 resistors, containing several of every value you're ever likely to need. Then organise them into a set of component drawers. I did this a very long time ago (**Photo 1**) and over the years it has saved an incalculable amount of time.

Figure 1 shows how to organise all values of small resistors from 10Ω up to 999kΩ into an array of only 5x6 drawers. Just three more drawers complete the whole range of commonly used values, from less than 1Ω to 1MΩ and beyond. Vertical columns are labelled according to the standard E6 range of component values, with root values of 1.0, 1.5, 2.2, 3.3, 4.7 and 6.8, while the horizontal rows increase from left to right by factors of 10. For example, the shaded drawer in Figure 1 will contain 33kΩ resistors and also higher values such as 39kΩ and 43kΩ – there's no practical problem about mixing a few similar values in the same drawer. Then the next drawer begins with 47kΩ, and so on. Don't bother to label all 30 drawers; just 10 labels in the 'T' arrangement shown in Figure 1 will be enough. The remaining three drawers are for resistors below 1Ω, 1-10Ω and 1MΩ upwards – and that's all your small resistors organised. Physically larger components go in the stack of ice cream tubs below the drawers in Photo 1.

Other types of components such as capacitors and semiconductors are more difficult to recommend because there are so many different types and values. Also, a lot more depends on your particular needs. For example, you can't go far wrong with a selection of small ceramic capacitors in values of 1nF, 10nF and 100nF for RF bypassing and various kinds of EMC

10R	100R	1.0K	10K	100K
		1.5		
		2.2		
		3.3		
		4.7		
		6.8		

<1R	1-10R	⩾1M

FIGURE 1: Simplified labelling system for resistor drawers. For example, the shaded drawer contains everything from 33K to just below 47K.

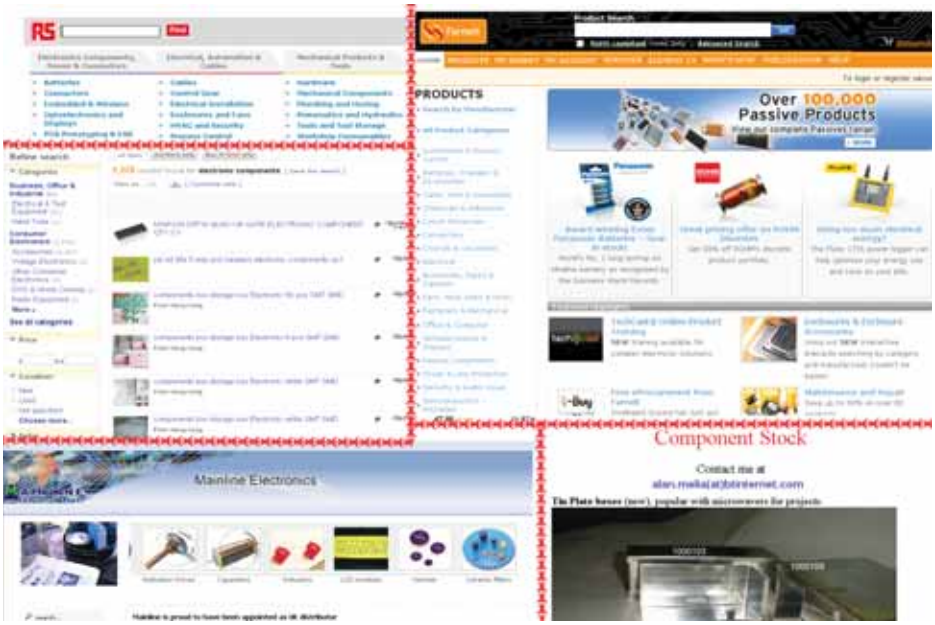

PHOTO 2: A wide range of component suppliers populate the the Web, from huge distributors through to one man bands.

troubleshooting. A few small electrolytics of say 10μF and 100μF will eventually come in handy. Don't attempt to buy stocks of transistors or Zener diodes until you learn which ones you use routinely, but do by all means buy 1N4148s as general-purpose RF and switching diodes and some 1N4007s as general-purpose diodes for higher voltages and currents, including 230V AC. When you're not quite sure what the end use is going to be, capacitors and rectifier diodes with higher voltage ratings will obviously be more versatile and aren't necessarily more expensive.

Ferrite or dust-iron cores and toroids are a different story because it's often very important to use the right type of magnetic material in the right size. Unknown magnetic materials are very difficult to characterise without advanced test equipment, while proper 'named' ferrite cores are quite expensive, so for these components my recommendation is not to buy them in advance [3].

SUPPLIERS. Online component suppliers divide into three main groups.

Small suppliers who specialise in amateur radio and electronics are the closest living descendants of the traditional small radio shops. The difference is that they don't need a shop front any more and they now serve customers across the UK – or even the whole world. They're out there, so you just need to find them. Most now have websites, at least to display their catalogues. More and more are moving towards online ordering and payment. To handle the e-commerce side of the business, many have chosen to operate as eBay traders (see later), either exclusively or in parallel with more traditional payment systems.

Many of these small businesses are run by radio amateurs who understand our needs very well. Although they cannot carry the entire industrial range of components, their catalogues contain a higher percentage of items that we'd actually want to buy. Prices can also be very competitive because they don't have the same overheads as the big suppliers. These dealers can often give advice about the selection of components and if they haven't got exactly what you asked for they can usually suggest alternatives. But please be reasonable about this: they aren't your personal electronics tutor!

These small suppliers often attend rallies and that's a major reason why they deserve our support. When you make it worthwhile for traders to be there, you're also supporting the rally as an event. Once again, though, be reasonable: don't expect them to bring their entire catalogue stock. If you know specifically what you'll want to buy, a phone call earlier in the week will help them ensure it will be there on Sunday. It's that kind of individual service that makes small component suppliers the backbone of amateur radio.

Major component distributors carry enormous inventories of components and other products from thousands of different manufacturers. These distributors aim to offer a 'one stop' service to medium sized companies, universities and other professional customers. The good news is that most of them will now deal with private individuals through their websites.

However, you have to deal with these suppliers in a businesslike way. Like a professional customer, you need to know exactly what you want to order and then buy it with no fuss. It is now quite easy to browse component categories or to make targeted searches for particular items and this will probably continue to improve. You're welcome to come and go as you wish and, if you see something interesting, to add it to your 'shopping basket' - without obligation.

When you do want to buy online, you generally have to register in one way or another. The major distributors' registration systems are tailored to business customers, but there's no reason to be scared of that. If a distributor is comfortable about serving private individuals, you'll find that business-related information is not mandatory (eg some drop-down selection lists will include 'Other'). If a distributor is still short-sighted enough to demand that kind of information, you are free to buy the same components from a competitor!

Having registered, you can then log into the website and manage your shopping basket. I now use shopping baskets at various suppliers' websites to build up my orders over a period of maybe several weeks. The advantage over keeping paper lists is that the total order value is immediately updated so I can see when it has become free of small order surcharges. E-mail also makes it very easy for friends and club members to combine individual lists and reduce the waiting time.

eBay stores and traders are easy enough to deal with, once you know how. There are some amazing bargains to be found, but you really need to know what you're doing, particularly when dealing with unknown sellers. Obviously you have to register with eBay and many sellers require you to use the associated PayPal service. My own experience with both of these services has been good but you need to understand how they work. This is a major topic in its own right and far beyond the scope of this short article. This isn't the place to discuss online payment and security either, but again there's plenty of good advice on the web itself [1].

NOTES AND REFERENCES

[1] For more information, follow this month's links from the 'In Practice' website.
[2] 'In Practice', Jul 2007, Sep-Oct 2008.
[3] 'In Practice', May 2007.

HF

The Autumn DX season beckons!

Bob, MD0CCE and Michael, G7VJR operated from El Salvador in May, making almost 10,000 contacts.

PLEASANT SURPRISES. HF conditions continue to be fairly indifferent over the summer, albeit with a few pleasant surprises. One reader, for example, phoned me after the IARU contest to say he had been dabbling and thought he had worked WH6R in IARU zone 61, Hawaii, but was having trouble believing this could be the case as he runs just 100 watts to a simple wire antenna. A quick check on the DX Summit website confirmed that this was for real, with WH6R working plenty of Europeans on 20 CW at that time. Actually, that path to Hawaii is quite a good one from the UK as it skirts the auroral zone unlike, say, Midway (coming up in October) which is just far enough away from Hawaii as to be almost directly over the North Pole.

Anyway, the good news is that by the time this hits your doormat we will be moving into the DX season, at least as far as the northern hemisphere is concerned and, as a result, there are quite a few DXpeditions planned. The autumn equinox is generally a good time for both HF and LF propagation, so it's a case of fingers crossed. Incidentally, the much-awaited and much-postponed Glorioso DXpedition may also finally put in an appearance this month, but I am not holding my breath, although it would be very welcome indeed.

DX NEWS. I have been taken to task by one reader about not starting this section each month with the most noteworthy expedition(s). What I do, in fact, is to work geographically from Europe through Africa, Asia, Oceania and North and South America, for consistency. However, I am quite prepared to change this system if readers prefer an alternative.

YL operators LA8FOA and LA6RHA, members of the Scandinavian YL Radio Amateurs (SYLRA), report that they are planning an 'expedition' to Svalbard from 6 to 13 September. They have already received the callsign JW1SYL.

A group of Brazilian operators plans to be active from Mayotte as TO2FH from 3 to 15 September. Also, Willi, DJ7RJ has received the call TO7RJ to be used from Mayotte (AF-027) from 22 September to 21 October. He will be leaving the island on 25 October, so he will be active as FH/DJ7RJ during the last few days. Expect Will to operate CW and SSB on 160-10. QSL via his home call.

Bill, N7OU will be on as ZL7/N7OU (Chatham Islands) from 18 to 30 September, CW only, running 100 watts and a vertical. Then as E51NOU (South Cooks) between 5 and 30 October, as before but with a linear available. QSL both operations via his home call N7OU.

Masa, JD1BMM, expects to be back to Minami Torishima in early September, for about a one month work assignment.

Al, CT1GPQ, is due to be in East Timor until 3 October as part of a medical team and hopes to operate in his spare time. No callsign known at press time. He plans to be on 40, 30, 20 and 17, mostly on CW but some SSB and RTTY. He will have an IC-706MkIIG and wire antennas. Toze, CT1GFK, will be the pilot station and will be in daily contact with Al. Toze can be reached at star@algarvedx.com. An online log search will be available.

A Polish team, along with FO5QB, will be on from Tubuai in the Austral Islands, OC-152, as TX5SPA 29 September to 12 October, and on Nuku Hiva in the Marquesas as TX5SPM 16 to 22 October. They will concentrate on the LF bands and working Europe. They plan on being on CW, SSB, RTTY and maybe PSK31 on all the higher bands too, if propagation makes it worthwhile. On Top Band they will use a vertical with two elevated radials or 12 on the ground. 80m will be a square of four 18m high verticals each with one elevated radial or 12 on the ground. On 40 there will be two phased verticals. For 30, the same as 40 or a four-square. 20-10 will have a hex beam and a vertical. They hope to have a receiving beverage directed toward Europe. Rigs will be a pair of K2s and an IC7000, with three 600W amplifiers. QSL via SP9PT. Check their website for further information.

Mori, JA2ZS, will be on as T88ZS from Palau between 19 and 22 September. Activity will be on 80 through 10 and possibly 160, CW and SSB. QSL via JA2ZS, either direct or via the bureau.

PG5M will be in the Pacific this month, with the following itinerary (possibly subject to change): 6/7 September Fiji (OC-016, callsign not known yet); 8 to 14 September Kiribati, Tarawa (OC-017) as T30G; 15/16 September Fiji; 17 to 23 September Tuvalu (OC-015) as T2G; 24 to 27 September Fiji. Gerben describes this as an 'ultra light solo DXpedition', and will be CW only. QSL via the bureau or direct, using his home call.

Don, G3BJ and Hilary, G4JKS will be on holiday in the South Pacific and active as FO/G3BJ from the Austral Islands (Rurutu and Tubuai) from 4 to 16 September, and as ZK2BJ from Niue from 18 to 25 September. Operation will be mainly on CW on 80 through 10, but not on 17 and 12. Operation is likely to be mainly when the bands are open to Europe. Equipment is limited to 100 watts (K3) and a Butternut HF6, but the locations are at the sea edge.

Tom, FP/M0TDG and Martin, FP/G3ZAY will be on Miquelon 24 to 27 September, CW and SSB on the low bands. Equipment availability and baggage limits will be factors in their plans. QSL to their home calls. Martin will also try to get to McNutt's Island in VE1 (IOTA NA-126) on 29 September.

60m REPORT (FROM G4TRA). DXing on 60m does rely typically on a darkness path between the stations. This month this was the case when, in late June and suffering from high static levels, 5J0BV San Andres Island (NA-033) was on for several days in the wee hours, with contacts made into the US, Europe and the UK as well, QSL to Dennis

K7BV. Further north, Alaska is one of the harder US states to work on 5MHz. However 60m regular John, KL7HBK can often be heard and was regularly on this month. Others active were, VP2MSJ in Montserrat, HP1AVS, YS1CF, HI3TEJ, and briefly XF3PAS in Cozumel Island (NA-090) for a 60m 'first'. If you fancy a real challenge then DXing in summer on this band is not easy; it certainly requires late hours and good ears.

DXCC HONOR ROLL. The August issue of *QST* (ARRL journal) carried the annual DXCC Honor Roll listings. These are folk who are within ten of the maximum number of DXCC counters (there are currently 338 in all), Mixed, Phone or CW. The full list is quite long, but I thought I would mention those UK amateurs who have all DXCC entities credited (which, of course, includes some which are currently impossible, such as North Korea and Yemen). Congratulations to G0CGL/344, G0DQS/344, G0JHC/344, G3GIQ/371, G3KHZ/362, G3KMA/373, G3LQP/363, G3NDC/353, G3NLY/370, G3OAG/346, G3PJT/342, G3PLP/347, G3RTE/350, G3SJX/347, G3SNN/349, G3UML/369, G3VKW/353, G3VXJ/345, G3XTT/347, G4BWP/347, G4IUF/346, G4OBK/344, G4PTJ/344, G4SOZ/338, G4ZCG/344, GJ3LFJ/344, GM0AXY/345, GM3ITN/379, GM3WIL/347, GM3YTS/345, GM4YMM/343, GW4BLE/351. The figures after the call show total entities credited, including deleted ones.

CORRESPONDENCE AND TABLES. I am in a quandary regarding the 9-band all-time tables, which have grown significantly since they first appeared something like 25 years ago. Back then there were only 6 bands, just one table (Mixed mode) and far fewer participants. And the column ran to two and a half pages, so there was more room available. We now have much larger tables but scores, particularly near the top, are barely changing, especially while band conditions are so poor. So it is increasingly difficult to justify the space every three months, especially as I am able to post the tables on my website where most of you can access them (incidentally, my apologies for the lack of recent updates to the site – I will try to make amends). I am, therefore, holding over the latest table for the time being, but please continue to send your updates to G3GIQ and, in the meantime, I would welcome comments on whether the table is still valued and how often you think it should appear. Equally, there is the ongoing question of what you find most useful in these pages. The best way to get current DX news nowadays is via the Internet, for example by way of the excellent Daily DX or, indeed, simply by watching the Cluster system. Equally, QSL information is trivial to find via the Internet. Most DXpeditions post their news, both pre-, during and post-event on their websites, usually with a wide selection of photographs. So is advice on operating, propagation, etc, most useful? Or maybe some historical and geographic background about specific DXCC entities. Or perhaps even the occasional restrospective on what was on the bands in years gone by. I can't please all of you all of the time, but am happy to have your feedback.

Peter, G3JFS makes a welcome return. He comments, "I was sorry to hear that Steve Gibbs had passed away. In the late 1960s, early 1970s we both worked for the same company overseas. I was posted to Perth WA in 1967 where I was VK6AI and I think it was a year or two later when Steve was in Mauritius as VQ8CC. We had many contacts during that period (which was around the peak of cycle 20) and couldn't have wished for a better DX path with nothing between us but a great big stretch of Indian Ocean". Peter recently received his K5D QSL, confirming contacts on 80, 40 and 30m with the highlight being confirmation of two 5 watt CW contacts on 80.

Another Peter, G3HQT, reports (CW) 17 S92LX, 20 XR1A, 9M6XRO, 9K9HQ, 30 TO8YY (St Barthelemy) and 40 5J0BV (San Andres & Providencia); (PSK31) 20 HK1KYR and (RTTY) 20 A92GE, TZ6EI, A65BP.

David, G3XYP continues to work pretty much anything that surfaces, including spending quite some time on RTTY and BPSK. Best DX on RTTY includes FR5, 5R8, HL, T08, XW and TZ. TO8YY was a nice surprise on 10 CW, also worked on several other bands and modes, as was 5J0BV.

Don, G0SOV rang me to discuss the fact that he has recently had several QSLs returned, marked "not in log", despite his being convinced that the DX station had got the call OK (all were on CW, and not with major DXpeditions but more low-profile single-operator efforts). He wonders whether this experience is common and whether these operators maybe get tired during the pile-ups and fail to log calls correctly. I wonder whether other readers have had similar experiences? My personal experience, as I told Don, is that in amassing close to 3000 band slots confirmed, there can't have been more than two or three instances where I have had my card returned as " not in log".

Peter, G4XEX managed JW/OK1IPS on 20 for a new one but had to get out the atlas to work out just where Svalbard is. Amateur radio can, indeed, be good for your general knowledge. The only other one he mentions as being of note was A65BJ from the UAE.

Rob, G4LMW mentions working VQ9LA and KP2HC on 17, FG8AR on 20 and S92LX plus CX7CO on 40, all CW.

Simon, M0VKY continues to put new ones in the log, all 20 SSB. 4U1ITU, 7P8R, TR8CA, ZY0F, H44MY, KL7CRC/P, E51JD and S92LX were new not only for the year but seven of them being all-time new ones for him.

Mike, G4DDL worked over 50 countries (including your scribe, in the 80m CC contest) during his recent visit to Denmark, but only after solving some problems with the lack of a decent earthing system in the house where he was staying.

Jim, G3UZB sent me a shot of the recent sunspots from the NASA website, wondering whether we had finally started the upswing. There have certainly been some more encouraging signs recently, though there is still a long way to go. He also mentioned the North Sea oilfields and queried whether there is any amateur activity from the rigs. An interesting question. I worked LA1EKO (Ekofisk field) back in 1983 but have no idea whether there has been more recent activity. It would be interesting to have feedback from anyone in the know.

THANKS. Special thanks go to the authors of the following for information extracted: OPDX Bulletin (KB8NW), The Daily DX (W3UR) and 425 DX News (I1JQJ). Please send items for the **November** issue including your end of year table totals by **Friday 18 September**.

REFERENCE
FO by SPs: http://fo2009sp.pl/

COUNTRIES WORKED, 2009

(starting 1/1/09, listed this month by SSB totals)

CALL	CW	SSB	DATA	MIXED
G3XYP	166	181	103	221
M0VKY	0	150	0	150
G4NXG/M	0	77	0	77
G4FVK	69	71	0	90
MM3XXW	0	68	0	68
MU0FAL	120	63	0	122
G1UGH	0	62	0	62
G3JFS	123	61	43	143
G4WXZ	54	60	15	88
G4XEX	0	47	77	88
G6CSY	60	41	63	74
GM4ELV	36	39	0	45
G4LMW	120	29	29	121
G4DDL	61	27	34	64
G4LWB	73	15	48	81
MM0RKT	38	15	71	80
G3HQT	142	0	111	162
M0BVE	124	0	0	124
G3LIK	86	0	0	86

LA1EKO QSL card, see text.

VHF/UHF

Another good month of Sporadic-E propagation resulted in a number of fine events on 50 and 144MHz.

Michael Kohla operating MI/DL1YMK during the recent 5-band EME operation in Ulster.

MOONBOUNCE. Howard Ling, G4CCH (IO93), was QRV on 23cm in June and on the 21st he completed with UT3LL on JT65c and DL3EBJ* for a new initial (#), the '*' denoting a CW contact. On the 27th he lists VK5MC, VK3UM, HB9MOON*, PI9CAM, W1M (K1RQG), OE9ERC, SM6FHZ*, PY2BS, VE6TA*, W0C* (K0YW) and N0Y* (N0OY). In the log on the 28th were VK2JDS on JT65c, VK3UM and F2TU on SSB, RD3DA, PA3FXB and G4DDK on JT65c, CT1DMK and W5J* (K5JL).

G4ZFJ was QRV on 2m and on 24 June Colin completed with WD4KPD (FM15) for a new grid. On 12 July RV3YM (KO63) was initial number 400 and on the 14th he worked E77DX (JN84). At G8VYK Brian reports nine 2m QSOs with K5DNL (EM15), NE1L (FN42), KN4SM (FN16) and WA2FGK (FN21) for new grids bringing his band total to 371. The 12-13 September weekend sees the ARI CW and SSB contest when London latitude stations will get almost 32 hours of Moon time as the declination varies from +25.74° to +21.23°. The 144/432MHz sky temperature ranges from 559/43K to 317/23K and the signal degradation, referred to perigee, varies from -0.08dB to 0dB. The Sun offset at Saturday midnight is -80°.

The July issue of *The 432 and above EME News*, edited by Al Katz, K2UYH, includes a lengthy report from Peter Blair, G3LTF (IO91), who was QRV in the Echoes of Apollo (EoA) activity at the end of June when a number of special three-character call signs were in use. This was an *ad hoc* event to celebrate the 40th anniversary of the Moon landings in 1969. Here is an extract from his report; 'All the following QSOs were on 23 cm SSB unless otherwise noted. I QSO'd on 26 June VK3UM, VK5MC, JA4BLC, LX1DB*, W1M, KR6R Stanford dish for initial 303, OE9ERC, W4OP, K8EB* #304, N6MB and W6TAI (Stanford again), and on 27 June VK3UM, HB9MOON, DF3RU, PI9CAM, SP6JLW, CTIDMK, RK3WWF*, W1M* , SM2CEW, LX1WB, VE6TA, K0C, W2LTI, F2TU. The loudest signal on SSB was LX1DB. I had about 400W at the feed and was using the speech processor. I also had a very interesting half-CW QSO with SM6CSO who was using 70W to a 2.3m dish and whose signal was about equal to noise in 50-60Hz. He hopes to be on soon with a much bigger signal. Finally on 28 June I worked PY2BS on SSB for #305.'

There is also a detailed report on Michael Kohla, DL1YMK and XYL Monika's DXpedition to Northern Ireland in the 24 May through 2 June period. This operation included five bands from 144MHz up and to quote from the report; 'A total of 174 moonbounce QSOs on 5 bands was reached, 132 initials were worked from 35 DXCCs, 67 of these on 23cm alone. During the DUBUS 23cm EME Contest a respectable 46 QSOs were completed. Look for our next moonbounce trip on the first 2 weekends of October and the week in between. It will be a hit-and-run operation from another rare DXCC in Europe.' Michael has placed all the details on the dedicated OK1DFC website (Websearch).

BAND REPORTS

50MHz. It has been an exciting month on the 'magic band' with many contributors enjoying some fine multi-hop E-layer QSOs with stations in the Caribbean and North America and even stations running modest power and antennas have been surprised at what they have worked. In alpha-numeric callsign order, first up is John Faulkner, G1VVP (IO93), whose busiest day was 17 July when he made 54 QSOs with stations in 16 countries including TA7OM (KN90). He is hoping to make some transatlantic contacts before the 'season' has ended. Ken Punshon, G4APJ (IO83) collected EB1BE in the elusive IN62 grid in NFD and also worked EA8CQS (IL18).

As usual G4DEZ lists scores of fine DX from 19 June. Bryn's new countries were 8R1DB* (GJ06) and A7/M0FGA* (LL55) on 19 June and TZ6EI (IK62) on the 27th. In the Trophy Contest on the 20th he worked stations in no fewer than 45 countries and 213 grids. He was called by four Puerto Ricans and six USA stations bringing three all-time new grids. A selection of countries worked were TF, CT3, TA, HI3, EA8, KP4, W, T7, 4X, UT, SV9 (around 40), C4, SM, ES, YL, LY and OH. The 26th was another super day with K1TEO* (FN31), V29JKV* (FK97), 9Y4D (FK90), VO1DJT (GN29) and a 100-plus other Ws and VOs. Bryn must be keeping the log book suppliers happy!

Don Readhead, G4KXW (IO91), found lots of HAs, several SPs and OMs on 29 June. In July on the 6th he worked UX1DC (KN18), YO5BRZ (KN07) and YUs in KN04. On the 15th CU3EQ (HM68) was a new grid and EA8CQS was also worked. The 16th brought QSOs with EA8AK and EA8EU (IL18) and 7X2ARA (JM16). John Tonks, G4MBN (IO93), lists 15 QSOs with stations in DG, EA, EA6, F, HA, IS0, IZ6, OE, S5, YL and 9H in the 19 to 30 June period. Similar DX was worked in the 6 to 15 July period.

On 20 June G4ZFJ contacted 9Y4VU* (FK90) for a new grid and country and V44KAI* (FK87): on the 26th V29JKV* was another new grid and country. In an excellent opening on the 26th Colin lists eight new grids in North America thanks to CW QSOs with K2AXX (FN12), W4GF (EM83), K8MFO (EN90), K4YMQ (EM63), K3JLM (FN11), VE3DO (EN94), VE3XN (EN93) and K8KS (EN82). In July on the 3rd TZ6EI* was a new grid and country and on the 15th he worked 9Y4D.

Bob Harrison, G8HGN (JO01), was QRV in the Trophy Contest on 20-21 June and mentions QSOs with UR7D (KN18), EA8CQS, T70A (JN63) and 15 other European countries. On the 22nd he worked E73CW (JN93) and 8R1DB for grid number 423 and country number 78 and on the 26th he contacted WA1T and N1LI, both in FN43. At G8VYK Brian worked UR5CCC (KN09), YO8SSB (KN27), EA1EJ (JN62) and 7X2GX (JM16) all new grids and the 7X a new country.

Ron Adam, GM4ILS (IO87), sent copies of his recent log pages and since 14 June he made scores of Es QSOs on CW with many European countries using just 20W to a collinear antenna. He even received a 59+ report from an HB9 in JN47 after reading the GB2RS news bulletin. In the Trophy Contest he completed 32 QSOs including seven on SSB with the likes of 9H6A (JM75), EA7RU (IM76), CT1CN (IN60) and CT3FQ (IM12). Martin Hall, GM8IEM (IO78) writes; 'A very productive period, the best DX being: D44TD (HK86) on 19 June, NP4A (FK68) on 21 June and 8R1DB (GJ06) on 22 June; then on 26 June HI3TEJ (FK49), K2LZQ (FN20), NR1R (FN42), K1TEO and K1MAA (FN31), VE1YX (FM74), N1LI (FM43), K3TKJ (FM28) and W1BYH (FN41). 15 July brought in 9Y4D (FK90). All contacts in SSB.'

Ron Stone, GW3YDX (IO82), writes; 'I thought the readers of your column might be interested in just what can be achieved on

6m without enormous long-boom antennas and kilowatts. Yesterday [26 June] I worked V29JKV and over 80 US stations (best was in western Texas) with 100W and a 2-ele Moxon rectangle on a 2ft 8in boom. Most were on CW of course.' Jamie Ashford, GW7SMV (IO81) comments about some brilliant openings; 'Huge opening to USA on 26th June: worked 79 stations on my SSB CQ as far as Texas over 7600kms. I've worked 4 new DXCC this year, now up to 181.' His ODX was K5DU (EM10FH) at 7,708km and new DXCCs were 8R1DB, J39BS (FK92) and J6/WB4WXE.

In the Trophy Contest Kevin Jackson, M0XLT (IO83) lists highlights as CT3FQ, UZ5DU (KN18), UR5YAF (KN38), UR7D, C31CT (JN02) and UR0MC (KN99). After the contest he worked HV0A (JN61). On 24 June 5B4AHY (KM64), SV8MFY (KM37), UX7DX and UX1UF/P (KN18) and EI2JD (IO63) were contacted and on the 26th, VE1YX. In the 26 June opening David Bowen, 2E0ZJA (IO81) worked KT3J (FN00), WC2C (FN30) and WA1T.

70MHz. Amateurs in Spain and its territories have been permitted to operate again according to a report on the 4m website. EA, EA6, EA8 and EA9 operators have access to 70.150MHz ±6kHz and 70.200MHz ±6kHz until June next year. In Norway the Norwegian PTA is considering a proposal for the use of the band on a secondary basis, covering in total 200kHz spread over 5 frequency blocks.

Graham Kimbell, G3TCT (IO81), completed 18 QSOs on 24 June in an extended Es opening contacting six OKs, an SV9, two SVs, two S5s, four 9As and one each DL, OM and CT stations. ODX was SV9GPV (KM25) at 2,776km. At G4DEZ Bryn had Es contacts with stations in 9A, S5 and CT on 24 June and on July 1 with EA7s and EA6; on the 3rd with EA, EA6 and CT stations; on the 6th with ES1CW (KO29) off the back of the beam and then with SV, SV9, S5, 9A and OK stations. There were more Es contacts with Spanish & Portuguese stations later in the month. On 21 June G4ZFJ worked ES3RF* (KO29#), ES5AM (KO38#); on the 24th ZB3B (IM76#) on FM for a new country and ZB2ER on FM; OM5KM (JN98#) and new country on the 29th. On 3 July Colin contacted SV9CJO (KM25#) for another new country and EA6FB* (JM08#), the '#' denoting a new grid. At G8HGN Bob worked ES5AM# on 21 June and next day 9A3LN (JN95). On 4 July he contacted EA6SX and EA6VQ (JM19#), EA1YV (IN52#) and EA1DDU (IN73) all via Es propagation.

144MHz. G1VVP caught his first Es opening on 11 June when John worked eight Spanish stations in IM87, 89, IN70-72 and 80. On the 24th he contacted S57EQ (JN76) and on 4 July three CTs in IM50, 57 and 59 and then on the 17th CT1HZE (IM57). G4APJ reports on the good Es opening to Iberia on 16 July when he had QSOs with four EAs and seven CTs bringing new grids while ZB3B was a new country. David Johnson, G4DHF (IO92), worked four EA8 stations in the long Es opening on 4 July, ODX being EA8TJ (IL18) an 3,034km, plus 14 mainland EAs and 15 CTs. He reckons it was the best such event in 12 years from his QTH. Roger Daniel, G4RUW (IO91), running just 10W, contacted three EAs and four CTs is this opening after working SV9CVY the previous day.

At G4ZJF Colin lists QSOs with EA9, CN8 and ZB stations on 21 June, and with another five EA8s on 4 and 16 July remarking that there have been five Es openings to the Canaries this year so far. From G8HGN Bob had QSOs with three EAs on 20 June and with CT, EA9 and CN8 stations next day. In the big 4 July event he completed with another seven CT and EA stations. In the UKAC on 7 July he made 59 QSOs with stations in 24 grids and seven countries for a claimed score of 12,709 points, ODX being DF5NK and DK1FG (JN59) at 789km. From G8VYK Brian added another five grids in CT, EA and EA8 on 16 July when some Es signals were S9+20dB.

GW7SMV was QRV in Es events on 20, 21 and 24 June and 4 and 16 July when Jamie lists 34 QSOs with stations in CT, EA, EA8, I and ZB3B (IM76) for country number 56. Running 20W to a tri-band collinear antenna just 6m AGL, M0XLT worked 17 CT and EA stations on 4 July and Portugal was a new country for Kevin. David Bowen, 2W0ZJA (IO81), runs 50W to a 9-ele Yagi and in an Es opening on 24 June he worked stations in DL, HA and 9A. On 3 July his ODX was SV9CVY at 2,923km and next day he contacted ten stations in CT, EA and EA6.

SIGN OFF. That's all there's room for this busy month. Thanks to *VHF Communications* for the Summer edition of the quarterly publication. The deadline for November is **18 September** and for December it is **16 October**. How about some more entries for the annual table?

WEBSEARCH
M1/DL1YMK:
www.ok1dfc.com/Peditions/MIped/miymk.htm
VHF Communications: www.vhfcomm.co.uk

ANNUAL VHF/UHF TABLE – JAN TO DEC 2009

Callsign	50MHz Grid	50MHz Ctr	70MHz Grid	70MHz Ctr	144MHz Grid	144MHz Ctr	430MHz Grid	430MHz Ctr	1296MHz Grid	1296MHz Ctr	Total Points
G4DEZ	377	78	65	23	124	29	39	10	14	5	764
G4ZFJ	250	64	48	20	286	70	16	6	-	-	760
G0LGS	213	50	9	4	47	15	23	9	7	4	381
G8VYK	83	39	10	7	164	47	12	4	-	-	366
G8HGN	63	55	18	8	75	20	36	11	-	-	266
G4APJ	57	21	-	-	31	12	18	6	-	-	145
G0LFP	30	17	1	1	9	3	-	-	-	-	61

The grids are the first four characters. eg JO02, and the countries are the DXCC entities plus IT9. No repeater, packet radio, cross-band or satellite QSOs. Next deadline is 18 September.

GHz Bands

Trying different weak-signal modes can be fun – and instructive.

DIGITAL MODES ON MICROWAVE. Recently there has been a great deal of discussion on the UK microwave reflector about using digital modes (machine generated modes or MGM) on the microwave bands. Microwave propagation modes, such as tropospheric scatter, give rise to frequency spreading and rapid amplitude variations of the received signal. When combined with multiple Doppler signals from aircraft, this can play havoc with most of the common MGM modes used on the HF and VHF bands, making them unsuitable for our use. Recognising this, Joe Taylor, K1JT, developed a range of modes known as JT4 that are intended to be candidates for increasing link budgets on the microwave bands. In particular, the JT4G mode, which uses 4 tones separated by 315Hz, should prove suitable for use on 10GHz even with the severe Doppler spreading often experienced in rain scatter events.

Few people had reported any practical microwave band results using this mode in the UK, although ON4IY and ON4CDU had been experimenting with these modes in Belgium and there has been some activity in Germany. In late June, Robin, G8APZ, suggested we should try this mode on 10GHz over our obstructed 80km Brentwood to Felixstowe path.

JT4G ON 10GHz. Initial results were very encouraging with 100% copy even with signal levels that were reported as an average of -16dB in 2500Hz bandwidth. The biggest problem was that even though Robin was using a DB6NT (Kuhne) G3 transverter [1] with a 144MHz IF, it was not locked to a 10MHz reference. The initial rapid frequency drift as the PA (in the same box) heated the whole transverter was unexpectedly high and required manual adjustment of the RIT to keep the tones 'vertical' on the WSJT SpecJT waterfall display [1]. The early versions of JT4G do not incorporate any AFC, although riding the RIT to retain lock was found to be quite easy when dealing with small amounts of drift. It should be noted that the drift did not pose any problems with normal speech and CW, although some RIT adjustment may have been needed in normal operation, as a matter of course.

I also conducted 10GHz tests with Andy, G4JNT (IO90). We both use frequency locked transverters. Setting our IF rig dials on 10368.100MHz, signals came through immediately with 100% decode. The small frequency offset we saw on the display was almost completely due to the small and normally ignored inaccuracy of the frequency reference in the IF rigs. This test was conducted in otherwise stable propagation conditions.

A more searching test was conducted with John, G4BAO. A severe thunder storm caused a great deal of rain scatter on the 80km path between Felixstowe and Cambridge. At times the four tones of the JT4G signal were completely unrecognisable as tones, being spread HF by up to 250Hz from the transmission frequency. Decode was 100% at average reported levels of around -21dB in 2500Hz bandwidth (see later about JT4 signal levels).

PHOTO 1: 3.1m TVRO dish used by WW2R (Dallas) on 902MHz to 3400MHz EME. (Photo: WW2R).

JT4 ON 1.3GHz. Successful tests were made using JT4G on 1.3GHz between Felixstowe and GM4CXM (IO75, Glasgow), a 560km path that is normally only workable using aircraft scatter. A contact that would normally take about 20 minutes was completed in around 6 minutes with 100% copy with the weak but always present tropospheric scatter signal.

Further tests with GW4DGU (IO71) on 1.3GHz using JT4E and then JT4G showed a definite advantage to using G mode. Due to an equipment re-build, Chris was running just 10W from his QTH in west Wales. Whilst I could see the tones from Chris most of the time, JT4E refused to produce all but one decode. The path was exhibiting a lot of Doppler aircraft 'trails' through the wanted signals as well as some low level radar 'blips'. Changing to JT4G immediately produced decodes on about 80% of Chris' transmissions and we were able to complete the QSO relatively easily.

PHOTO 2: Prodelin 2.4m VSAT antenna belonging to GW4DGU. This is used on 10GHz. (Photo: GW4DGU).

Each of the JT4 modes from A to G uses increasing tone spacing. The narrow spacing of JT4A seems to cause problems as the width of the propagated signal is comparable with the tone spacing. The wider spaced tones, although not giving as high sensitivity as JT4A, seem to cope better and as a result produce more consistent decodes.

As a comparison, JT4A has a claimed sensitivity of around -23dB signal to noise ratio (SNR) in 2.5kHz whereas JT4G is around -17dB SNR. This corresponds to a signal equal to the noise level in a bandwidth of 50Hz. It is *just* possible to copy a CW signal at this level, but it would be marginal, and all the Doppler and radar interference would probably prolong or preclude any attempt at a CW contact on 23cm.

My tests were 100% successful over the path from Southampton to Felixstowe, receiving G4JNT's 200mW 1.3GHz attended JT4G beacon (which uses a DDS based 144MHz IF and up converter to 1296MHz). At 50mW, I was only able to decode the odd message. GM6BIG (IO85) is also developing a similar JT4G beacon source for possible use in the Scottish GB3CSB 10GHz beacon.

JT4 ON 3.4GHz. Further QSOs were made with G4PBP (IO82) and G4BAO (JO02) using all the JT4 modes on 23cm and also JT4G on 9cm with complete success.

CONCLUSIONS. The JT4 modes look like they could be a very useful addition to the

PHOTO 3: OK1DFC's 3.2m commercially available dish set up for an EME expedition. (Photo: OK1DFC).

communications modes available to the amateur microwave enthusiast. The WSJT suite of programs are available free of charge from the K1JT web page (see Websearch **[2]**). All you then need is a suitable sound card in your computer.

STOP PRESS: Since writing the above, Joe Taylor has upgraded the JT4 suite to incorporate an improved decoder that looks like it could significantly improve the sensitivity of the wider spaced tone versions of JT4. I hope to report on some more experiences with the improved JT4 suite in a future column. My grateful thanks to everyone involved in these tests.

GETTING STARTED IN MOON-BOUNCE (EME) PART 2 - DISHES

Yagi Uda and other array type antennas can be used for 23cm EME, but not usually on any higher band. Some of the reasons for this were given in Part 1 last month. This should not discourage those with large terrestrial arrays (eg 4 x 23-element Tonnas) from using their existing antenna to try for contacts with the bigger dish-equipped stations as an initial foray into 23cm EME, but it would not generally be a recommended starting point for microwave band EME. Dish antennas (more correctly dish reflectors) are to be preferred.

From my personal experience, I would only reluctantly suggest using a dish of less than about 2m diameter on 23cm. You should preferably use a dish of a least 2.4m. On the higher bands 2m is probably a more practical minimum size, although some people have had limited success on 3cm with dishes of just 1.2m diameter.

Serious EME operators have built or acquired dishes to over 10m in diameter. These pose serious design problems ncluding cost, weight and wind loading and are not to be considered lightly.

When considering what sort of dish to look for you should bear in mind what size it is practical to install at the chosen site. This may be determined by local planning laws, domestic situation and available budget. Once this decision is made then the choice is likely to be from the following options:

Ex-commercial satellite downlink (cable TV head end or telecom gateway)
Very small aperture satellite (VSAT)
Television receive only (TVRO - domestic)
Amateur commercial (several companies make these)
Home built (either fixed or stress type)

Sometimes, asking around the EME community will produce a lead as to where there might be a suitable dish that can be had for the cost of removal.

Over the last few years there have been a number of dishes of around 2 to 3.7 metre diameter offered for disposal in the UK. These are often from cable TV head end sites that have been rationalised with the arrival of digital TV services. Although these can be a great source of dishes that are suitable for use to at least 12.7GHz, they are often bulky and have mounts that are unsuitable for tracking the moon, since in normal service they would have been set up look at a particular satellite and are not then required to move again. Photo 1 shows a 3.1m TVRO dish that belongs to WW2R.

VSAT dishes are usually around 2.4 – 3m in diameter and of elliptical construction. These are very desirable but do watch that the mount is suitable for moon tracking. It will almost certainly need modification. **Photo 2** shows the GW4DGU 2.4m Prodelin ex-VSAT dish used on 10GHz.

TVRO dishes for C band (3.7 – 4.2GHz) television were quite common at one time and could be obtained in sizes ranging from 2.3 to over 3m diameter. With the arrival of Ku band (11 – 12GHz) satellite TV, and small dishes, they have become much harder to find in the UK. Look for KTI, Orbitron, etc. Satellite-tracking polar mounts will need to be modified for moon tracking.

Amateur commercial dishes are available from RF HamDesign **[3]** in the Netherlands and OK1DFC **[4]** in the Czech Republic. These dish antennas are available with diameters from around 1.5m to over 3m. They do not normally include a mount that is suitable for moon tracking. **Photo 3** shows the OK1DFC 3.2 metre commercial dish.

Stress dishes were very popular in amateur radio. They are based on the fact that when a radial arm attached to a central hub is pulled from its end towards a central arm, it will form a parabolic shape. When a number of such stressed arms are placed around a central hub and the gap covered by mesh, a very effective parabolic dish can be constructed for a low outlay.

Some of the earliest amateur microwave EME dishes used this method of construction and early issues of the RSGB *VHF-UHF Manual* carried details of stress dish construction. Sadly, there has been little about stress dish construction in any of the later RSGB and ARRL microwave handbooks. However, there is an interesting article on stress dishes in **[5]**.

Michael, DL1YMK and Monika use a stress dish when out on their multi-band (70cm to 9cm) EME expeditions. **Photo 4** shows their dish set up during the MI/DL1YMK EME expedition in GI in May 2009.

G8VR – SK. Sadly, I have just learned of the passing of Ken Willis, G8VR. Ken was a past *RadCom* columnist and a dedicated 23cm operator. Ken and I had many QSOs on the band over the years. He will be greatly missed. *Vale* Ken.

PHOTO 4: Home built 3.2m stressed construction dish belonging to DL1YMK and used on 432 – 3400MHz EME. (Photo: DL1YMK).

FORTHCOMING MICROWAVE EVENTS

54.UKW Tagung Weinheim
Germany, 12 and 13 September. Details at www.ukw-tagung.de.

Crawley Microwave Round Table
13 September, Crawley Radio Club house, Crawley. Details from G0FDZ, chris@g0fdz.com.

RSGB Convention
9 to 11 October, Wyboston Lakes Centre, Bedfordshire. Details at www.rsgb.org/hfc.

Microwave Update
Dallas Texas, 22 to 25 October 2009. Details at www.microwaveupdate.org.

Martlesham Microwave Round Table
7 and 8 November 2009. Details at http://mmrt.homedns.org and from G3XDY.

WEBSEARCH

[1] Kuhne Electronics: www.kuhne-electronic.de/
[2] K1JT: www.physics.princeton.edu/pulsar/K1JT/
[3] RFHAM Design: www.rfhamdesign.com/
[4] OK1DFC: www.ok1dfc.com
[5] Stress dish article: www.nitehawk.com/432_MHz_EME/stress_dish.pdf

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E&OE

Procom repeater duplexers

We look at the DPF 2/33 for 2m and DPF 70/6 for 70cm

PHOTO 1: DPF2/33 2m band 6 cavity duplexer.

PHOTO 2: DPF70/6 70cm band 6 cavity duplexer.

INTRODUCTION. A duplexer is a device that allows a transmitter and a receiver to simultaneously connect to a common antenna and operate without mutual interference or damage.

There are two basic types of duplexer: band pass and band reject. The latter type is better suited to closely spaced transmit and receive frequencies, such as those used within the amateur 144 – 146MHz amateur band. Within this band, speech repeaters use a transmitter to receiver separation of just 600kHz (~0.4%).

The Procom DPF 2/33-250 144MHz band duplexer examined here is a bandpass/reject type **[1]**. The one supplied for review was tuned to 145.100MHz and 145.700MHz (Channel RV56).

The second duplexer reviewed here, also from Procom, is the smaller DPF 70/6. It is meant for a wider transmitter/receiver frequency separation of between 9 and 13MHz. The review unit was supplied set for 9MHz separation, with the high frequency cavities tuned to 439.6625MHz and the low frequency cavities tuned to 430.6625MHz. These frequencies correspond to D-Star channel RV773.

2m DPF 2/33-250. This is a 6 cavity duplexer intended for the 140 to 175MHz band (which, of course, includes the amateur 145MHz band). It is designed for use in talk through repeaters with a transmitter-to-receiver frequency separation of 600kHz. Its power rating is up to 300W, depending on insertion loss adjustment. As measured, the supplied duplexer should be able to handle the full 300W, although this is unlikely to be required in UK amateur repeater service. The DPF2/33 is shown in **Photo 1**.

Six cavities are used; three in the transmit path and three in the receive path. Each cavity is 125cm tall and has a claimed Q of around 8000. The common antenna connection uses an N type connector, as do the receiver and transmitter port connections. Interconnection between the cavities is by means of RG214 coaxial cables. For rigidity, the six cylindrical cavities are strapped to two 19 inch aluminium mounting bars. The duplexer weighs 19.2kg.

Each of the cylindrical cavities is made of specially electroplated and painted aluminium. The lower part of each resonator is made of untreated copper while the upper (moving part) of the resonator is silver plated aluminium. The cavities are tuned by means of a large bolt-type plunger adjuster, whilst the coupling within each cavity is a resonant helical inductor. A trimmer capacitor allows for optimum matching.

Figure 1 shows the measured frequency response of the transmitter and receiver paths of the duplexer, and **Table 1** gives the measured results for return loss (match) and insertion loss in dB.

DPF70/6. This 70cm device is also a 6 cavity duplexer, but of much smaller dimensions than the DPF 2/33. Procom specify the DPF70/6 for use over the 406 to 470MHz frequency range with transmit to receive separation of 9 to 13MHz (~2 – 3% at 435MHz). Note that these filters are not suitable for the narrow 1.6MHz split used by most speech repeaters within the 70cm band.

The higher frequency of operation, increased transmitter to receiver frequency separation and lower power rating all allow the duplexer to be much more compact than the 2m band version. The DPF70/6 weighs less than 1kg. **Photo 2** shows the 70cm band duplexer.

All six cavities are made from extruded aluminium and secured to a folded metal frame for rigidity. Interconnection between the cavities is by means of semi-rigid coaxial cable. Cavity tuning is by means of a threaded rod into the top of each cavity. The Procom web page shows the DPF70/6 with BNC connectors as standard. The supplied unit was fitted with N type connectors for improved performance.

These filters are suitable for use within the D-Star allocation in the 70cm band. Maximum power rating is given as 50W. **Figure 2** shows the measured frequency response on both the transmit and receive path of the DPF70/6 and **Table 2** gives the

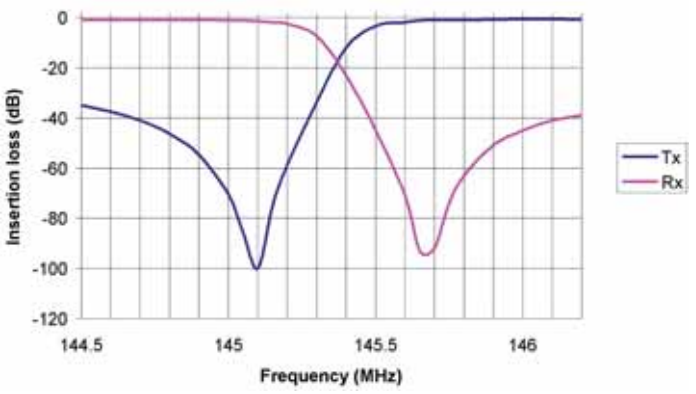


FIGURE 1: DPF2/33 measured results.

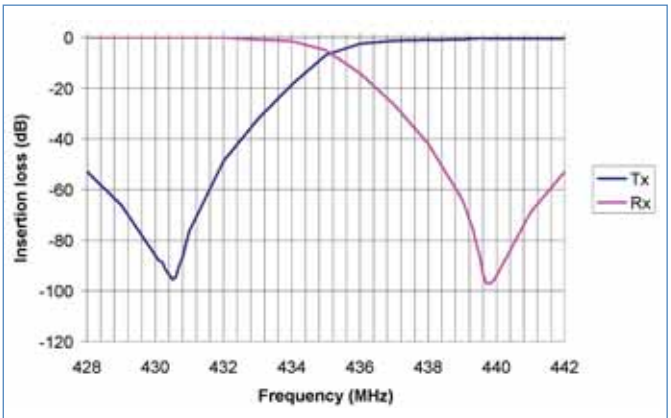


FIGURE 2: DPF70/6 measured results.

measured results for insertion loss, isolation and match.

The test equipment used in these tests is shown in **Table 3**. All measurements were made with the HP8754A network analyser except for isolation. The HP8754A has a dynamic range of 80dB which is insufficient to measure the near-100dB isolation of the duplexer. The signal generator and spectrum analyser are easily able to measure this range with ±2dB estimated uncertainty. The signal generator and spectrum analyser were locked to a Z3801 GPS disciplined 10MHz reference.

SUMMARY. The duplexer is an essential part of any repeater that uses a common antenna or closely spaced antenna array. The overall performance of the repeater critically depends on the insertion loss, transmitter to receiver isolation and stability of the duplexer. It is important for quality of service that these parameters are as good as can be achieved. This means using a proven duplexer design. The Procom 2m band duplexer is not cheap but is of the highest quality and should give many years of trouble-free operation. For 70cm D-Star operation the DPF70/6 should prove a good investment. Its measured performance is excellent and the mechanical construction used appears very rugged and suitable for a tough life in an amateur repeater environment. It is perhaps worth adding that groups using these duplexers should ensure they use good quality coaxial cables between the radios and the duplexer and again between the duplexer and the antenna or some of the excellent performance advantages could be lost due to signal leakage.

Both duplexers are well constructed and easily meet their respective performance claims. The DPF2/33-125 140-175MHz 125mm Cavity Duplex Filter costs £ 3,447.72 but Procom UK Sales Ltd **[2]** offer a discount to any amateur club wishing to purchase this duplexer. The smaller DPF70/6 406-470MHz 6 cavity ¼ wave resonator duplexer is £255.66. Note that while this smaller style filter is suitable for wide split 70cm repeaters, the narrower 1.6MHz split would require a UHF cavity filter similar to the DPF2/33-125 VHF unit tested here, eg the DPF70/33-125 which costs £3,034.54, though again Procom UK Sales Ltd offer amateur groups a discount.

REFERENCES

[1] Procom DK: www.procom.dk/eng/
[2] Procom UK: www.procomuk.co.uk

TABLE 1: DPF2/33 test results. All measurements were made with the unused ports terminated in 50Ω unless otherwise stated.

Parameter	Manufacturers claim	Measured by G4DDK
Insertion loss		
Tx to antenna connector	<1.5dB (145.700MHz)	1.1dB (145.700MHz)
Antenna to Rx connector	<1.5dB (145.100MHz)	1.3dB (145.100MHz)
Matching		
Return loss at antenna connector	>14dB	24dB ±1dB (145.100MHz)
Return loss at Tx connector	>14dB	29dB ±1dB (145.700MHz)
Return loss at Rx connector	>14dB	21dB ±1dB (145.100MHz)
Isolation		
Tx conn. to Rx conn. (145.700MHz)	88dB (interpolated)	99dB ±2dB

TABLE 2: DPF70/6 test results. All measurements were made with the unused ports terminated in 50Ω unless otherwise stated.

Parameter	Manufacturers claim	Measured by G4DDK
Insertion loss		
Tx to antenna connector	<1.2dB (439.6625MHz)	0.8dB (439.6625MHz)
Antenna to Rx connector	<1.2dB (430.6625MHz)	0.6dB (430.6625MHz)
Matching		
Return loss at antenna connector		30dB ±1dB (439.6625MHz)
Return loss at Tx connector		33dB ±1dB (430.6625MHz))
Isolation		
Tx conn. to Rx conn. (438.900MHz)	>85dB	96dB ±2dB

TABLE 3: Measuring equipment used.

Measurement	Test equipment used
Return loss, insertion loss and frequency response Isolation	HP 8754A Network analyser + HP 8502A transmission test set + HP908A 50Ω terminations HP 8592L spectrum analyser + Rohde and Schwarz SMG signal generator. Both GPS locked.

Using redundant duplexers

In the first section of this 2-part article an old Procom duplexer gets an unexpected new lease of life as a 2m/70cm splitter.

One of the duplexers found and tested.

SCOUTING FOR TOYS. Scouting around the shack, rummaging through old forgotten junk can sometimes yield some interesting radio devices. One such device I recently found hiding in a box somewhere was a duplexer, in fact, a Procom DPF2/6H. This had seen professional service near the 2m band, providing over 60dB of isolation between the transmitter and receiver high and low ports. The frequency separation between the two ports is a minimum of 8MHz according to the information printed on the device and this was confirmed by consulting information available from the manufacturer.

The figures were measured and confirmed with a spectrum analyser during bench testing. My initial thoughts were that this duplexer was of little use to anyone with the exception of maybe using it as a 2m low pass filter or perhaps as a notch filter to remove the annoying pager interference that seems to plague 2m on occasions. But when I looked beyond VHF, the device surprised me – and prompted me to put the duplexer to a use for which it was probably was never intended.

TESTING. The filter was originally designed to operate a duplex repeater system using one antenna. In this situation the isolation must be sufficient between the transmitter and receiver ports not to de-sense the receiver. The loss between the transmitter port and the antenna and also the loss from the receiver port to the antenna port must be negligible, certainly less than 1dB (I measured 0.8dB). Again, the minimum frequency separation of 8MHz between the transmit and receive frequencies for this device obviously made it unsuitable for use in a repeater system, since the separation on 2m is a mere 600kHz and the allocated band we have in the UK is just 2MHz wide. Having use of professional test equipment made the exercise of examining the duplexer much easier and a full range of tests were conducted over 100MHz to 500MHz, covering the 2m and 70cm bands.

First, the device was examined with a Rohde & Schwarz FSH3 spectrum analyser with its integrated tracking generator; the unused filter port was terminated in 50Ω. Figures 1-4 are screen shots downloaded from the analyser and tell an interesting story about the filter's performance.

PERFORMANCE. **Figure 1** shows the loss from the antenna port to the 'low' port, which I chose to designate as the 2m port. The frequency sweep is from 100MHz to 500MHz. At 2m the loss read 3.55dB and at 70cm it was 34.4dB. Swapping to the 'High' port, which I chose to call the 70cm port, in the results shown in **Figure 2** we see a notch at 3m of some 58dB and a through loss at 70cm of a mere 2.83dB. These figures indicate that there is a reasonable VHF connection from the 2m socket to the common socket and a slightly better one at UHF from the 70cm port. The 34.4dB and 58dB notches mean that there is a substantial amount of cross-frequency isolation so that 2m energy doesn't go to the 70cm port, can vice versa.

Figures 3 and **4** are a close-in look at the through ('passband') attenuation from the 2m port to the aerial port and the 70cm port to the aerial port, respectively. At the edges of the 2m band the loss figures aren't terribly good, at around 5dB, but they're better mid-band. On 70cm the loss is better.

HOW CAN I USE THIS? The idea came to mind that a dual band radio such as my Yaesu 8800 at home could operate with two antennas: an omni-directional on 2m for local contacts and a six-element UHF beam pointing at a 70cm repeater I often use, where a white stick doesn't give solid copy.

Experimenting with antennas in the loft I was indeed successful in running an omni-directional antenna on 2m and a six element beam on 70cm. I added an old 2m bandpass filter in series with the two metre antenna to provide additional isolation for the two metre port from UHF transmissions – just in case. The great advantage of this arrangement is that I can have the two aerials with a single cable, and no need to switch between them on the single aerial socket on the radio.

The manufacturer's literature states that the duplexer is rated at 50W of RF and is thus more than suitable for the rig I use at home. However, erring on the side of caution, it's always best only to run power sufficient for the actual communication and not blast gigawatts of RF through the antenna for a local QSO. I can now enjoy local simplex contacts on 2m and work the repeater using the beam. This has made life simpler, now not needing to switch over feeders to change bands.

MOVING ON. Since finding the first duplexer a couple more have surfaced. So next month we'll look at other uses for similar old duplexers, including re-tuning them to reject pager interference.

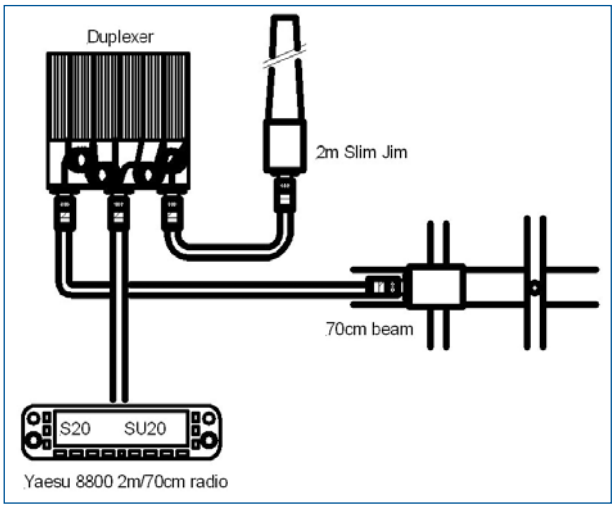
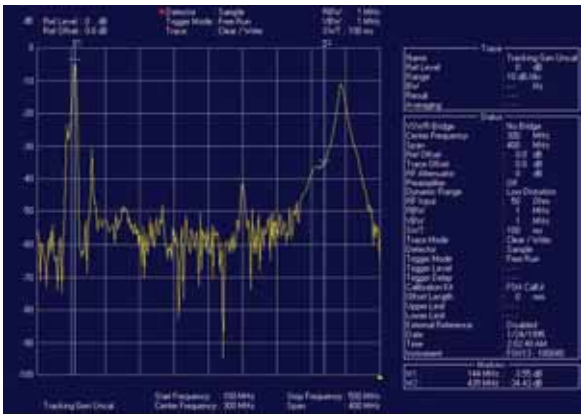


FIGURE 5: General arrangement of the radio and two antennas fed through the duplexer.



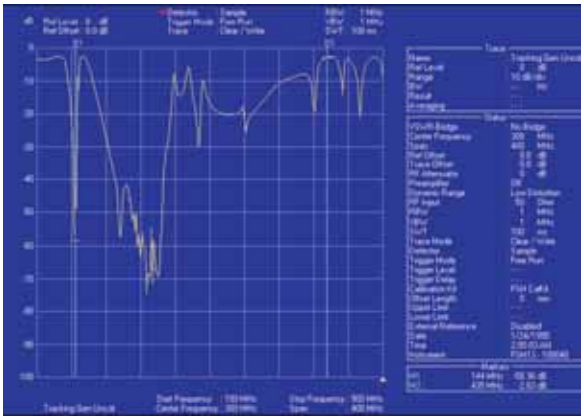
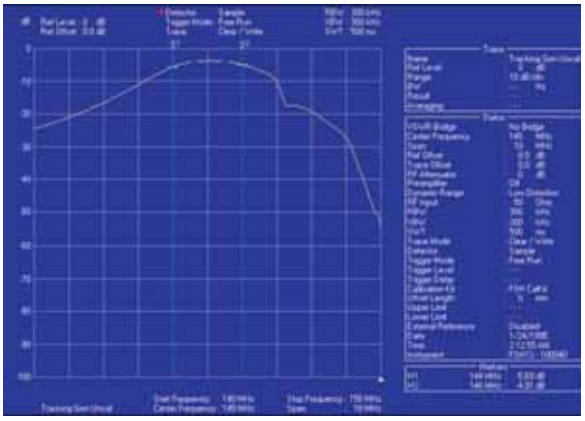


FIGURE 1: The signal path from the antenna port to the low (2m) port, 100-500MHz. Note the loss, 3.55dB at 2m and 34.4dB at 70cm.

FIGURE 2: Signal path from the antenna port to the high (70cm) port. The depth of the 2m notch is some 58dB and the loss at 435MHz is just 2.83dB.



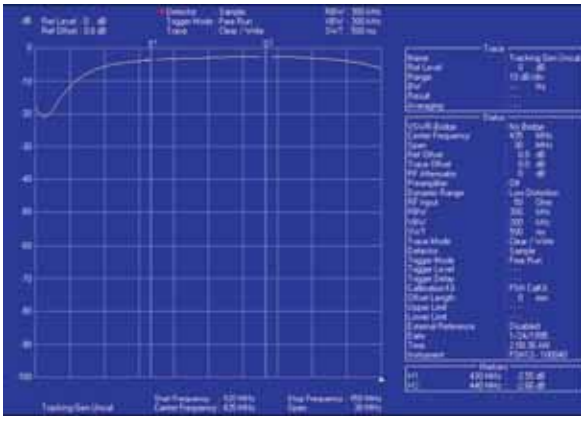


FIGURE 3: Pass band of the duplexer between the antenna port and the low port.

FIGURE 4: pass band of the duplexer between the antenna port and the high port.

G3LIV Isoterm data interfaces

HISTORY. Johnny Melvin, G3LIV has a background in bio-medical electronics and built his first data interface for the BBC B home computer in 1981. He takes great care in making his current range of digital isolation interfaces and it shows – the workmanship is first class, the screen-printed front panels clear and attractive and they come with all the required leads, software and instructions.

As I had not yet got around to buying or making a new set of leads to connect my recently-acquired Yaesu FT-2000 to my existing Opto-electronic interface it seemed like a good opportunity to review two of G3LIV's products to see how they performed. The models tested were the Isoterm Multicon USB and the Isoterm Multimode. Both models are very similar in size with the Multicon USB measuring 77 x 125 x 30mm and the slightly larger Multimode measuring 102 x 125 x 30mm. They are both housed in extruded aluminium project boxes (for RF isolation) with plastic feet, attenuator controls for both TX drive and waterfall drive, plus transmit and receive LEDs. Now let's look at both in turn.

ISOTERM MULTICON USB. This is a fully-isolated data interface with USB input. The PTT line is also fully isolated via a DIL relay. On the computer side are two 3.5mm stereo jack plugs, which are plugged into the soundcard line in / line out jack sockets or, in the case of laptops, the mic and headphone sockets. A connection to a standard USB port controls the required PTT switching.

Most laptops no longer have an RS232 serial port as standard, making USB the only way to trigger the rig's PTT. Data in and out of the transceiver is via a rear-mounted six-pin mini DIN socket and the supplied cable as requested to suit your rig. A USB cable is also supplied for the computer to interface connection, plus Windows drivers supplied on a mini CD ROM. Note that this won't work with 'push in' CD ROM drives – you must be able to mount it on the central spindle.

Another supplied full-size CD ROM comes with a selection of various data software programs, including Digipan, Ham Radio Deluxe, MMSSTV, MMTTY, CwGet and CWType. While some of the programs are free, both CwGet and CwType offer 30-day evaluation periods before you must register the products and pay to continue their use. The supplied software allows you to transmit and receive a whole host of digital modes including PSK, RTTY, SSTV, WSJT, CW and others.

ISOTERM MULTIMODE. Isoterm Multimode is very similar to the Multicon USB, but with a few notable differences. First, it has an RS232 interface, so if you are using a modern laptop you will need an RS232/USB converter. I tested it with a cheap model bought off eBay and it worked fine. After all, all it has to do is key the transmitter.

Secondly, it has a button marked FSK on the front that, when depressed, lets you run Frequency Shift Keying and not Audio Frequency Shift Keying (AFSK) when running RTTY and similar modes.

It also has a 3.5mm CW socket on the front and the back. The back socket can be used to key your radio automatically (with a supplied cable) and the front socket allows you to plug in your straight key at the same time. I found that my paddle worked only when plugged into the second (front) socket of the Yaesu FT-2000 and not the interface.

Computerised keying shouldn't be underestimated as it allows you to automatically key your radio from a contest program like N1MM. To me this was a revelation, allowing me to take part in the RSGB's 80m CW Club Championship without even touching my Morse key and notching up numerous CW contacts in the Commonwealth Contest in the same way, just by hitting a couple of function keys.

The N1MM keying with the interface was superb and never missed a beat. However,

some logging programs are not so efficient at keying so do test this thoroughly. I also tested it with N3FJP's ACLog and, while it did work, there were times when the keyed CW was incorrect as the program/computer couldn't keep up with the interface. This used to be a common problem with keying interfaces, but N1MM has obviously found a way around the issues.

I then tried the Multimode unit on 80m RTTY with MMTTY and it worked very well. It was actually quite handy having the waterfall gain control on the terminal unit as it saved delving around in the computer's sound control panel. Likewise, the TX drive control ensured that you didn't overdrive the radio.

I then moved on to Ham Radio Deluxe, and in particular the Digital Master (DM) 780 digital modes option. This is a fantastic free program by Simon, HB9DRV that covers RTTY, PSK31/63, Olivia, CW, MT63, Domino, SSTV and just about anything else you can throw at it. I have been using it after Simon demonstrated it at the 2007 RSGB HF Convention and can thoroughly recommend it.

Once again, it only took a minute or so to configure the software to work with the FT-2000 and soon I was having PSK31 QSOs with most of Europe – the SuperBrowser allowing me to decode 10 or more PSK 31 QSOs at once. On CW and DM780, it made a fair stab at decoding 25WPM machine-sent Morse, but struggled with hand-sent and weak CW, which is to be expected.

As a learning tool and as a way of dipping your toe in the water with CW to see if is a mode you might like to learn properly it has a lot to commend it. But don't expect perfect copy under all conditions.

Switching to the IsoTerm Multicon USB, with the appropriate driver software installed, it was recognised straight away by my Toshiba laptop and automatically allocated as COM2 (note with Windows XP it is possible to reallocate the COM port numbers if this isn't suitable).

The main difference between the two units is that the Multicon USB doesn't have a socket for a Morse key. That doesn't mean that it can't send Morse. Using Digital Master 780 you can send CQ with the interface using what DM780 calls MCW (keyed audio tones out of the loudspeaker socket) – more on this later. I was soon receiving PSK31 signals on 14.070MHz, interestingly including those of GW2ABJ in South Wales. As I live in Norfolk I did a double take as you shouldn't really be able to hear Wales on 20m. But this was the Sporadic-E season and probably short skip. Sure enough they soon faded away.

In transmit mode I was able to get about 50W out on PSK31 with the transmit drive control in the 12 o'clock position and with no sign of the ALC operating. This suggests that the interface is set up so as not to be overdriven, which is a good idea.

Advancing the transmit drive to full gave 80W out, with the ALC still in the green zone. Again, this looks like the unit has been well thought through in terms of making sure that it can deliver full power, but without overdriving the transmitter. On receive the waterfall was best with the drive in the 12 o'clock position as well.

Switching to Digital Master 780 it was a similar story, so the interface will work well with your favourite data mode program. It was able to decode any of the modes selected, including CW. By selecting the MCW mode you can transmit CW using the interface as it sends CW by playing audio tones out of the speaker socket. You can then select the frequency of the tones and the speed. While it works, I think it would take some getting used to. The supplied CWType program works in the same way.

By the way, this method of CW generation will not work with contest programs like N1MM. It is also frowned upon by traditionalists. Another problem with this is that you can't hear a sidetone. And you can't generally run a keyer or paddle at the same time, at least without some form of interface, as you need to have the radio in USB mode. Some rigs do allow you to use a key while the rig is in SSB mode – the Yaesu FT-2000 included – but do check.

CONCLUSION. Both interfaces do exactly what they say on the tin. If you are not interested in CW (or are happy to use CWType to do the keying) then the Multicon USB is probably for you. If you are a CW aficionado then the Isoterm Multimode is probably better – its CW keying capabilities means you can choose between proper machine-keyed and/or hand-sent Morse.

The Isoterm Multicon USB comes fully-wired to suit your transceiver and costs £74.50 plus £3.00 P&P. The Isoterm Multimode costs £88 plus £5 p&p, complete with the data cable to the rig. The FSK or CW cables are extra – the FSK cable being £7.00 to £10.00, depending on the rig, and the CW cable is £6.00. For more details see www.melvin2.freeserve.co.uk or call Johnny on 0191 2843028. My thanks to Johnny, G3LIV for the loan of the interfaces.

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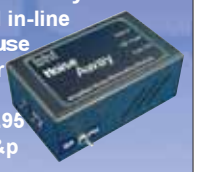

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Noise Considerations in Receiver Design

The second and final part of this article looks at the hidden sources of receiver noise.

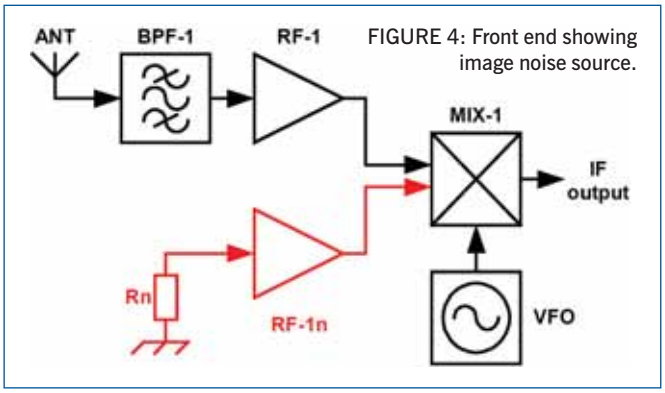

FIGURE 4: Front end showing image noise source.

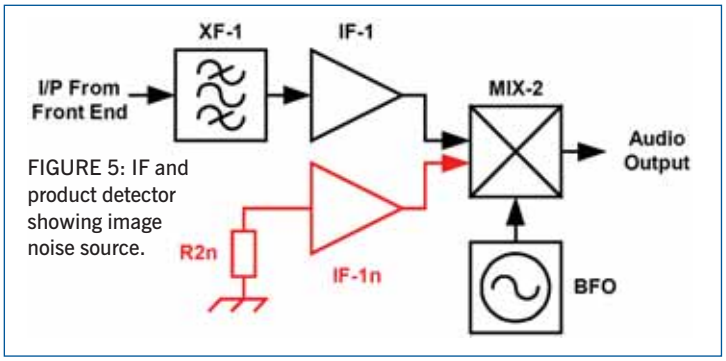

FIGURE 5: IF and product detector showing image noise source.

CONTINUING THE STORY. In the first part of this article we looked at the noise sources that are classically identified in receivers, and started to touch on mixer noise and other 'hidden' sources. We continue with the effects of image noise.

IMAGE NOISE. The block diagram in **Figure 4** shows the input filter, BPF-1, which rejects image frequency signals from the antenna. The problem is now that the preamplifier stage, RF-1, is a broad band device and will normally amplify noise over a considerable bandwidth. It also *adds* noise to the system because it is an active device. Most of the noise spectrum is mixed to frequencies outside that of the range of the IF crystal filter XF-1. What was not taken into account before was that noise at both the signal frequency and at the image frequency are both mixed to the wanted IF. There are now *two* internal noise sources to consider: firstly, that which has been generated in the preamplifier at the signal frequency and secondly we have the noise generated in the preamplifier at the image frequency. This is the one that is often ignored.

It is easier to imagine the front end of the receiver as having two preamplifiers: one at the signal frequency and one at the image frequency. These are shown in Figure 4. This is purely so that we can carry out separate calculations and not because the second one actually exists independently. The signal path preamplifier is still designated RF-1 and the image path preamplifier is designated RF-1n to show that it only amplifies the noise path.

The same problem will present itself wherever we have a mixer that is preceded by an amplifier whose bandwidth is wider than that of the wanted signal, if it can amplify the image noise. Our typical SSB receiver uses a second mixer, MIX-2, which is the product detector. This shown in **Figure 5**.

Again we can pretend that there is a second amplifier also feeding noise into the mixer stage. Preceding them is the IF filter so there should be no image noise from before that point. The IF amplifier is a very high gain device (compared with the other gain stages in the system) so noise at both frequencies must be taken into account.

The complete signal and noise model of the receiver is now shown in **Figure 6**. The audio stages are not shown this time as we are only considering the performance up to the output of the product detector.

NOISE PATH CALCULATIONS. The noise contribution in the wanted signal path has already been calculated. The original stage gains can be added to show that there is a system gain of 66dB from the antenna input through to the output of the product detector. The thermal noise at the receiver input was shown to be –170.2dBW. If the receiver had not contributed any more noise then the output noise level would be simply given by (–170.2 + 66)dBW = –104.2dBW. The noise figure of 9.21dB was calculated earlier so this must be included to give a total noise output of (–170.2 + 66 + 9.21)dBW = –94.99dBW.

This has shown the noise contribution in the signal path. To find the total noise we must now consider the additional noise paths that start from R1n and from R2n. The first of these can be found by using the gains and noise contributions shown in **Table 2**. This table is similar to **Table 1** (last month) but excludes the input band pass filter BPF-1.

$$F_{tot(n1)} = 1.26 + \frac{(4-1)}{15.8} + \frac{(4-1)}{15.8\times0.25} + \frac{(4-1)}{15.8\times0.25\times0.25} + \frac{(3.2-1)}{15.8\times0.25\times0.25\times100000}$$
$$= 1.26 + 0.19 + 0.76 + 3.04 + 4.82 + 2.2\times10^{-5} = 5.25$$

$$F_{dB(n1)} = 10\times\log(5.25) = 7.20\ dB$$

The path gain this time is 68dB. This is 2dB more than for the signal path as there is that much less loss. The input band pass filter BPF-1 is not in this path.

The second noise path is even simpler as it only contains the IF amplifier and the product detector. These are given in **Table 3**.

These values can now be used in Equation 8 where n = 2.

$$F_{tot(n1)} = 4 + \frac{(3.2-1)}{100000} = 4 + 2.2\times10^{-5} = 4$$

$$F_{dB(n1)} = 10\times\log(4) = 6.02\ dB$$

The path gain this time is 68dB. This happens to be the same as for the first noise path as we have lost the gain of the preamplifier, 12dB, and the losses of both the first mixer and the crystal filter, which are each 6dB.

We have seen that the noise power, at the output of the product detector, from the signal path has been calculated as –94.99dBW. The same calculation can now be made for the two noise paths.

For the first one we have (–170.2 + 68 + 7.20)dBW = –95.0dBW. For the second noise path the result is (–170.2 + 68 + 6.02)dBW = –96.18dBW. All these values are quite similar but they have to be converted to watts in order to calculate the total noise power at this point.

Signal path noise $P_s = 10^{\left(\frac{-94.99}{10}\right)} = 3.17\times10^{-10} W$

Noise path 1 $P_{n1} = 10^{\left(\frac{-95.0}{10}\right)} = 3.16\times10^{-10} W$

Noise path 2 $P_{n2} = 10^{\left(\frac{-96.18}{10}\right)} = 2.41\times10^{-10} W$

These can be added to give the total noise power at the output of the product detector.

$$P_{tot} = 3.17\times10^{-10} + 3.16\times10^{-10} + 2.41\times10^{-10}\ W = 8.74\times10^{-10}\ W = -90.58\ dBW$$

The noise level at this point would have been –104.2dBW if there had been no added noise. This ideal noise floor has been degraded by 13.62dB, which is the new noise figure for the receiver. This noise figure is 4.41dB worse than the result that had been originally calculated. A difference like this would not normally be noticed on most of the HF bands but could be critical in a receiver that is to be used for moonbounce at VHF.

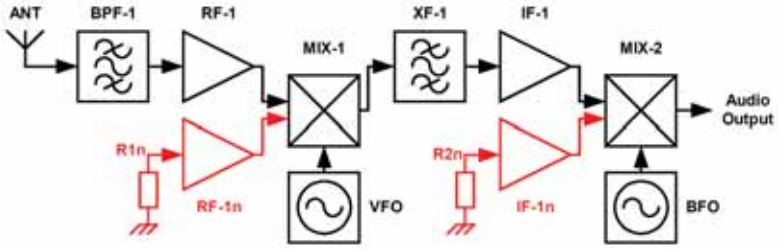

FIGURE 6: Noise model of receiver.

TABLE 2: Stage gains and noise factors – noise path 1

Stage	Gain	Noise Factor
1	15.8	1.26
2	0.25	4
3	0.25	4
4	100,000	4

TABLE 3: Stage gains and noise factors – noise path 2

Stage	Gain	Noise Factor
1	100,000	4
2	63	3.2

HOW TO REDUCE THE IMAGE NOISE. In this example it is quite easy to minimise the new noise sources now that they have been identified. Each of these noise sources that are additional to the signal path are due to allowing image noise to reach the two mixers. The addition of extra filtering would virtually eliminate the problem.

The first filter would be an additional bandpass filter, like BPF-1, that would be placed between the preamplifier, RF-1, and the first mixer MIX-1. This allows the wanted signal band to reach the mixer but without the image noise that has been generated in the preamplifier.

The second filter is more critical in its response as it must only pass the wanted sideband to the product detector, MIX-2. The unwanted opposite sideband noise starts at only 600Hz away from the wanted one. The simplest answer is to use a second crystal filter after the IF amplifier. Such a filter can be quite expensive and to double the cost of filtering can make a simple receiver uneconomical. If the first filter uses a ladder design, which is now popular for home construction, then a simpler second filter could be made for very little extra cost. It could reject the image noise by just using two or three crystals. It also reduces the wideband noise that required the use of an audio filter in the original design.

Another option for rejecting the IF image noise could be to use an image cancelling mixer system for the product detector. That would mean either a conventional phasing design, which may be a rather simpler than one that would be used in a receiver that only used the phasing method to receive SSB signals. The problem is that an audio filter is needed again after the product detector.

An alternative to a conventional phasing design at this point in the receiver would be to use the Third Method. This has the advantage of including the audio filtering that was needed before.

The updated receiver design is shown in **Figure 7**. This should give us a noise performance that is similar to that of the original calculation although the additional signal losses due to the two extra filters need to be taken into account. The calculations for this version now show a gain that has been reduced from 66dB to 58dB due to the losses in the extra filters. The noise figure is 10.75dB which is slightly worse than the original calculation – but that turned out to be incorrect anyway.

This time I have not included the calculations as they are very similar to the previous ones. Your task is now to see if you can duplicate my results.

A FURTHER IMPROVEMENT. Some of the additional filter losses could be overcome and a further improvement in noise performance may be found by including another amplifier stage. This is often placed between the first mixer, MIX-1, and the first crystal filter, XF-1. As it is still in a relatively wide bandwidth part of the circuit it has to be able to cope with strong unwanted signals that are near the wanted one. For this reason the choice is usually best to use a semi-power transistor.

This version of the receiver design is shown in **Figure 8**. The original IF amplifier with AGC is now designated as IF-2 and the new one, with a fixed gain, is IF-1. Again the AGC part of the circuit is not shown as we are only considering the weak signal performance. Assuming that the new IF stage has a gain of 12dB and a noise figure of 1dB the receiver gain is now calculated to be 70dB and with a noise figure of 5.16dB. This the best noise performance so far and it also has more gain than the previous versions. Again the actual calculations have been left for you to confirm.

OVERVIEW. This has been a typical design process. A fairly standard circuit was proposed at the beginning and the performance was calculated. It was then shown that applying the conventional noise equations did not necessarily show the whole story as additional noise sources exist in the circuit.

The revised calculation then took this into account. We could then see how to improve the design and get over the limitations of image noise. In the end it was possible to add one more stage of gain in a critical place and get an even better design.

There are other assumptions that have been made that also need to be considered. The calculations are only correct if the source impedances of the image amplifiers are properly matched. Both of the image sources are taken from the outputs of filters that are outside their design frequency ranges. Those source impedances could actually be much lower or higher than if they were matched. This could be taken into account in the design of the actual circuitry or measured after those parts of the prototype have been assembled.

Another assumption was that the gains of the RF stage and of the IF amplifier are the same at the image frequency as they are at the wanted frequency. This is likely to be correct for the IF amplifier as the wanted signal and the image are both within a 6kHz bandwidth. This assumption could be incorrect for the RF preamplifier. In one example that was given we had a 9MHz IF and the VFO tuned from 5 to 5.5MHz so that we only needed to switch input bandpass filters to change bands between 3.5 and 14MHz. Although we might not even need a preamplifier on those bands, it is quite easy to make one of virtually constant gain over the HF range. This is not the case when designing a VHF or UHF receiver. The image band could be of a much lower frequency and the gain could be higher. This could significantly degrade the noise performance from that which would have been predicted.

The second IF crystal filter that was proposed can add to the cost and complexity of the receiver but it will do more than just improving

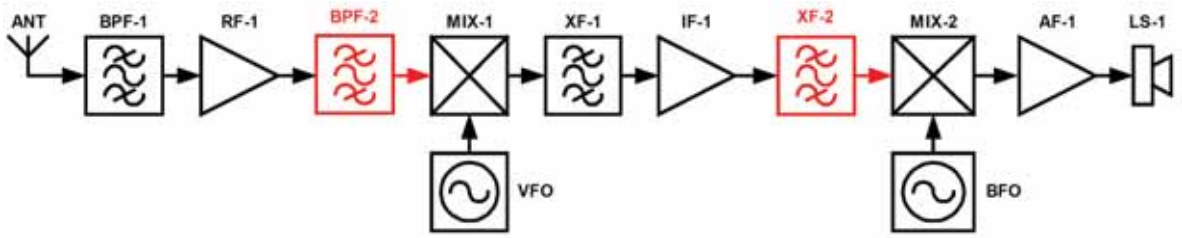

FIGURE 7: Modified receiver design with image noise filtering.

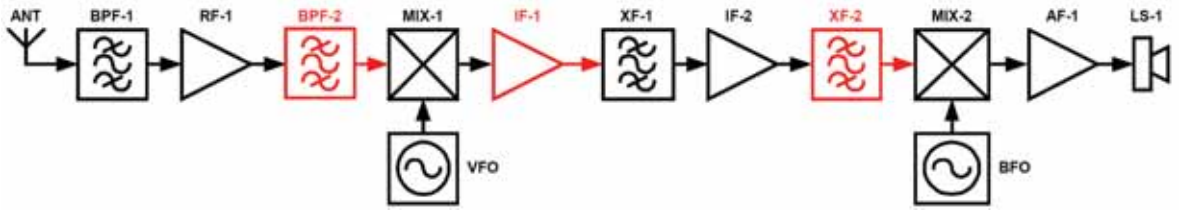

FIGURE 8: Modified receiver design with image noise filtering and extra IF stage.

the system noise performance. If the specification is similar to that of the first one then the overall skirt selectivity will be improved. This will provide added rejection to strong adjacent signals, which is particularly useful on a crowded band such as 40m in Europe. If the receiver is part of a transceiver then we can reuse both crystal filters in the transmit path with a limiting amplifier in between to provide RF clipping for speech processing.

The main added complexity in a multiband receiver is the extra switching required now that we have specified two bandpass filters between the antenna and the first mixer. As well as switching these filters we often want to be able to bypass the preamplifier stage. A compromise might be to use just one filter and no preamplifier for the lower frequency HF bands. On the higher frequency bands a separate preamplifier could be included in each band-switched front end circuit, although choosing one with variable gain might prove useful at times.

As well as showing how a basic design can evolve and be improved it is hoped that you have appreciated how relatively simple mathematics can be used to predict how the system will work. The more calculations that can be performed, the closer we should get to designing a project that will work first time and behave as predicted.

HAS ANYTHING ELSE BEEN LEFT OUT? Of course! It is never easy to get all the answers. There are other noise sources that have not been considered yet as they are not in the signal path. It was easier to assume that the oscillators that are to be applied to the first mixer and to the product detector are noise free – but this is very unlikely.

The most critical oscillator is the one used to drive the first mixer. That could to be a simple VFO that tunes over the chosen range, but for a multi band receiver the VFO has to be mixed with a crystal oscillator selected from a switched bank. This means further mixing processes with added noise. Modern receivers use synthesisers that are phase locked to a single crystal, so now we have the concept of phase noise to think about – but that must be the subject of another article. The latest synthesisers now use DDS, Direct Digital Synthesis, which usually have much better noise performance than the older PLL designs.

CALCULATION ACCURACY. The calculations in this article have been shown to two places of decimals, a much higher apparent accuracy than is actually justified. Most of the results would be best approximated to the nearest dB. But by using calculations that are of much greater apparent accuracy than is justified we can make sure that additional accumulated errors do not occur. The final results can then be put into a real context.

We might even decide that the noise performance of a simple direct conversion receiver can be as good as much more expensive design. The 3dB degradation due to the image not having any rejection could be quite tolerable if there is no actual adjacent signal present to interfere with the wanted one. This is not likely to be a good idea on 40 or 20m but on many of the other bands it is potentially capable of good results.

CONCLUSIONS. We can now decide if design compromises are justified or not. We know that the basic receiver design shown in Figure 2 (last month) can be improved on, but at a cost. In comparing that design with the later versions we can see that it would still work as well as we would normally need on the HF bands, especially the lower ones. Even without going through the full design process we should now be able to look at a circuit or a block diagram of a receiver and see at a glance if any of these features have been included in it.

Most simple calculations for receiver noise consider only the direct signal path. The contribution from RF and IF stages to noise at the image frequency of each mixer is often ignored. In some cases, where inadequate filtering is used, the problem becomes even worse if the stage has more gain at the image frequency than at the wanted frequency. The effect of these noise sources can often be ignored on the lower HF bands, but can become a problem on the higher HF bands. The need to minimise receiver noise is particularly important for weak signal work on VHF and UHF. If a particular receiver gives adequate performance on the HF bands it might still not be ideal for use as an IF for weak signal VHF work such as moonbounce. Noise performance on the lower HF bands is normally limited by external sources including galactic, atmospheric and man made. A graph and further useful information is available at www.ab4oj.com/icom/nf.html.

It is often possible to improve the noise performance of a receiver by including a preamplifier. While this can solve that problem, it is also likely to degrade the strong signal handling unless a very robust mixer design is used. Every improvement can result in a potential compromise to another aspect of the design. A low cost design will often give adequate performance for most of the time. A high cost design does not always solve all the problems. You should now be more aware of some of those problems and be able to overcome some of them in your own designs if you think you need to.

ERRATA. There was a error in the second calculation on page 88 last month for the total noise with the RF preamp out. The second factor should have been (4-1)/0.63 = 4.76, not (1.26-1)/0.63 = 0.41, giving Ftot=101.6. Thanks to G3MGQ for spotting this.

ACKNOWLEDGEMENTS. Thanks are due to Adam Farson, VA7OJ, Peter Martinez, G3PLX and to Nick Shepherd, VE3OWV, who were kind enough to review the draft copy and provide valuable comments and suggestions.

An HF gateway for emergency communications

Experiments with a frequency-agile Gateway that links HF amateur radio with the internet.

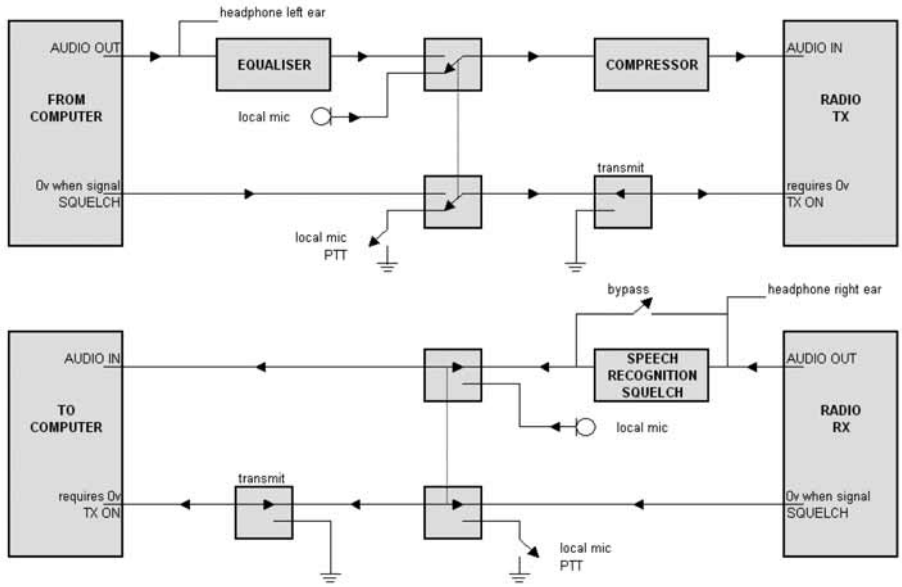

FIGURE 1: The basic signal paths that comprise the HF Gateway.

HISTORY. In October 2006, the RSGB helped me to obtain a Special Research Permit from Ofcom. This allowed experimentation with a frequency-agile Gateway to link HF amateur radio with the internet.

The start of my interest in this subject evolved from my membership of the RAYNET HF Team [1] and IRESC, the International Radio Emergency Support Coalition [2]. Both provide traditional amateur radio links to assist with the flow of emergency traffic between disaster zones and sources of control and assistance. But what if that help is at some distance from the disaster? As that distance becomes greater the vulnerability of the radio path increases, either requiring complex chains of repeaters or being at the mercy of propagation effects. IRESC, an international organisation, aims to provide emergency communications paths right across the globe. To achieve this reliably on demand asks a lot of radio alone. The Internet Radio Linking Project [3] has shown that the effectiveness of a communications circuit can be enhanced by using the voice over internet protocol (VoIP) to provide part of the path.

WHAT IS A GATEWAY? A Gateway bridges the technological gap between two different communications environments. In this application, the Gateway has a radio frequency port and an internet port and permits communication to pass, in both directions, between the two. Physically, the Gateway will comprise of several pieces of hardware: the radio transceiver, a computer connected to the internet, and an interface that connects between them to control audio and switching.

A Gateway is different from a repeater. A repeater listens on an input channel and reproduces what it receives on an output channel – all users operate with their transmitter and receiver frequencies split across the two. A Gateway with two ports can both transmit and receive on either and the switching action is automated, reacting to the traffic flow. Effectively, the Gateway flip-flops to order. It listens on both ports until a signal is heard on one of them, which causes the unused port to go into transmit. When the signal ends, a reply may be received which causes the Gateway to switch the communications path into the opposite direction.

It is the switching, of course, that is critical to correct operation. Detecting a busy channel on the internet side is usually no problem because the computer can change the voltage on one of its connectors when a signal is received. An FM receiver is also helpful, because a busy channel can be detected through a change in state of the receiver's squelch circuit.

With both of these systems, it is also possible to detect the difference between silence and active signals to facilitate the changeover required. But with an HF receiver working in SSB mode, it is not usually appropriate to use a noise-detecting squelch. Instead, the channel must be continually monitored for human speech, which gives rise to the tricky issue of how to discern between the intended message and the multitude of shortwave noises and unwanted signals. This is what makes setting up an HF Gateway such a challenge, so more about this later!

HF GATEWAY FOR EMERGENCY COMMS?

The question now arises as to how an HF Gateway can be used to facilitate emergency communications. In a simple form, an HF Gateway could be used by a radio amateur to monitor their transmitted signal at a distance. For example, a net controller would be able to monitor their HF transmissions as received by a distant Gateway, sent back to their headphones via VoIP. This would not only allow them to identify any transmission defects, but also gauge propagation variations. They might also be able to hear weak outstations via the distant receiver that they could not discern via their own station directly, a sort of widely spaced diversity antenna.

HF Gateways create the possibility of using a transceiver geographically near to the zone of interest while the user can be located anywhere on the globe, courtesy of the instantaneous shrinking of the world permitted by VoIP linking. For example, it would be possible for a radio amateur to take a VoIP-capable laptop to the offices of a relief agency and, via the Gateway, put them in direct touch with their teams in the field – even if they are half a world apart. Furthermore, once in the digital domain, the received audio can

PHOTO 1: The aftermath of Hurricane Ike, Texas, September 2008.

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be safely and securely streamed to a website where interested consumers can monitor, if appropriate, without any danger of return intrusion and without loading the available bandwidth of the VoIP network itself.

THE SPECIAL RESEARCH PERMIT. To explore the practicality of an HF Gateway, an application for a Notice of Variation to the normal amateur radio licence was made, and the RSGB gave the project its support. The then Spectrum Manager, Colin Thomas, G3PSM, and HF Manager, John Gould G3WKL, were instrumental in helping to write up the application for presentation to Ofcom and for seeing the application process through. Mark Gregory, G4LCH, the internet Specialist of the Data Communications Committee **[4]**, also provided much support.

An application of this nature had never been successful before. But this time the emphasis was on how useful such a facility could be to emergency communications where significant range within the UK was required, so the application concerned 40, 80 and 160m. It was important that the Gateway could be frequency agile, to allow for a choice of the best frequency to serve the zone of interest under the prevailing propagation conditions. It was also important that a realistic RF power level could be used. Interference-free traffic was necessary, and it was also agreed that the licensee should attend the Gateway during operation.

In October 2006, it was a great pleasure to be granted the Special Research Permit and experimentation could begin in earnest. At Ofcom, Steve Roper and Rod Wilkinson gave every possible support to get the project under way and have since granted extensions to the original NOV period to allow further tests.

PRINCIPAL AREAS OF THE RESEARCH. The Special Research Permit has permitted investigations to be conducted into a number of specific areas. These include:

Squelch and switching. When operating an SSB port on HF, the situation is complex. Unwanted artefacts, such as data transmissions, 'tuning up' carriers, off-frequency speech, man-made noises and lightning static can all contribute to holding the Gateway in a single direction. Fortunately, most modern HF transceivers provide a signal-level squelch that goes some way to muting the weaker unwanted signals, but this is not a very controllable solution because it reacts in the same way to both the wanted and unwanted signals. What is needed is an 'intelligent squelch', one that can discern between human speech and everything else.

Detection of the characteristics of human speech is complicated. Successful recognition has to take into account the spectral makeup of the signal, from low bass through to high treble sections. The syllabic or rhythmic nature of the spoken word is a factor, as is the pattern of percussive and sibilant elements of language. In isolating what is human speech and what is not, variations in the technical quality of received audio and the differences in patterns of speech between different languages, dialects and nationality must not hinder effective detection.

Military developers and a few civilian circuit designers have produced highly complex squelch circuits for use in such trying radio environments. Readers may be familiar with the Icom VSC 'Voice Squelch Control' facility that is provided with some of its products. That this "opens the squelch only when a modulated signal is detected and ignores unmodulated, beat noise signals" is all they will say on the matter. There is also a very affordable amateur construction project offered by AH6LE **[5]** for this purpose. Such circuits, effectively FM discriminators, attempt to ignore non-human audio signals.

For the HF Gateway in this research, the interface has been fitted with the VOS-4 intelligent squelch circuit available from Naval Communications in the USA **[6]**. This appears to work very well. It is generally successful in opening on speech and ignores noise, tuning transmitters and data transmissions. Settings have to be quite carefully adjusted to achieve optimum performance.

It is notable that the solutions found so far all appear to require the construction of electrical circuits, with fixed components on a circuit board. It would seem so much more flexible to create a speech-recognition system in software, ie a computer program that can carry out this task using DSP (digital signal processing). Such a facility might allow 'fine tuning' of its operation by adjusting key parameters and observing the change in performance that results. Bear in mind that the task is not to understand the words being said, simply that the signal is confirmable as human conversation. If you are someone who has an interest in developing suitable software, or you have come across such an item in the public domain, many would be very pleased to hear from you!

Another squelch option that could be explored is the use of audio tone access codes, known as 'CTCSS' (Continuous Tone-Coded Squelch System), where the squelch will only open after receiving the correct sequence of tones. It's also worth noting here that some of the digital speech modes for HF, such as WinDRM **[7]**, may again make the use of a simple noise squelch all that is necessary.

Optimum transceiver settings. Modern transceivers offer the operator a comprehensive number of parameters, many of which can be adjusted to optimise the transmitted and received signals. In terms of audio treatment, the settings of these parameters are likely to be different when the transceiver is being used for Gateway operation as compared to direct microphone-to-air, particularly as

PHOTO 2: The shack at G4HPE. The Gateway interface sits on top of the HF transceiver with the VoIP computer to the right.

PHOTO 3: Hurricane Hanna, September 2008, wrecked official communications in the Turks & Caicos Islands. Amateur radio is often the first communication to be re-established.

signals are passing between the radio equipment and a computer. Furthermore, there is a sub-layer of control signals such as push-to-talk (PTT) and squelch status lines that are also subject to the setting of various parameters (switching sense, delay aspects, hang-time). On the internet control side, the software similarly requires the careful setting of such controls.

Radio frequency induction. To be effective in longer-range emergency communications, an HF Gateway will need to employ practical output power levels. The Gateway is licensed up to 21dB(W), which is deemed to be a realistic upper limit. The use of higher power levels allows for understanding the issues that arise when significant radio frequency energy is being generated close to domestic (that is, unbalanced) audio installations – this is likely to include the Gateway interface equipment itself. It is important to be able to recognise the symptoms of RF induction and to understand techniques for minimising such problems, which can lead to substandard radio transmissions and audio distortion.

Audio quality issues. Communication via a radio transceiver requires different audio tailoring compared to internet-based speech circuits. When communicating via radio, clarity and 'punch' are important whereas when speaking from computer to computer a more natural (and fuller bandwidth) quality is sought. Thus, treatment is necessary in order to optimise audio quality when bringing one domain into the other. This project will hopefully lead to good-practice guidelines on level, equalisation and compression settings, as well as hints on operating and even

PHOTO 4: The prototype Gateway interface - not very pretty, but it works!

PHOTO 5: A temporary station set up by Chinese radio amateurs of the '875' Club, at Lingyan Guanyin Mountain in Dujianyan, near Chengdu city. It was established to support local emergency communications in the aftermath of the 2008 earthquake. The HF antennas were clamped to street signs.

microphone technique. In terms of the physical interface between computer and transceiver, the issues explored include safety isolation, signal levels, noise and distortion.

Operator skills. There is no doubt that supervising an HF Gateway requires operator skills that can only be acquired through practice and experiencing the problems that arise in real situations. Many amateurs involved with 'talk-through' operations for emergency communications will know how technically demanding this role can be. The design of the interface must allow the operator to listen and talk to both sides of the Gateway either singly or simultaneously, understanding that there are potentially two nets of operators that remain unaware of each other unless the Gateway is invoked. The operator must have the appropriate switching facilities to instantly control the Gateway manually if necessary, particularly in the case of interference. Once the Gateway is operating, skill in identification and control is required in order to avoid confusion.

LEGAL ISSUES. It should firstly be noted that several fixed-frequency 29MHz FM Gateways are in use in the UK. Therefore, it would not be unusual for non-UK amateurs to use these Gateways, speaking over the internet from their home country but effectively being transmitted from a station in the UK and working any other amateurs in range of the RF link. The potential licensing issues surrounding this operation have thus already been considered. In effect, such stations are identifying themselves by giving their normal home callsigns but are being radiated from within a different country. It is not unlike inviting a visiting radio ham friend to operate your station under your direct supervision.

In this research, it has been very beneficial to be able to allow non-UK amateurs to operate without legal restriction. This showed most powerfully how a control station located on the far side of the earth can be entirely effective in controlling a net of European HF stations. It has also been shown that a radio operator on HF can satisfactorily control a net of VoIP participants.

VoIP programs usually allow for all activity across the Gateway to be recorded as audio files on the local computer. This has been used at all times to provide a legal record of Gateway activity and can also be useful for examination during test debriefing.

INTERFERENCE AND SECURITY. In this project, it has been possible to eliminate deliberate interference through strictly controlled access to the VoIP port of the Gateway, coupled with controlled net operation and, when necessary, manual intervention of the link on the RF side.

The Echolink VoIP program [8], whilst not the only choice, has been used for the internet side of the Gateway for several reasons. Firstly, only licensed radio amateurs are able to use Echolink. On downloading the software, it is disabled until the network managers have received a copy of the licence of the individual. I have personally never experienced any form of malicious interference in all the years that I have been active on Echolink. Echolink has powerful facilities that completely control the ability to access the Gateway and, additionally, whether connected stations are enabled to transmit or only monitor. This means that the VoIP side has its 'house fully in order' before any connection to the radio side of the Gateway is made.

REMOTE PTT. One of the problems with interfacing VoIP systems with radio equipment is that they are simplex in operation. Both the VoIP and radio circuits occupy a single channel, therefore they can only be in either transmit or receive mode, but never both. The Gateway must switch the direction of audio flow through it if two-way communication is to be successful. If one side of the Gateway is permanently busy with traffic, the Gateway can become locked in a single direction. In practice, the VoIP side of the Gateway is not a problem: when a station finishes their transmission, the channel falls silent and the Gateway is free to switch. It is not quite so clear-cut on the radio side. Even with the use of both noise-based and speech recognition squelch systems, the receiver can still be excited by unwanted audio. An example of this is when strong radio stations are operating close to the Gateway frequency, within the receiver pass-band, which can fool even the intelligent squelch into thinking that wanted speech is present.

To get round this problem, a method of remotely forcing the Gateway's HF radio into transmit is required. Fortunately, the radio amateur world enjoys the skills of Len Stefanelli, N8AD [9], who has devised many ingenious software solutions for controlling radio transceivers. He was both patient and kind in assisting me and he has developed a small and robust program called TCP Gateway for allowing a remote VoIP user to directly control the radio transmit/receive (PTT) line via the internet.

The way it works is that the Gateway computer runs a simple TCP server program. The remote VoIP user runs the corresponding TCP client program. The remote user firstly issues a connect command and, via the internet, the Gateway operator receives an incoming connect request. The Gateway operator can allow or deny access depending on the credentials provided - if there is any confusion the two can use a simple text box to exchange questions and answers. Once the remote user has been granted access, they see a small control sub-screen containing large red and green buttons. These two buttons are, respectively, the transmit and receive controls. When the user clicks on the red button, the remote TCP command forces the Gateway radio into transmit. The user can then speak over the VoIP circuit knowing that they are being relayed onto the radio channel. When they have finished speaking, they click on the green button and the radio drops back into receive.

This system is simple, yet secure, and always remains entirely under the supervisory control of the Gateway operator. To make best use of the remote switching, the Gateway operator removes all squelch controls from the radio receiver. The receiver produces permanent audio, whether noise or wanted speech. The Gateway is locked in one direction, from radio channel through to VoIP channel. VoIP users are now effectively monitoring the radio channel continuously. If a call is received on the radio channel, the VoIP Control Station can force the transceiver into transmit in order to reply. This way of working is very solid and positive in action.

BUILDING AND TESTING. The initial work was to design and construct the interface between the HF transceiver and the internet computer, to create a single unit that would allow the Gateway operator to control all aspects of the system. Cable looms were made up to provide the various connections necessary; transmit and receive audio, squelch circuits and switching on both sides of the interface, plus external microphone and headphone monitoring for the operator. The

construction included audio transformers to isolate the external devices and took measures to minimise the danger of RF induction. The intelligent squelch circuitry was also installed within the interface unit.

Once the interface was up and running, on-air tests commenced. Initially, simple activities were undertaken, such as relaying traffic in one direction or another through the system so that audio could be tailored and the most suitable settings of the multitude of parameters could be found. Members of the RAYNET HF Team (on the HF radio side) and IRESC (using their Echolink conference facility) gave much of their time in providing themselves and their stations as guinea pigs. A lot was learned about operating practice by the Gateway supervisor and participants alike.

A user group of interested radio amateurs soon built up and the tests were announced so that as many people as possible could take part. As confidence in the system grew, the tests became more expansive and for the past year several major exercises have been undertaken with a complete set of simulated scenarios and mock traffic messages being emailed out to the worldwide participants in advance. For example, Dennis Baumgarte, AE2EE, near New York, activated the local FEMA [10] emergency communications centre at Batavia Airport and worked into his own Echolink Gateway via the Genesee County ARES group's UHF/VHF repeater system. He used the internet connection to work on 80m in the UK via the HF Gateway, controlling the net very effectively for a considerable time.

Perhaps the most complicated use of the Gateway to date was during the IARU 'GlobalSET' simulated emergency test in May 2008 [11]. GlobalSET is an international emergency communications exercise across all IARU regions, designed to improve working between different organisations across the world. The Gateway was heavily used, with many participants taking advantage of the system to pass messages over great distances. An example of this is shown in **Photo 6**, which shows Ray Abela, 9H1RA, operating his 70cm handheld in the Civil Protection Centre on the island of Malta, working via his own internet Gateway (at his nearby home) to emerge on HF in the UK where he was able to work many European stations. Appalling propagation conditions in his own region meant that no contacts would otherwise have been made.

About forty contacts were made over the four-hour exercise period, with some exotic callsigns (such as VU2RBI, HP1/OE5CEN, VE7XAT and ZS6BUU) appearing on the lower HF bands in the UK! It is worth noting that many messages were successfully passed across paths that would have been impossible by radio alone, and all this with the Gateway performing reliably even though a European contest was in full flood on the bands at the same time.

There is a website [12] for those interested in the HF Gateway and every test has been carefully documented there. The reports can be freely downloaded as PDF files. The details also contain many audio clips, recorded both on the VoIP and the radio side of the Gateway, so that the performance of the system can be assessed.

WHERE TO FROM HERE? The Gateway as a basic tool has been seen to work effectively. It is hoped that Ofcom may consider granting further research periods, or even perhaps a continuing NoV that could be applied for by interested experimenters, which would open up even more possibilities. For example, a network of several HF Gateways could be maintained at the ready, so that should a major problem hit a large area of the UK it would be possible to trigger a predetermined plan to provide radio coverage into the area that had lost all other connectivity and to provide two-way links with a central command facility located outside the disaster zone.

There are several areas where further development can be pursued. As mentioned, the idea of using software to achieve speech recognition must surely be a better solution than fixed circuitry. It is probable that such work has been undertaken somewhere in the world but it has not been possible to track this down so far.

Operationally, working via an HF Gateway brings special demands on communications skills and the production of a set of guidelines would be helpful.

Another area that requires attention is how to optimise the audio of VoIP users. The Echolink program, for example, provides only very basic audio tailoring options. In particular, there is no facility for compression or limiting. At one extreme, the audio can be very distorted and this produces a badly degraded signal when transmitted via the HF transceiver. At the other end of the scale, audio that is under-modulated is subject to noise and can fail to fully modulate the transmitter, effectively generating a weaker signal to the distant radio user. It has been found that many VoIP users have not paid much attention to the quality or level of their audio, with the result that their signal as transmitted is difficult to understand on HF, particularly if the frequency is not all that clear. It seems a forlorn hope to expect all VoIP users to optimise their audio and therefore a much more comprehensive set of filters and compressor/limiters should be developed for future inclusion in VoIP software.

PHOTO 6: Ray Abela, 9H1RA, briefs Malta Amateur Radio League colleagues in the message format for GlobalSET 2008 and (inset) passes the message through the HF Gateway in the UK, 1600 miles away, directly from his own 70cm portable.

PHOTO 7: Fortunato Bonnici, 9H1ES, and members of the MARL GlobalSET team set up a portable station in the car park of the Civil Protection Centre.

REFERENCES

[1] RAYNET HF TEAM: A subsidiary of RAYNET in the UK, the HF Team are interested in exploring the benefits of HF to emergency communications. www.raynet-hf.net.

[2] IRESC: an international organisation that tries to enable communications between disaster areas and sources of support, using a mix of traditional amateur radio and internet speech networks. www.iresc.org.

[3] THE INTERNET RADIO LINKING PROJECT: This well-established system uses custom software to link repeaters and nodes over the internet, expanding the radio horizon for the amateur radio hobby. www.irlp.net.

[4] RSGB DATA COMMUNICATIONS COMMITTEE: A focal point for information about the Data Communications work of the RSGB Emerging Technologies Co-ordination Committee. www.dcc.rsgb.org.

[5] SYLLABIC SQUELCH HOME CONSTRUCTION PROJECT: A circuit developed by Kenneth Arck, AH6LE and others, designed to differentiate between human speech and the other signals encountered on HF frequencies. www.ah6le.net/hf_squelch.html

[6] NAVAL COMMUNICATIONS INTELLIGENT SQUELCH VOS-4: This system is available for purchase. The website also contains interesting information about speech recognition techniques. www.naval.com/vos.

[7] WINDRM: This program encodes and decodes speech for high quality digital speech over HF radio. http://n1su.com/windrm.

[8] ECHOLINK: Information and downloads available from the comprehensive website. www.echolink.org.

[9] LEN STEFANELLI, N8AD: Len maintains a website bursting with interesting ideas and his own software developments which can be downloaded. The TCP_GATEWAY program, described in the text, is available here. www.hfremote.us.

[10] FEMA: The Federal Emergency Management Agency that has strong ties with amateur radio in the USA. www.fema.gov.

[11] GlobalSET: A report by Greg Mossop, G0DUB, on the May 2008 GlobalSET exercise can be viewed at the following link: http://tinyurl.com/GlobalSETMay08

[12] G4HPE-L HF GATEWAY PROJECT WEBSITE: This site contains reports on all of the tests and exercises undertaken for the special research permit and includes many audio clips. http://hfgateway.website.orange.co.uk.

Sport Radio

Bringing new people into contesting and a busy weekend in prospect in September.

CHANGE AT THE TOP. In early 2007 Don, G3XTT took direct control of the then two contest committees, HF and VHF, with the intention of merging them. The then Chairmen, Justin, G4TSH (HF) and Andy, G4PIQ (VHF) both wanted to resign for personal reasons (work and family, respectively), so the timing was appropriate. Don says, "It was never my intention to be more than an interim Chairman but, inevitably, things took a bit longer than I had anticipated. Anyway, by the end of the this year I will have done three years (unelected!) at the helm, so it's time to put things on a more permanent and proper footing, hence the ad for a replacement in last month's *RadCom*. I remain as Board member for Sport Radio (Contesting, Awards, ARDF) until the end of 2010.

"I believe, and the feedback (with some loud exceptions) supports this, that the merger has been helpful. There are those who argue that HF and VHF contesting are different (which, indeed, they are in some respects) but the committee doesn't do contests, it does contest management and adjudication, and those are common to both."

Some of the changes that have taken place during Don's time in charge are:

1. *Software.* Big progress in, for example, having a common web submission service and common adjudication software.
2. *Certificates.* Generally the committee have caught up with outstanding ones and have now implemented PDF certificates for those who are happy to receive them.
3. *Turnaround of results.* Now much quicker than hitherto.
4. *Publication of results.* Contest supplements (Sport Radio supplements!) now carry results three times a year.
5. *Working with Yearbook, RadCom columnist, RSGB* (on trophies, etc). Hopefully now much more seamless.

VHF NFD. Traditionally VHF NFD was, as the name implies, purely a field event, but people had been asking how to encourage fixed stations to give more points away and maybe even win something. The contest committee thought long and hard about it and eventually came up with a Fixed station Sweepers (FS) section, which was introduced shortly before this year's event. It encouraged fixed stations to contact as many of the registered portables as possible. G4CLA of the contest committee would like feedback on the new FS section, both from FS section entrants (did they enjoy it and have they any suggestions for changes?) and from portable entrants (did they think the new section had increased activity?). Please e-mail g4cla@rsgbcc.org with your comments.

PHOTO 1: James, M3YOM with 'minder' Terry, G4MKP, operating M0XXT/P in SSB Field Day 2008. The Double X-ray Firm came third in the Open Section and in characteristic style their team leader Callum McCormick, M0MCX, has thrown down the gauntlet for 2009 by saying "I intend to win SSB FD Open this year and the Restricted next year." I can't help but think that a few people might have other ideas on the matter.

COACHING NEWCOMERS. It may seem obvious that if contesters want the activity to flourish, we have to attract new blood. It's just not good enough to exclude 'novices' on the grounds that they're not good enough until they have experience, because if they are constantly excluded on the grounds that they don't have experience they will never acquire it. I said last month that a lot of folk can be completely paranoid about screwing-up a QSO, especially in front of someone else, so I wasn't surprised to read what Roger Cooke, G3LDI, had to say on the subject. "The problem with most of the newcomers in Norfolk is that they are left to their own devices and most of them stay on the local 2m repeater, knowing nothing about HF and don't seem to want to. This is despite lots of talks at the Club, my Morse classes and numerous club events. It really is strange, because when I was young (and probably impressionable) the only thing I wanted to do was work CW and DX. Mind you, there were no 2m repeaters and very little 2m activity anyway in those days. It is also very irritating to hear all the rubbish that is being talked, again despite trying to educate them. Personally, I feel that amateur radio as we know it will die with the demise of the G3s. It will take on a whole new guise, akin to CB, with very little being learned. However, with your comments and encouragement, it will help."

So what am I supposed to do about it? I'll tell you! Via this column I would like to appeal to contest groups (or clubs that take part in contests) and actively encourage new people into the activity to tell us all how they take a new Foundation licensee and turn him or her into a contester. By the looks of it, the M0XXT team could tell us a thing or two, because as **Photo 1** shows one of the operators of their station in SSB Field Day 2008 was M3YOM – and he hadn't had a licence for particularly long.

THIS MONTH'S EVENTS. On HF, the first RSGB HF event is the ever-popular SSB Field Day on 5 – 6 September. Region 1 HF Field Day coincides, which means there will be numerous Continental European portables active as well. If you want to give some points away from home, it's a quick-fire exchange of signal report and serial number. The RSGB 80m Club Sprint series continues, with the SSB leg coming before the CW leg this month. Once again, work everyone, but remember that once you have called CQ and made a QSO you have to QSY. Remember also that contestants are limited to a maximum of 100W RF out. Alternatively, run 10W and enter the QRP section.

On VHF, in addition to the UKACs throughout the month, there's the RSGB

RSGB HF EVENTS

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange (info)
Sep 5-6	SSB Field Day	1300-1300	SSB	3.5-28	RS + SN
Sep 10	80m Club Sprint	1900-2030	SSB	3.5	SN + name (power 10W/100W)
Sep 23	80m Club Sprint	1900-2030	CW	3.5	SN + name (power 10W/100W)

RSGB VHF EVENTS

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Sep 1	144MHz UKAC & Club Championship	1900-2130	All	144	RS(T) + SN + Locator
Sep 5-6	144MHz Trophy	1400-1400	All	144	RS(T) + SN + Locator
Sep 6	5th 144MHz Backpackers	1100-1500	All	144	RS(T) + SN + Locator
Sep 8	432MHz UKAC	1900-2130	All	432	RS(T) + SN + Locator
Sep 13	2nd 70MHz Contest	0900-1200	All	70	RS(T) + SN + Locator
Sep 15	UHF UKAC	1900-2130	All	1.3/2.3	RS(T) + SN + Locator
Sep 22	50MHz UKAC	1900-2130	All	50	RS(T) + SN + Locator
Sep 29	70MHz UKAC	1900-2130	All	70	RS(T) + SN + Locator

BEST OF THE REST EVENTS

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange (info)
Sep 5-6	All Asian DX Contest	0000-2359	SSB	1.8-28	RS + age
Sep 5-6	IARU Region 1 HF Field Day	1300-1300	SSB	1.8-28	RS + SN
Sep 5-6	IARU Region 1 2m Field Day	1300-1300	SSB	144	RS + SN + Locator
Sep 6	WAB 144MHz QRP Phone	1000-1400	SSB/FM	144	RS + SN + WAB square
Sep 12-13	WAE DX SSB Contest	0000-2359	SSB	3.5-28	RS + SN (Eu stations work non-Eu only)
Sep 16-21	BFRA Region 1 Champs Obzor, Bulgaria			144/3.5	ARDF
Sep 19-20	*CIS DX RTTY Contest*	*1200-1200*	*RTTY*	*1-8.28*	*RS + SN (Russians send Area Code)*
Sep 26-27	CQ WW RTTY DX Contest	0000-2359	RTTY	3.5-28	RST + CQ Zone (UK = 14)
Sep 27	ON Contest	0600-1000	All	50	RST + SN (ON's also give club code)

Italics indicate that provisional information only was available at the time of writing.

144MHz Trophy Contest on 5 – 6 September. There are five sections to enter, depending on whether a station is single- or multi-op, fixed or portable, and 6-hour or 24-hour. In the 24-hour sections some big QSO totals are made by the top stations, even under flat conditions. Last year, the Open Section was won by the Parallel Lines Contest Group (see **Photo 2**), who operated as G8P from near Dover. Second place went to G4ZAP/P, who also operated from the East coast. It was a pattern repeated across most Sections, with stations in JO squares generally doing very well. Tells you something, doesn't it? The final three hours coincides with the first three hours of the fifth and final 2m Backpackers Contest of 2009. This continues for one hour after the 2m Trophy finishes. In that hour, after the QRM level on the band has subsided, low power portables who might otherwise get swamped by QRM find it easier to work other low power portables. One week later, on Sunday 13 September, the 2nd 70MHz Contest takes place.

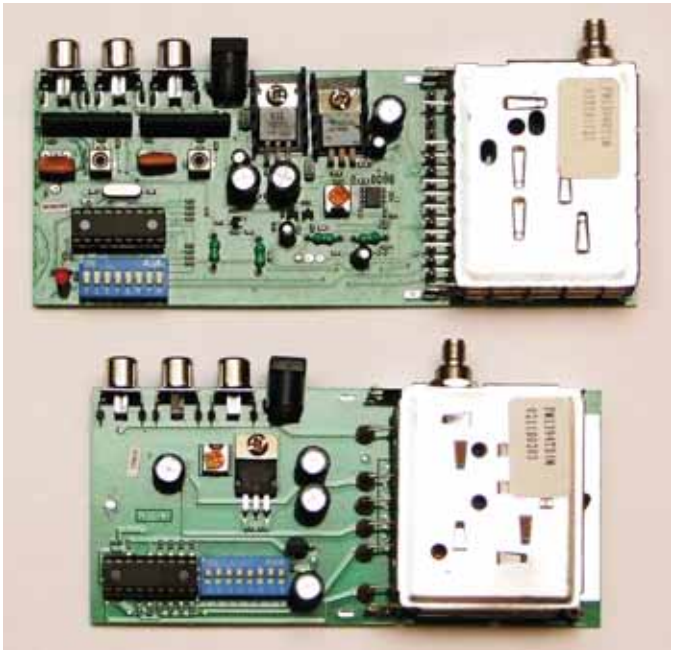
Internationally, IARU Region 1 Field Days take place on 5 – 6 September. There are separate events for HF and 2m and they coincide with the RSGB contests I've already described. The All Asian DX Contest runs for the entire 48 hours of the weekend on HF and much confusion and hilarity can be expected when someone from the UK gives an Asian station a high serial number because the contest exchange that they are looking for is the operator's age! It makes sense for UK portables in SSB Field Day to be ready with a consistent number to give the Asians. It will also make sense for 2m operators to have another item of information available on Sunday 6 September, because the Worked All Britain (WAB) 2m Contest coincides with all the other 2m events. Your WAB square can be calculated from your grid reference, a reference of SY345987 translating to a WAB square of SY39 (the first, second, third and sixth characters).

The entire 48 hours of the following weekend, 12/13 September, is when the Worked All Europe SSB Contest takes place. Remember that European stations only want to work non-Europeans, so please don't try to give points away to them. Instead, call DX stations, who will be delighted to work you. RTTY enthusiasts get their fix on the final two weekends of September. On 19 – 20 the CIS DX RTTY Contest takes place. Russians give signal report, serial number and Area Code, while non-Russians just give a report and serial number. If the RTTY portions of the HF bands aren't packed during the CIS Contest they certainly will be the following weekend, because the entire weekend of 26 – 27 September is when the CQ WW RTTY DX Contest takes place. Exchange signal report and CQ Zone number, which is 14 for the UK. Finally, the first of a series of Belgian contents takes place on 50MHz on Sunday 27 September. Work ON stations only and give them a report and serial number. ON clubs will give a 3-letter club code, in addition to a report and serial.

PHOTO 2: As far as the Parallel Lines Contest Group are concerned, the story of the 2008 2m Trophy Contest was more about the weather than the radio.

ATV

What is ATV and what does it cost?



Basic Comtech 23cm ATV Rx (top) and Tx modules with DIP switch frequency selection. The receiver is very sensitive, and the transmitter produces 50-70mW – enough for a couple of miles with good antennas.

A NEW HAND AT THE TILLER. I would like to thank Trevor, G8CJS, for running the ATV column for so many years. He's going to be a hard act to follow. My name is Roy, G8CKN and I've been into amateur radio since the late 1960s and amateur television from 1992. My background includes professional electronics, radio frequency and antenna design. I have been a GB2RS Newsreader for 30 years and have transmitted the News via ATV repeaters since 1995. In taking over the ATV column, I intend to combine a back-to-basics approach with technical snippets and news.

WHAT IS 'AMATEUR TELEVISION'? First, of all what is the definition of Television? My dictionary says "Television (TV) is a widely used telecommunication medium for transmitting and receiving moving images, either monochromatic (black and white) or colour, usually accompanied by sound." The telecommunication medium is normally accepted as one using radio frequencies, but not exclusively so. Apparently, by definition, it could even include smoke signals! Amateur TV incorporates three main categories – Slow Scan TV (analogue or digital), Fast Scan Analogue TV (predominately using FM) and Fast Scan Digital TV. Broadly crossing those categories are DX operating and contests.

SO WHY AMATEUR TELEVISION? They say that a picture is worth a thousand words: so much more so with moving pictures. Amateur television is like inviting the other chap into your shack. For the potential convert to ATV there are many challenges, achievements and the satisfaction that follows when equipment refurbishment, modification and construction or antenna experiments succeed.

Traditionally, getting into amateur radio (and ATV) meant becoming aware of a local radio club or being invited to see the receiving and transmitting system of a local licensed amateur. This might progress to being shown how to solder, make simple circuits and tune in signals with the available receivers and, under supervision, operate a transmitter.

The amateur radio licence, even with the recent changes to the wording, still speaks of "… self-training in radio communications, including conducting technical investigations…". ATV readily lends itself to this requirement, particularly as there are few 'black boxes' to 'plug and play'. However, for analogue FM there are various sources of Comtech and similar receive and transmit 'modules' available that can give a fair performance and, with a bit of help from friends, can be enhanced to give very good performance indeed. There are several 'multi-function controllers' with LCD frequency readout, scanning and memory functions which, when housed in a suitable case, will become a complete ATV transceiver.

An alternate approach is to acquire an old analogue satellite receiver. The IF output from the satellite LNB included the 23cm band, and many amateurs have pressed these receivers into service for ATV. For other than very local working a good 30dB preamp would be required because satellite receivers are quite 'deaf' without the gain of the (frequency changing) LNB. A preamp is not needed with the Comtech style modules.

There are many more aspects to ATV than just the gear – video and audio editing, 'film' making, outside/portable operation, contests and much more – including simple rag-chews with the locals.

Even without an amateur licence it is still possible to give receiving ATV signals a try. When licensed you don't need to buy everything in one go, an ATV station can be built up as time and money permits.

WHAT WILL IT COST? ATV is not expensive. You do not require costly cameras, video/audio mixing and effects units – well, not until you really 'get the bug' for ATV! The average camcorder is an excellent source of video and audio, both live and recorded. Alternately, there are small surveillance-type cameras, some with microphone, retailing around £30 to £90. It pays to shop around. Go for colour, and maximum 'lines' of resolution you can afford. Then there's the all-important antenna and the best low-loss coaxial cable you can get. There are one or two suppliers of antennas, but get independent advice. These are likely to cost £50 to £75. Alternatively, make your own! There are several very good designs available, including variations of the Yagi beam and what is known as the 'Plate' antenna, or even a simple 'corner reflector'. (I will return to the subject of antennas and cable in a future column.) You will also need a video monitor to show the received pictures - a domestic TV with a video (SCART) input is fine.

Totting up the cost for all the bits, £400 will cover a typical 23cm analogue FM ATV receive and transmit station, based on Comtech modules and including a 20W RF power amplifier. Not everything need be purchased in one go. Start with the receiver, antenna and RF coaxial cable, then progress to the transmitter side later. The 20W PA and accompanying 13.8V 10A power supply are the more expensive items.

WHAT ATV SIGNALS WILL I SEE? This will very much depend on your location, the local ATV activity and available ATV repeaters. You can find your local repeater(s) via the UKrepeater.net website and it's well worth listening (and calling CQ TV) on the 2m talkback frequency, 144.750MHz FM.

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Signals from space

New satellite packet signals on 2m.

PHOTO 1: Castor and Pollux shortly after deployment, photographed from the Space Shuttle and seen with a discarded coupling ring. Photo: NASA.

TWINS IN SPACE. Two new atmospheric research satellites were launched from the Space Shuttle at the end of July. Named after mythical twins Castor and Pollux, they will be tracked using radar and laser ranging, allowing accurate data to be gathered on atmospheric density. This will lead to better tracking of space debris and help avoid space collisions.

Each satellite consists of two 19" aluminium hemispheres separated by an insulator. The hemispheres form a dipole for onboard 145.825MHz transmitters. There are no solar panels; both satellites are powered by internal battery packs, which will give power for about a year. The Pollux satellite incorporates elements made by US college students including flight software and onboard instrumentation such as the microelectromechanical systems (MEMS) gyroscope, magnetometer and accelerometer.

TELEMETRY. Both satellites transmit telemetry data on 145.825MHz as AX.25 packet frames at about 30 second intervals. I use a PC sound card and MixW software, but other systems should work equally well. (The ISS and PCSAT also use 145.825MHz but it is easy to see if your packets are from ANDE as the packet frames are identified as Castor or Pollux in the header.) Software to download the packets is freely downloadable from www.dk3wn.info/software.shtml, and a typical Pollux decode is shown in **Figure 1** (created using an early beta version of the software that didn't decode the MEMS info).

RECEIVING THE BIRDS. Both satellites are in very low orbits at around 300km with an inclination of only 51° (0° inclination = around the equator, 90° inclination = over the poles). For readers in higher latitudes, the satellites seldom reach very high above the horizon. A 2m beam antenna with no elevation and an azimuth rotator will bring in signals from several passes each day provided that you have reasonably unobstructed view of the sky above 10° elevation. A useful technique for telemetry capture is to set the antenna at the beam heading for the middle of the pass and set the radio at the satellites' nominal frequency 145.825MHz (ie no Doppler correction). As the satellite flies 'through the beam' you should be able to capture one or two packets.

More southerly listeners may be able to receive longer segments of passes on a normal 2m 'white stick' collinear. The signals will be Doppler shifted due their velocity so that as they come into range they will be heard about 3kHz above the nominal frequency, dropping throughout the pass to about 3kHz below as they go out of range. Since we are dealing with FM on 2m it's not essential to track the Doppler shift but as you get more practice you will find that you can increase the number of packets received if you do track the changing frequency. Both satellites nominally have 1W ERP but Castor seems much weaker. Smaller antennas systems may not hear Castor strongly enough for reliable packet decodes.

WHEN TO LISTEN? You will get several short-duration passes each day lasting up to five minutes or so. The usual place for info is the AMSAT.org web site. Click on PASSES, enter your approximate latitude and longitude, selecting CASTOR or POLLUX from the drop-down box. Another useful source of info is www.heavens-above.com.

AMATEUR PARTICIPATION. Radio amateurs are invited to e-mail captured telemetry packets to the ANDE project office via ande@juno.nrl.navy.mil. A QSL card will be sent to everyone who sends in telemetry. Considering the very low orbit the satellite control station will no doubt be relying on radio amateurs for packet data collection when the satellites are over parts of the world beyond their own ground station.

PACKET EXPERIMENTS. Although the satellites are currently using standard AX.25 there are plans to test FX.25, which adds Forward Error Correction (FEC). Experimenters will be able to set up two parallel reception channels to monitor the number of error free packets received and evaluate FX.25 versus AX.25.

MORE INFORMATION. To find out more information on Castor and Pollux, visit the US Navy ANDE home page at https://goby.nrl.navy.mil/ANDE/Main.html. At the time of writing this site is giving a 'security certificate warning'. I have been told that this is simply because the site owners have not updated the certificate and that the site is perfectly safe. I have used it without any apparent problems but I am no computer security expert, and the fact that a US military website is safe should not be taken as *carte blanche* to ignore other similar security certificate warnings on other sites.

If you Google 'ANDE Satellite' you will find a lot more information. Go to the NASA ILRS pages for lots of technical details.

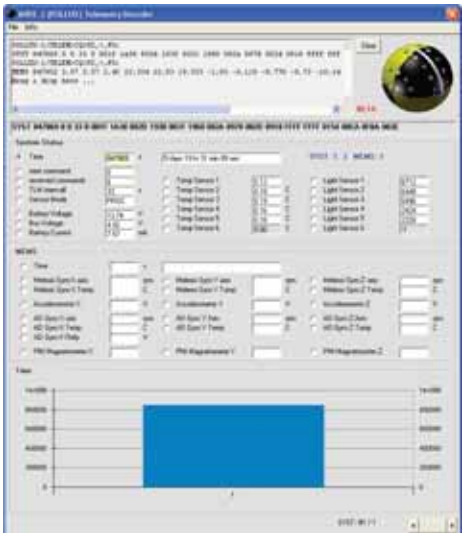

FIGURE 1: Beta version of Castor/Pollux decode software from DK3WN.

Book review

The essential collection for your shack.

RSGB Yearbook 2010

The *RSGB Yearbook 2010*, incorporating the UK & Ireland Callbook, will be launched at the National Hamfest on 2 October. It has been fully revised and is even bigger than the 2009 version with more callsigns than ever and eight more information pages between the covers.

But it's a lot more than a list of callsigns. The front section of the Yearbook contains 204 pages of information on the RSGB, amateur radio clubs, licensing details and operating information. Within the RSGB there is a wealth of knowledge and experience that can be tapped into – if only you know where to look. The Yearbook has the detail you require to access that information with everything from planning to GB4FUN and QSLs to Intruder Watch.

Amateur radio clubs are an important aspect of the hobby to many people. If you want details of the clubs in any area of the UK, you can find it in the Yearbook. Many of the clubs appear in the Featured Clubs section where you can read more of what they have been getting involved in recently. If you haven't sat your amateur radio exam yet – or perhaps you are hoping to take the next level of licence soon – you can find information on courses available, exam centres and the clubs that organise the training.

Of course, once you have passed your exam, you need information on licences, you may want to help organise a special event station or use a contest callsign. Details of how to apply for, use and make the most of these special aspects of amateur radio are also to be found in the Yearbook.

Finally, the Yearbook deals with every aspect of amateur radio operating you could want from repeaters to datacomms and contests to satellites. This year you will find special features covering the UK Six Metre Group (UKSMG) and the Radio Amateurs Old Timers Association (RAOTA). Well over 100 pages of information will keep you in reading matter for several weeks!

But, of course, the callsign listings are always useful. The second half of the Yearbook is devoted to the UK & Ireland callsign list. This section now runs to over a million words! It contains the latest database information from the UK licensing authority, a complete list of UK Special Contest callsigns, the Irish callsigns listing, plus listings of UK licensees in surname and postcode order.

In the back of the Yearbook you'll find a **free CD** with masses of bonus information. There's nearly 300 megabytes of amateur radio-related software in 25 different groups of software (a full list can be found the RSGB Shop section of the main website). Other bonus information on the disk are details of UK amateur radio clubs, excerpts from RSGB books and the complete 204 page information section of the Year book in fully searchable pdf format.

RSGB Yearbook 2010
Edited by Steve White, G3VZV
ISBN 9781-9050-8653-5
528 pages
Members price £16.14 plus P&P
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RSGB BOOKS ARE AVAILABLE FROM THE RSGB BOOKSHOP, ALONG WITH MANY OTHER EXCELLENT PUBLICATIONS.

2010 Callseeker Plus CD

The ideal companion to the Yearbook

The Yearbook contains the UK and Ireland calls in printed form, which is immensely useful, but the *2010 Callseeker Plus CD* improves even further on this. Not only does it have the UK and EI databases, but it also contains callsign data for over 20 European countries. Access to the callsign database is via the now well-established and easy to use Eurocall interface.

One of the really nice features of this software is that there is no installation procedure – you just put the CD in the drive and it runs straight from the disk. No hard disk space is required and the software is really easy to use. Typing a callsign into the Call box and pressing Return brings up the licensee's details almost instantaneously. Name, address and postal code are also shown. There is a CW drop-down feature that opens a Morse sender window and plays out the licensee details in Morse though the PC speaker. It is possible to print search results in a variety of formats, including one intended specifically for QSL cards.

2010 Callseeker Plus CD
Members price £13.74 plus P&P
Non-members price £15.99 plus P&P

Deluxe Logbook & Diary 2010

The Deluxe Logbook & Diary 2010 contains a mass of reference information such as a DXCC prefix list and a locator map (including an explanation of how locators work). It also contains details of the RSGB QSL Bureau, a full set of UK band plans, details of Ofcom, repeaters, GB2RS, events and major contests. Of course, there is a full log section, where you can record details of your contacts, and a Diary to help you plan your year – or perhaps note forthcoming skeds.

The nice thing is that it is spiral-bound so it will lay flat on your shack table. It's slightly smaller than the standard RSGB Log Book, but with much more content at the same price.

Deluxe Logbook & Diary 2010
Members price £4.24 plus P&P
Non-members price £4.99 plus P&P

Special Event at Bentley Priory

Photos by Dave, G3WCB

GB80RBP. A chance meeting between a member of the Radio Society of Harrow and a representative of the Bentley Priory Battle of Britain Trust resulted in the RS Harrow being invited to take part in the Heritage Open Day at Bentley Priory in Stanmore. The former RAF base, which was the headquarters of RAF Fighter Command during the Battle of Britain, was to open its doors to welcome visitors for the first time in 82 years as part of the event organised by the Civic Trust.

The radio club were thrilled and delighted to be invited to demonstrate radio communications at this prestigious event. The most suitable location, taking into consideration both the best way to rig the antennas and the most accessible site from a visitors' point of view, was on the lower ground floor overlooking the gardens. Two weeks of whirlwind of activity followed. There was a team of members to organise, extra tables and display boards (courtesy of Harrow Library Service) were borrowed, antennas had to be erected, display material on Voluntary Interceptors and the Radio Security Service was devised and the loan of vintage military equipment from various sources was also organised.

A special callsign application was submitted, assisted by a letter of support from the Bentley Priory Battle of Britain Trust. Ofcom, helpfully, expedited permission to use GB80RBP, representing RAF Bentley Priory. A sked was also organised over the weekend with GB2BP at Bletchley Park.

THE STATION. A fine collection of antennas were erected on the lawns: a G5RV, which extended over two locator squares, running from the main balcony (IO91UP) to the adjacent 1950s accommodation block (IO91TP); a mast with a VHF/UHF 6, 2 and 70 collinear; a WWII vertical receiving antenna; a Butternut vertical and a long wire. Operational equipment included an HF Icom, HF Kenwood, a Yaesu HF rig, Icom D-Star rig, an FT-747GX with a laptop decoding PSK31/SSTV, an FT-9800 VHF/UHF rig, a Morse tutor and key and a working 1940s R1155 receiver.

Originally built in 1766, Bentley Priory was significantly extended in 1788 by Sir John Soane and, in the late 19th Century, was used as a hotel and girls' school before being acquired by the Royal Air Force in 1926. During the Heritage weekend over 5000 visitors flocked to the site, taking tours of the house and grounds as well as viewing the exhibits provided by the Bentley Priory Trust and various local societies, including crafts, conservation and local nature displays and nostalgic reminders of life in the 1940s.

VISITORS. Many of the visitors found their way to RS Harrow's two rooms and they provided demonstrations of Morse and helped younger visitors with information for their quiz trail. A number of visitors introduced themselves as fellow radio amateurs and they also had several ex-Service visitors, including a 90-year-old lady who found she could still read the Morse being sent.

The room next door had been allocated to the Bletchley Park Trust for a code-breaking display and the RS Harrow station was joined by their representative for the sked between GB80RBP and GB2BP. Overall it was a very busy and exciting weekend and a wonderful opportunity to demonstrate amateur radio to the public. RS Harrow feel privileged to have taken part.

The objectives of the Trust are to establish and maintain Bentley Priory as a centre for education, information, training and teaching of the history of the Battle of Britain and aerospace history, aerospace technology and its future advancement; and to use Bentley Priory as a permanent memorial to those who served in the Royal Air Force and in particular (but not exclusively) during the Battle of Britain. Further information can be found at www.bentleypriory.org.

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1 SCOTLAND SOUTH & WESTERN ISLES

REGIONAL REP: GORDON HUNTER, GM3ULP, GM3ULP@RSGB.ORG.UK

AYR ARG
Charlie, MM0GNS, 01563 551704
cgnstewart@hotmail.com
15 New Session Group Discussion
29 Construction Night

COCKENZIE & PORT SETON ARC
Bob, GM4UYZ, 01875 811 723
4 Normal Club Night
25 2m DF, 6.30 at Old Ship Inn car park

LIVINGSTON & DARS
Norman, 07740 946192
uk.groups.yahoo/group/ms0liv
1, 15, 29 Club Evening
8 Operating Evening
22 Morse Code Practice

2 SCOTLAND NORTH & NORTHERN ISLES

REGIONAL REP: DENNY MORRISON, GM1BAN, GM1BAN@RSGB.ORG.UK

ABERDEEN ARS
Lewis, GM4AJR, 01224 575 663
www.aars.freeserve.co.uk
3 Junk Sale

GLENROTHES &DRC
Dave Francis, 01383 823878
www.gdarc.org.uk
23 AGM

KINGDOM AMATEUR RADIO SOCIETY
Brian, MM0XBD, 01383 738905
mm0xbd@kars.org.uk
2, 9, 23, 30 Shack Night
16 Presentation Night

3 NORTH WEST

REGIONAL REP: KATH WILSON, M1CNY, M1CNY@RSGB.ORG.UK

BOLTON WIRELESS CLUB
boltonwireless@gmail.com
14 Life above 70cm, G6GVI & G4MVU
28 Low Earth Orbit Amateur Satellites, G1EFP

CHESTER & DRS
Barbara Green on 0151 339 9183
www.chesterdars.org.uk
1 NHS Communications, Roger Howells
15 Working for C&W in the Falklands in mid 1980s, Les Green
22 Quiz with Wirral & District AR Club

ISLE OF MAN ARS
Stuart Hill, GD0OUD, 01624 613226
8 Echolink, Dave Osborn, G4HOZ

MID-CHESHIRE ARS
Peter Paul Fox, G8HAV, 01606553401
2 VHF OTA
9 Committee meeting
16 Recording contacts into a database, M0TLR
23 AGM
30 RadioActive forward planning

MORECAMBE BAY ARS
Martin Hazel, M0ZIF, 07852 200232
martin@mbars.internationalham.com
1, 8, 15, 22, 29 Social Evening

SOUTH MANCHESTER R & CC
Ron, G3SVW, 0161 969 3999
3 War-time Radio 70 Years On, Ged, G8RSI
10 Flight Simulators, Roland, G8LUL
17 Norway and Spitzberg, Chris, G3UAU
24 Local QRM Cancellation, Steve, G3OAG
28 Monthly Technical Forum

STOCKPORT RS
Nigel Roscoe, 0161 428 8413
info@g8srs.co.uk
1 GM2T IOTA DXpedition, Jim, G3VOU

THORNTON CLEVELEYS ARS
John Foster, M3WAZ, 01253 399377
7 Natter night
14 Computers with John, M0JFE
21 Enigma by Ted & Ray
28 Wellington bomber video, John, G4FRK

4 NORTH EAST

REGIONAL REP: HAROLD SCRIVENS, G0UGE, G0UGE@RSGB.ORG.UK

ANGEL OF THE NORTH ARC
Nancy Bone, G7UUR, 0191 477 0036
nancybone2001@yahoo.co.uk
7 OTA
12 CHOTA weekend event
19 Advanced Course enrolment

EAST CLEVELAND ARC
Alistair, G4OLK, 01642 475 671
alistair.mackay@talk21.com
4 Radio components catalogues evening
11, 25 OTA
18 Technical forum

HALIFAX & DARS
Anthony Vinters, 01422 822636
tony@g0wfg.demon.co.uk
15 AGM

HORNSEA ARC
Gordon MacNaught, G3WOV
01377 240573
gmacnaughtwov@yahoo.co.uk
2 Prep for SSB Field Day
5 SSB Field Day
9 SSB FD wash up
16 Hornsea Rally Prep
20 Rally at Floral Hall
23 Rally wash up
30 Contesting talk, Richard, G4CGG

MEXBOROUGH & DARS
Sharon, M0BOH, M0BOH@aol.com
5 HF FD at Phoenix Park, All welcome
11 Talk by Hanz Hindle, G3WBG

OTLEY ARS
Paul, 2E0PAK, 07768 996370
m6wat@pekae.co.uk
1 144MHz Club Contest
8, 29 Members Presentation
15 Club shack night
16 70MHz Contest
22 50MHz activity night

SHEFFIELD ARC
Trevor Wood, M0TWS
trevorwood6@yahoo.co.uk
7 Making the right connections, G3PHO
14 YouTube video on connectors
21 Practical - making coaxial & data mode leads
28 Social night

TYNEMOUTH RADIO CLUB
Graham Errington, 07812 172136
4 70cm Moxon antenna for SSB
11, 25 Operating night /technical topics / Morse class
18 Pie & peas quiz night

5 WEST MIDLANDS

REGIONAL REP: TREVOR BAILEY, M0KMB, M0KMB@RSGB.ORG.UK

BROMSGROVE & DARC
Chris, M0BQE, 01905 776 869,
m0bqe@hotmail.com
4 Morse practice
11 Talk on operating the FT-1000MP
18 Committee meeting
25 Looking at construction projects

COVENTRY ARS
John, G8SEQ, 07958 777363
4 From the archives
11 4th round G2FDC Trophy
18 Video night
25 Radio workshop VHF/UHF; 6m, 4m, satellites

GLOUCESTER AR & ES
Anne, 2E1GKY, 01452 548478
daytime, www.g4aym.org.uk
7 AGM
14 PIC basics, Cliff, G8CQZ
21 Operating club equipment
28 Informal evening

MIDLAND ARS
Norman, G8BHE, QTHR
01214 229 787
2 Open meeting & training classes
6 Club visit to Telford rally
9 Rag chew & training classes
16 Committee meeting & training classes
23 Laptop computer training class
30 OTA, rag chew & training classes

MID-WARWICKSHIRE ARS
Bernard, M1AUK, 01926 420 913
8 Homebrew construction night
22 Talk on MIMO systems

SOUTH BIRMINGHAM RADIO SOCIETY
Don, 0121 458 1603
4, 11, 18, 25 Construction Evening
6 Club stand at Telford rally
7 Sorting out rally stock, unpacking trailer
9 Lecture in main hall
14 Equipment on the air.
21 Committee Meeting
28 Equipment testing for field day

STRATFORD UPON AVON DRS
Jack, G3VYE, 01926 641 988
g3vye@onetel.com
14 Opening meeting of new session
28 Aurora, G4GEE

TELFORD & DARS
Mike, G3JKX, 01952 299 677
mjstreetg3jkx@blueyonder.co.uk
2 Open house / OTA / committee
6 Telford Hamfest
9 Show & Tell evening
16 How to make & tune HF antennas, G0UFE
19 Train the Trainers
23 Introduction to Microwaves, G3UKV
30 Social with video; SARS invited

WORCESTER RAA
Leslie Coyne M3WRZ, 01905 764320
m3wrz@wraa.co.uk
5/6 SSB Field day, M0ZOO OTA
8 Club meeting, Talk & OTA

6 NORTH WALES

REGIONAL REP: MARK HARPER, MW1MDH, MW1MDH@RSGB.ORG.UK

No information submitted.

7 SOUTH WALES

REGIONAL REP: JIMMY SNEDDON, MW0EQL, MW0EQL@RSGB.ORG.UK

LLANELLI ARS
Craig, MW0MXT, 01269 840292
craig@mw0mxt.co.uk
7, 21 OTA
14 Club raffle & social night
28 TBA

NEWPORT ARS
Gareth Price on 01633 880081
25 First meeting of new term

YOUR RSGB
SUPPORTING YOUR CLUB

8 NORTHERN IRELAND

REGIONAL REP: PETER LOWRIE, MI5JYK, MI5JYK@RSGB.ORG.UK

No information submitted.

9 LONDON & THAMES VALLEY

REGIONAL REP: ALISON JOHNSTON, G8ROG, G8ROG@RSGB.ORG.UK

AYLESBURY VALE RS
Roger, G3MEH, 01442 826 651
9 Discussion evening

BRACKNELL ARC
Paul, M3XPR, pryan@max.co.uk
2, 16, 23, 30 2m net, 145.375 FM
9 Two years in amateur radio, Paul, M3XPR

BURNHAM BEECHES RC
Dave, G4XDU, 01628 625 720
7 Foxhunt
21 DFM construction

COULSDON ATS
Andy, G8JAC, g8jac@btinternet.com
14 Classic radios show & tell evening

CRAY VALLEY RS
Bob, 2E0RCV, 020 8265 7735 after 8pm
3 Health & safety for amateurs, Dave, M0BGR
17 Surplus sale

CRYSTAL PALACE R & EC
Bob, G3OOU, 01737 552 170
4 Fun quiz

DORKING & DRS
Garth, G3NPC, 01737 359472
garth@swansons.org.uk
22 Mobile phone systems, David, M0SXD

NEWBURY & DARS
Richard, G3ZGC, 01635 46241
richard.jolliffe@vodafone.com
23 Test equipment evening

READING & DARC
Pete, G8FRC, 01189 695 697
10 TBA
10 Visit by Paul Bigwood, G3WYW, Yaseu
14 Start of Advanced course
24 Contesting, Don Field, G3XTT
24 The TS7C DXpedition, Tony, G0OPB

SHEFFORD & DARS
David, G8UOD, 01234 742 757
10 Welcome Back
17 Visit to Astrium
24 Colossus Visit & lecture by Tony Sale

SOUTHGATE ARC
David Sharp, M0XDS,
david.sharp1@tesco.net
9 Great Erg Race

SURREY RADIO CONTACT CLUB
Ray, G4FFY, 020 8644 7589
7 GPS: Clocks in Space, Pat, G4FDN
21 Club Fix-it and natter night

VERULAM ARC
Ralph, 01923 265572, g1bsz@aol.com
15 Vertical antennas

WEY VALLEY ARG
www.weyvalleyarg.org.uk
4 Member's equipment sale
18 Visit by Rob Mannion, G3XFD

WIMBLEDON & DARS
Jim, M0CON, 020 8874 7456
www.gx3wim.org.uk
11 OTA
25 Talk (TBA)

10 SOUTH & SOUTH EAST

REGIONAL REP: GAVIN KEEGAN, G6DGK, G6DGK@RSGB.ORG.UK

ANDOVER RAC
Martin, M0MWS, 07776181646
www.arac.co.uk
1 Army communications

BASINGSTOKE ARC
Clive, G4ODM, 01256 326050
5 Weekend event SSB Field Day
7 Practical Wireless by Rob, G3XFD

BREDE STEAM ARS
Steve, 01424 720815, m0nuc@aol.com
1, 8, 15, 22, 29 Operating from the shack
5 At the bunker

BROMLEY & DARS
Andy, G4WGZ, 01689 878089
15 New members evening

CRAWLEY ARC
John, G3VLH, 01342 714 402
13 Microwave Round Table. Visitors very welcome
16 D-Star, David, G4ULF

FAREHAM & DARC
Derek Clarkson, G4JLP, 01329 823405
2 Simple Choice Presentation Techniques, Jackie Walsh

FARNBOROUGH & DRS
Derek. G3OFA, mail@fdrs.org.uk
www.fdrs.org.uk
9 Exam Q&A, Colin, G8BCO
23 Visit to Martin Lynch & Sons

HORNDEAN & DARC
Stuart, G0FYX, 023 9247 2846
www.hdarc.co.uk
1 Natter night/social evening
22 Members' 10-minute talks

HORSHAM ARC
www.harc.org.uk
3 Networks and Viruses, Stephen, G4TPO
17 Social at The Fountain, Ashurst

SOUTHDOWN ARS
John, G3DQY, 01424 424 319
vaughdqy@aol.com
2 Operating at Hailsham
7 Bob, G3VXJ on Friedrichshafen Rally
19 British Wireless for the Blind Fund operating

SWINDON & DARC
Den, M0ACM, 07810 317750
www.sdarc.net
3 HF SSB field day prep
10, 24 Natter Night
17 Electronic cyphers after Enigma, Richard, M1CFW

TROWBRIDGE & DARC
Ian, G0GRI, 01225 864 698, E/W
2 TBC
16 Natter night

WORTHING & DARC
Roy, G4GPX, 01903 753 893
2 Planning for SSB Field Day
5/6 SSB Field Day
9 DVD evening
16 Construction Contest
23 The History of Newhaven Fort, Ed Tyhurst
30 GX3WOR OTA; discussions

11 SOUTH WEST & CHANNEL ISLANDS

REGIONAL REP: PAM HELLIWELL, G7SME, G7SME@RSGB.ORG.UK

APPLEDORE & DARC
Brian Jewell, M0BRB, 01237 473251
21 Back Yard Antenna with club radio, Laurence, G4XHD

BRISTOL RSGB GROUP
Robin, G3TKF, 01225 420442
28 Mechanics of music & how to stay in tune, Prof Bramley, G4NDU

CORNISH RADIO AMATEUR CLUB
Steve, G7VOH. 01209 844939
g7voh@btinternet.com
2 Main Meeting
7 Committee meeting
14 Talk on Windows 7, Clive, G3OCB

EXMOUTH ARC
Mike, G1GZG, 01395 274172
2 Antennas, Tony, M0THJ
16 Operating & mystery night

PLYMOUTH RC
Bob. G7NHB. 01752 343177
g7nhb@hotmail.co.uk
8 Valves, history and construction, Bob, G7NHB
8 Weather Satellites, Keith, G3MCD

SOUTH BRISTOL ARC
Len, G4RZY, 01275 834 282
3 Broadband internet operation with G7PKJ
10 What is D-Star?, G4SDR
17 Photographs from members' archives
24 OTA

TAUNTON & DARC
William, G3WNI, 01823 666 234
g3wni@btinternet.com
2 Preparing for NFD
5/6 SSB NFD
9 Talk on operating in NFD
16 Video, Bill, G0PNF
23 OTA & Morse class
30 Kite aerials, Roger, G4ROJ

THORNBURY & SOUTH GLOS ARC
Tony, G0WMB, 01454 417048
tonytsgarc@sky.com
2 Construction evening with Peter, G4OST
9, 23, 30 OTA
16 Video night

TORBAY ARS
Dave, G6FSP, g6fsp@tars.org.uk
4, 18 Natter night
11 Rally details
25 No meeting

WEST DEVON RADIO CLUB
Jules Cuddy, M1AGY, 01752291588
1 Radio and general knowledge quiz
15 Bring a Non-Radio Friend night
29 CW night

YEOVIL ARC
Steve Crask, G7AHP, steve@g7ahp.co.uk
3 WW11 Evening Domestic & Military Radio
10 TBA
17 How SSB works, G4GVM
24 OTA

12 EAST & EAST ANGLIA

REGIONAL REP: PHILLIP BROOKS, G4NZQ, G4NZQ@RSGB.ORG.UK

BITTERN DX GROUP
Keith, G0GFQ, 01263 588 506
info@bittern-dxers.org.uk
10 Informal
24 GB5FRR JOTA final planning

BRAINTREE & DARS
John, M5AJB, 01787 460 947
7 BWFTB planning; quiz night
21 Construction project part 1

CAMBRIDGE & DARC
David Leary, G8JKV on 01223 355254
4 C Programming
5 144MHz Trophy contest weekend
11, 25 Shack evening
18 Antenna Polarplot Measurements, Mike, M0BLP

CHELMSFORD ARS
Martyn, G1EFL, 01245 469 008
1 D-Star, G6JYB & G1EUC

DOVER RC
Brian, G4SAU, g4sau@darc.org.uk
2 Pub nosh & natter night, venue TBA
9 Return to Club
16 Natter & OTA
23 Club winter project intro, Ian, G3ROO
30 My Shack - three 10min talks by members

FELIXSTOWE & DARS
Paul, G4YQC, pjw@btinternet.com
7 Club net, 145.400MHz
21 ESWR post mortem

GORLESTON ARS
David, G3OEP, QTHR, 01493 662 323
26 Lunch time meeting at the Short Blue Hotel, Gorleston

KING'S LYNN ARC
Ray, G3RSV, ral-g3rsv@supanet.com
www.klarc.org.uk
1 Special event GB0PHS, Park High School
3, 10, 17, 24 Club night and 2m club net

LEISTON ARC
Dave, G4HUP, 01473 737 717
g4hup@btinternet.com
8 Visit to Bawdsey Radar Museum

LOWESTOFT & DISTRICT PYE ARC
Phil, G0JSG, 01502585448
phillip.holden@virgin.net
3, 10, 17, 24 Club Night
5 SSB Field Day & barbecue

NORFOLK ARC
Chris Danby, G0DWV, 01603 419204
cmdanby@btinternet.com
2 Visit from Waters & Stanton by Mark Francis, G0GBY
6 Police Gala Day / SSB FD
9 Informal / construction / workshop
16 RAYNET and You, Steve, G7VAH
23 Members forum
30 Informal / construction / workshop / Bright Sparks

PETERBOROUGH & DARC
David Howlett, M0VTG, padarc@tesco.net
23 A blind view of propagation, George, G4FKG

SOUTH ESSEX ARS
Dave Speechley, G4UVJ. 01268 697978
southessex.ars@btinternet.com
9 Propagation, Carl, G3PEM

13 EAST MIDLANDS

REGIONAL REP: JIM STEVENSON, G0EJQ, G0EJQ@RSGB.ORG.UK

EAGLE RG
Terry, G0SWS, 01507 478590
8 Community Policing & Neighbourhood Management

LINCOLN SHORT-WAVE CLUB
Pam Rose, 01427 788356
pamelagrose@tiscali.co.uk
2 SSB Field Day prep
9 QSL Card Design, Darren, G7WAP
14 OTA & natter night
23, 30 Final arrangements for National Hamfest

LOUGHBOROUGH & DARC
Chris, G1ETZ, 01509 504 319
1 Internet connection night
8 Video night; 'Mullard valves'
15 Skittle & food evening at the Griffin Inn
22 InterClub quiz
29 Practical evening

NUNSFIELD HOUSE ARG
Ken Frankcom, G3OCA, 01332 720976
4 Long distance photography of animals, Ken Frankcom
11 Committee meeting and shack night
18 Talk on the history and development of Heage Windmill
25 Memory keyer construction evening

SOUTH NOTTS AMATEUR RADIO CLUB
Terry, M0RIA, www.radioclubs.net/snarc
2 Software Defined Radio, M0XIK
9 Kitchen sink PCBs, M0RIA
12 Leicester Rally, Loughborough Uni
16 Oscilloscopes, G4EDX
23 Satellites and EME, M0XIK
30 Forum (members only)

WELLAND VALLEY AMATEUR RADIO SOCIETY
Peter D Rivers G4XEX, QTHR, 01858 432105, g4xex@fsmail.net
21 Fishing rod vertical for 20m

HELPLINES

IMPORTANT NOTICE

RESPONDENTS TO ITEMS IN THE 'HELPLINES' COLUMN ARE ADVISED NOT TO SEND ORIGINAL DOCUMENTS, BUT TO COPY THEM AND SEND THE COPIES.

Members are reminded that Helplines is a free service that can be used to ask other members for help on amateur radio related matters. Items for inclusion can be sent by post to RSGB HQ or preferably by e-mail to radcom@rsgb.org.uk.

• WANTED – a plan view photo / picture / illustration of a Creed 7B teleprinter KEYBOARD (not computer keyboard) showing all 30 keys and spacebar, the letters and symbols to be 100% clear. Can anyone help please? G0DIC, Dick, mrfixter@hotmail.com.

• Paul, G8KDQ would like to share notes, etc. with anyone else who has an RDX-109 transceiver, built from the Hands Electronics kit. E-mail: paulpatricia@tiscali.co.uk or tel. 01883 620360.

• Gianluigi is looking for a manual with schematics for a 50MHz SSB transverter by Microwave Modules (no model number on the box). IF = 144MHz, power output 5-10W. Any help will be greatly appreciated. Gianluigi Portinaro, I1POR, e-mail: portinaro@sogin.it.

• Does anyone have a copy of the assembly instructions for the HQ-1 Mini-Beam? The HQ-1 was sold during the 1970s and early 80s. Dave, G4IDF is looking to repair and re-install his HQ-1. A photocopy, scan or WHY of the manual would be appreciated. Dave Hobro, G4IDF, QTHR, 01905 351568 or e-mail david@hobro.plus.com.

• G4IPZ is looking for a handbook/ circuit diagram for a Microwave Modules MML50-30-3 6m linear amplifier. If anyone has any info then please e-mail. g4ipz@g4ipz.com or to mail it to PO Box 75, Westerham, Kent TN16 3YS.

• Bob Askew (full name was Percy Herdson Askew) whose callsign was G8TP was stationed at Bletchley Park during the war. Due to the Official Secrets Act he was unable to tell his daughter, Marion, anything about his activities during the war other than the following. He had his own radio shack at home and, one day, unannounced, army officials appeared and boarded up the shack then told him it had to remain like that until after the war. She do not know whether they also offered him the opportunity to go to Bletchley Park then or if that happened later. She has asked the Records Department at Bletchley as they are currently updating their archives but they were unable to help her as they do not have a great deal of information.

Her father's address was in Sedbergh, West Yorkshire, later to become Cumbria. He was born on 2 May 1910 and died on 6 May 1972. She has always wanted to know what he did during those years and he was looking forward to telling her. The only other small piece of information she has is that he had an FOC lapel badge.

She was brought up to the comforting sounds of 'pipping' and spending many happy hours in her father's shack - anyone was welcome - but no tidying up! Marion wondered and hoped that perhaps someone within the RSGB membership might remember her father during the Bletchley years and could fill in the blanks for her. Marion@lytchett.plus.com.

HF F-Layer, Propagation Predictions for September 2009

Compiled by Gwyn Williams, G4FKH

	3.5MHz	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz	28.0MHz
Time	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220
(UTC)	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020
*** Europe								
Moscow	85.....4778	372....48876	..6.345788..	...777778...	...57776....	.....	.....	.....
*** Asia								
Yakutsk	.....2..	6776	..3...35553.	...656.....	.....	.....	.....	.....
Tokyo	.....23..	.....567..	.....	.....	.....	.....	.....	.....
Singapore	.....121.	68822	.....463..	.....23...	.....	.....	.....	.....
Hyderabad	.....	3443	.....454.	.....3....	.....	.....	.....	.....
Tel Aviv	99.....8999	787....79998	..72..2788..	...333457...	....555.....	.....	.....	.....
*** Oceania								
Wellington	.....	.....36...	.....	.....	.....	.....	.....	.....
Well (ZL) (LP)	..1.....	.58.....	679.....665	5.8.....764	.....	.....	.....	.....
Perth	.....	.....2653.	.....352..	.....	.....	.....	.....	.....
Sydney	.....	.....566..	.....2643..	.....	.....	.....	.....	.....
Melbourne (LP)	.....	.489.....	56796.....	...9.....4.	.....	.....	.....	.....
Honolulu	.....	..43.....	...4.....	.....	.....	.....	.....	.....
Honolulu (LP)	.....	.....	.....3...	.....7...	.....	.....	.....	.....
W. Samoa	.....	.....	...4542.....	....453.....	.....5.....	.....	.....	.....
*** Africa								
Mauritius	3.....433	6.....28886	.....7887.	.....787..	.....66...	.....44...	.....	.....
Johanesburg	89.....3998	89.....9999	.6.....29993	..3....7996.	.....675..	.....56...	.....	.....
Ibadan	12.....11	673.....1566	.37.....5762	..75...378..	...7.34677..	...5...775..	.....6...	.....
Nairobi	3.....12	87.....6777	56.....5555	..3....4663.	..33..3664..	...544567...	.....	.....
Canary Isles	999.....2999	9997...28999	84862..58887	...83..4885.	...7888889..	...5666687..	.....5...	.....
*** S. America								
Buenos Aires	777.....6	9892.....89	5.5.....264	.....6..	.....5..	.....	.....	.....
Rio de Janeiro	777.....57	999.....899	525.....875	.....83.	.....36..	.....5..	.....	.....
Lima	211.....	6453.....36	2..5.....53	.....	.....	.....	.....	.....
Caracas	331.....2	7772.....57	6.46.....77	....5....75.	.....54457..	.....3...	.....	.....
*** N. America								
Guatemala	222.....	6455.....5	...5.....2	.....	.....	.....	.....	.....
New Orleans	23.....	666.....5	2	.....	.....	.....	.....	.....
Washington	553.....2	888.....27	3.....66	.....3.3463.	.....5...	.....	.....	.....
Quebec	773.....6	736.....46	.....37.	.....54467..	.....	.....	.....	.....
Anchorage	.....	4672.....34	..3.....35.	.....3..	.....	.....	.....	.....
Vancouver	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco	.....	.....	.....	.....	.....	.....	.....	.....
San Fran (LP)	.....	.....	.....	.....	.....5....	.....4....	.....	.....

KEY: Each number in the table represents the expected circuit reliability, eg '1' represents reliability between 1 and 19% of days, '2' between 20 and 30% of days, etc. No signal is expected when a '.' is shown. **Black** is shown when the signal strength is expected to be low to very low, **blue** when it is expected to be fair and **red** when it is expected to be strong. The RSGB Propagation Studies Committee provides propagation predictions on the internet at http//uk.geocities.com/g4fkh@btinternet.com. An input power of 100W and a dipole aerial has been used in the preparation of these predictions; therefore a better equipped station should expect better results. The predicted smoothed sunspot numbers for September, October and November 09 are respectively (SIDC classical method – Waldmeier's standard) 14, 15, 17 and (combined method) 9, 11, 12. The provisional mean sunspot number for July 2009 was 3.5. The daily maximum / minimum numbers were 16 on 4 – 6 and 0 on 1 – 3, 11 – 22, 24 – 29 and 31 July.

RadCom

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- Massive Bring and Buy stand
- Major UK organisations such as AMSAT, BATC, WAB etc represented.
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- Superb Panoramic Restaurant.
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ALTRON CM30 TELESCOPIC MAST £100. Ten-Tec Corsair 2 filters, PSU, mint, £280. Plus carriage. G3VTT@aol.com, 01634 250427 (Rochester).

BC779B COMMS RX. Rack mtg. Suitable for restoration. No mods. Buyer collects, £50. Telephony Vol 1 & 2 by J Atkinson ex condx £50. S Atkinson, 0780 360 1176 (Gainsboro', Lincs).

CHELCOM HFV-1 80m VERTICAL NEW, boxed, all band with ATU, 22ft high, £90. G3PJK, QTHR, 01772 813857 (Lancs).

HK-709 MORSE KEY £22, ES-08 external speaker 1.8m cable £10, CN-101L cross needle SWR & power meter 1.8-150MHz £39, MFJ-901B 200W Versa Tuner £45, FT840 HF transceiver plus 13.8V PSU £290. Free postage. Tony Sladin, G4JJI, 01253 780047, e-mail tony.sladin@virgin.net (St Annes).

HYGAIN TH7 TRIBAND YAGI with balun and manual £350 ono. Buyer to collect. Contact Jeff, GW4AYJ, on 01792 298090.

LOWE HF-225 HF RECEIVER SSB/CW/AM/AMS/FM with external keypad, PSU and manual. VGC. £210 plus carriage at cost. John, G4DBE, 0151 3427545, e-mail john@curedum.plus.com (Wirral).

M5AB MINI BEAM dismantled, ready for collection or buyer pays postage. In good condition. £220. Contact Les, G8MEH, QTHR, 01288 331447, e-mail les.1938@btinternet.com (Bude, N Cornwall).

RACAL 100W HF STATION. Made up of TRA931X transceiver, TA4044A RF power amp, MA4085 PSU/LS AMP, MA4142 A/ATU control unit and BCC540B A/ATU. £450. Reading 0118 377 4859 evenings, e-mail wfsawyer@hotmail.com.

TRIO TW4000A 2m/70cm FM 25W mobile xcr and mic, 5kHz & 25kHz. No CTCSS, operating or service manuals, £100 ono. Trio TR9500 70cm all mode 10W mobile xcvr & mic, 25kHz and 100Hz steps. No CTCSS, operating or service manuals, £100 ono. Philips PM3217 50MHz oscilloscope working, needs attention, £50 ono. MFJ radio interface model 5124K/Y for use with MFJ993 auto tuner, £25 ono. Sensible offers welcomed on all items. Contact Kim, G6JXA, 07812 735507. Buyer collects or pays carriage. (Morden, Surrey).

YAESU FT450AT excellent condition, less than 1 year old. Offers. Andy, G8MIA, QTHR, 01635 862098 (Thatcham).

YAESU FT817 fitted with Collins SSB filter and case. HF/6m/VHF/UHF portable with microphone, shoulder strap, charger, DC lead etc. As new, £200. Rob Stratford, 01582 769078 (Harpenden).

WANTED

19 SET, power unit, leads, control boxes, any ancillaries. Also R1155, T1154. Any condition considered. WHY? P Taylor, G7JEX, 0208 3292340, e-mail pat.taylor@sperry.ngc.com (Epsom).

HEATHKIT DX100U for rebuild/restoration. Complete transmitter or parts considered. Also wanted: receivers SB301 and KW77. Manual/circuit for OS2, AO-7u. CRT 1CP1 / 1FP1. G3WCE, QTHR, 01692 538794, e-mail G3WCE@supanet.com (North Walsham).

HF AMP WANTED. Must cover WARC bands. WHY? Ken, G4VSJ, 01455 209382.

KENWOOD VC20 converter module for R5000 receiver. Dave, G4IDF, QTHR, 07754 785983.

MORSE KEYS WANTED PLEASE. Avid collector seeks straight keys, bug keys etc. In particular Marconi. Please ring or e-mail John, G0RDO, on 01626 206090, e-mail john@morsemad.co.uk (Newton Abbot).

SILENT KEY CLEAROUT or just not needed. I collect QSL cards for their historic interest, preferably from periods before 1970. Please don't throw them away. I can collect or arrange collection. Tony, G4UZN, 01132 693892 (Leeds). E-mail: AQuest1263@btinternet.com.

RALLIES & EVENTS

Members of the RSGB Regional Teams will be at the rallies in September marked with a diamond.

SEPTEMBER 2009

6 SEPTEMBER - NEW DATE - **TELFORD HAMFEST** - Enginuity Technology Centre, Coalbrookdale, Telford TF8 7DU. OT 10:30. TI S22 & GB3TF 433.200MHz. TS, SIG, discounted admission to Enginuity Centre. Details from Martyn, G3UKV, 01952 255416 [www.telfordhamfest.co.uk].

12 & 13 SEPTEMBER - CHANGE OF DATE, CHANGE OF VENUE - **LEICESTER AMATEUR RADIO SHOW** - Loughborough University. Details from Geoff, 01455 823344, e-mail geoffg4afj@aol.com [www.LARS.org.uk].

13 SEPTEMBER - NEW DATE - **TORBAY ANNUAL COMMUNICATIONS FAIR** - Newton Abbot racecourse, Newton Abbot, Devon TQ12 3AF. OT 10.00/10.30, £2.00. TS, B&B, WIN, C, DF. Details by e-mail to rally@tars.org.uk.

13 SEPTEMBER - **TELFORD HAMFEST** DATE CHANGED TO 6 SEPTEMBER

20 SEPTEMBER - **HORNSEA AMATEUR RADIO CLUB RALLY** - Floral Hall, 7 The Esplanade, Hornsea, East Yorks HU18 1NQ. OT 10.30am, £2, CP, TS, B&B, SIG RSGB, RAFARS, LB, C, DF, WIN. Details from Rick, M0CZR by e-mail to R106221@aol.com or Duncan, G3TLI at g3tli@hotmail.co.uk. [www.hornseaarc.co.uk].

22 SEPTEMBER - **OLD FASHIONED RALLY** - Detling, near Kent County Showground on the A249. Free CP, free admission, free tables and lots of giveaways from the estate of SK Ted, G3YCN. TI via GB3KN. Details by e-mail to terry@chipperfield.name.

27 SEPTEMBER - **WEST LONDON RADIO & ELECTRONICS SHOW (KEMPTON RALLY)** - Kempton Park racecourse, Sunbury-on-Thames, Middx. OT 10.00. TS, FM, DF, CP free, RSGB, LEC, TI S22 (V44). Paul, M0CJX, 0845 165 0351, info@radiofairs.co.uk [www.radiofairs.co.uk].

27 SEPTEMBER - **BELGIAN NATIONAL AMATEUR RADIO & COMPUTER RALLY** - Hall 'LA Louviere Expo', La Louvière, 50km south of Brussels, access direct from motorway. OT 09.00, TI via repeaters 145.600MHz & 430.325MHz. International TS, FM. Details Michel, ON7FI, on 0032 64 849 596 or by e-mail to michel.dewyngaert@skynet.be [www.on6ll.be].

OCTOBER 2009

2 & 3 OCTOBER - NEW EVENT - **NATIONAL HAMFEST** - brought to you by the RSGB in association with the Lincoln Short Wave Club. George Stephenson Pavillion, Newark and Nottinghamshire Showground, Lincoln Road, Winthorpe, Newark NG24 2NY (close to junction of A1/A46/A17). TS, B&B, CB, C, SIG, RSGB Bookstall, RSGB Services & Committees, DF, FM. Details at www.nationalhamfest.org.uk.

4 OCTOBER - **AUTUMN MILITARIA & ELECTRONICS & RADIO AMATEUR HANGAR SALE** - Hack Green secret Nuclear Bunker, Nantwich, Cheshire, CW5 8AL. 10am, £2.50. Contact Rod Siebert, 01270 623353 or coldwatr@hackgreen.co.uk [www.hackgreen.co.uk].

9-11 OCTOBER - **RSGB CONVENTION** - Wyboston Lakes Conference Centre, Bedfordshire. New for 2009 is a VHF and Up Stream of lectures. Other highlights will be Bob Allphin, K4UEE will be visiting and talking about the KP5 Desecheo DXpedition, Peter Chadwick, G3RZP will looking at the theory of ATUs and Leslie Butterfields, G0CIB will discuss the international beacon project. The ever-popular Contest University will also be running. www.rsgb.org/rsgbconvention.

10 OCTOBER - **3RD CHESTERFIELD AMATEUR RADIO RALLY** - Hasland Village Hall, Eastwood Park, Hasland S41 0AY (M1 j29/30). TI S22 (V44) & GB3EE. OT 10am, TS, C. Details by e-mail rally@chesterfieldrally.com [www.chesterfieldrally.com].

11 OCTOBER - **GREAT LUMLEY AR & ES RALLY** - Great Lumley Community Centre, Front Street, Chester-le-Street DH3 4JD. OT 10.30, £2, TS, BB, C, DF. Details David Barclay, M0BPM, 0191 3888113, e-mail m0bpm@btinternet.com.

18 OCTOBER - **BLACKWOOD AND DISTRICT ARS RALLY** - Coleg Gwent, Risca Road, Cross Keys NP11 7ZA. CP, OT 10.00/10.30, £2. TS, B&B, SIG, C, WIN, £2. Details Dave, GW4HBK, 01495 228515, e-mail ddlewhbk@btinternet.com [www.gw6gw.co.uk].

18 OCTOBER - **GALASHIELS & DISTRICT ARS RADIO & COMPUTER RALLY** - Volunteer Hall, St John's Street, Galashiels TD1 3JX. OT 11.00, £2. TS, B&B, C. Details from Jim, GM7LUN, on 01896-850245 or e-mail gm7lun@qsl.net.

25 OCTOBER - NEW DATE - **NORTHERN MOBILE RALLY** - Richmond School, Darlington Road, Richmond. North Yorkshire. DL10 7BQ (4 miles from A1 Scotch Corner). CP, OT 10.00/10.30, TS, B&B, C, FAM. Details by e-mail from rsars@hotmail.co.uk [www.rsars.co.nr].

31 OCTOBER/1 NOVEMBER - **NORTH WALES RALLY** - John Bright School, Llandudno. TS, RSGB Bookstall, CP. Details from Liz Cabban, GW0ETU on 01690 710257 or e-mail lizcabben@vodafonee-mail.co.uk or Ron Roberts, GW6ZDH on 01492 592884.

NOVEMBER 2009

1 NOVEMBER - **GREAT NORTHERN HAMFEST** - Metrodome Leisure Complex, Barnsley S71 1AN. OT 11.00, DF, TS, SIG, B&B. Details Ernie, G4LUE, 01226 716339.

This list shows all rallies and events we are aware of as at 4 August 2009. If your rally or event is not listed, TELL US ABOUT IT! Send an e-mail to GB2RS@RSGB.org.uk and your event will appear here and on GB2RS. It's free! Guidelines for submissions: Please let us know your event details as early as possible. If you submit by e–mail (to GB2RS@RSGB.org.uk) then we suggest you set your e–mail program to request a 'read' receipt so you can be sure we've seen the details.

TI Talk-In; CP Car Park; £ Admission; OT Opening time – time for disabled visitors appears first, (eg 10.30/11am); TS Trade Stands; FM Flea Market; CBS Car Boot Sale; B&B Bring and Buy; A Auction; SIG Special Interest Groups; MT Morse tests; MA Foundation Morse Assessments; LB Licensed Bar; C Catering; DF Disabled Facilities; WIN prize draw, raffle; LEC Lectures/Seminars; FAM Family attractions; CS Camp Site.

SILENT KEYS

We regret to record the passing of the following members:

Mr H F V Webb, RS53907	
Mr F C Lathwood, G3MUL	25/6/2009
Mr M W Capewell, G3FZR	21/5/2009
Mr G D Kopperl, KA1GS	4/10/2008
Mr R Wilkinson, G4YKO	14/7/2009
Mr CAF Denton, G3DSX	22/5/2009
Mr B Young, G7UAN	8/7/2009
Mr G W J Massey, G3BZR	
Mr M Woodfield, RS 17044	22/7/2009
Mr M J Chell, G0WPZ	14/7/2009
Mr B Farleigh, G4RJ	15/7/2009
Mr W J R Rosser, G7RRN	14/7/2009
Mr P C Ives, G3ASQ	
Mr J Worthington, G3COI	13/7/2009
Mr H F Bang, LA6OM	24/6/2009
Mr J Tye, G4BYV	
Mr A Keeble, G4HPU	23/7/2009
Mr S A Denner, G3PYY	7/2009
Mr A Østereng, LA9PT	5/7/2009
Mr G Grayson, G3YWI	1/8/2009
Mr G E Lumley, G3DJE	26/7/2009
Mr J H Robley, G3TLG	2/8/2009
Mr R A Rothwell, G7JDK	

1 NOVEMBER - HOLSWORTHY ARC RALLY - Holsworthy Community College, Holsworthy, Devon EX22 6JD. OT 10.00, £2, TS, B&B, C. Details Don, G0RQL, 01409 261223.

1 NOVEMBER - FOYLE & DISTRICT ARC RALLY - Best Western White Horse Hotel, Derry, BT47 3PA. OT 12 noon.

15 NOVEMBER - CATS RADIO & ELECTRONICS BAZAAR - 1st Coulsdon Scout HQ, r/o Council Car Park, Lion Green Road, Coulsdon, Surrey. OT 10am – 1pm, £1, B&B, C, DF, CP free. Details Andy G8JAC, e-mail g8jac@btinternet.com.

22 NOVEMBER - PLYMOUTH RADIO CLUB RALLY - Elm Community Centre, Leypark Walk, Estover, Plymouth PL6 8UE. CP, TI, OT 10.15/10.30, TS, B&B, C, WIN.

29 NOVEMBER - BISHOP AUCKLAND RADIO AMATEURS CLUB RALLY - Spennymoor Leisure Centre, Co Durham DL16 6DB. CP, TI S22 (V44), OT 10.15/10.30, £1.50 (U14 free). TS, B&B, C, LB, DF, FAM. Details Mark, G0GFG, 01388 745 353.

7 FEBRUARY 2010 - 25TH CANVEY RADIO & ELECTRONICS RALLY - 'The Paddocks', Long Road, Canvey Island, Essex SS8 0JA (southern end of A130). Free CP, OT 10.30, £2, C, DF, TS. Dave, G4UVJ, 01268 697978 (evenings). [www.southessex.ars.btinternet.co.uk].

18 FEBRUARY 2010 - RAINHAM RADIO RALLY - Rainham School for Girls, Derwent Way, Rainham. Gillingham. Kent ME8 0BX. Trevor, G6YLW, 0771 7678 795.

24 APRIL 2010 - NEW DATE - 4TH CHESTERFIELD AMATEUR RADIO RALLY - Hasland Village Hall, Eastwood Park, Hasland S41 0AY (M1 j29/30). TI S22 (V44) & GB3EE. OT 10am, TS, C. Details by e-mail rally@chesterfieldrally.com [www.chesterfieldrally.com].

CONGRATULATIONS

To the following members whom our records show as having reached 50, 60 or 70 years' continuous membership of the RSGB.

60 years

Mr J A Wilkes	G3FRX
Mr JBG Parker	G3SOL
Spen Valley ARS	G3SVC

50 years

Mr A Shannon	G3KKJ
Mr C A Mattacks	G3KQQ
Mr AE Gwynne	GW3LNR
Mr AS Walker	G3MPW
Mr EH Matthews	G3NPL
Mr R C Shuck	G3NXD
Mr DEJ Coles	G3NYD
Mr I Jackson	G3OHX
Mr P I Park	GM3PIP
Mr J V Mee	G3PJK
Mr MA Hall	G3USC
Mr P Beecroft	G3WVY
Conwy Valley ARC	GW6TM
Mr MJ Bonner	G8ALB
Dr B G Taylor	HB9ANY
Mr D M Willoughby	RS27261

27 JUNE 2010 - WEST OF ENGLAND RADIO RALLY - "Cheese & Grain", Bridge Street, Frome, Somerset BA11 1BE. TS, RSGB Books, C, CP, DIS. Contact Shaun, G8VPG, 01225 873 098, e-mail rallymanager@westrally.org.uk [www.westrally.org.uk].

SPECIAL EVENT STATIONS FOR SEPTEMBER 2009

These callsigns are valid for use from the date given, but the period of operation may vary from 1 – 28 days before or after the event date. Operating details are provided in an abbreviated form as follows: T = 160m; L = 80 or 40m; H = HF bands (30 – 10m); V = 6 and/or 4m; 2 = 2m; 7 = 70cm; S = satellite and P = packet. Please send operational details of your special event station to the RadCom office at least five weeks before publication. The only QSL Bureau sub-manager for special event station callsigns is as follows: Mike Evans, 322 Heol Gwyrosydd, Penlan, Swansea SA5 7BR, e-mail mw0cna@ntl world.com. Will organisers of special event stations please ensure that they lodge plenty of envelopes with their sub-manager?

01 SEPT	GB2NNC	North Norfolk Circuit	Sheringham	LH27	G0HYZ
	GB4SMA	Saint Marys' Ash Vale	Surrey	LH	G1LKJ
	GB2LWR	Lincolnshire Wolds Railway	Ludborough	LH27	G4YHP
	GB80RBP	RAF Bentley Prior	Stanmore	TLHV27	G0CAG
	GB0ROC	Royal Observer Corp	Machynlleth	LH27	M0MAO
	GB0PHS	Park High School	Kings Lynn	TLHV27	G1KLP
	GG100GN	Guides Northants	Northampton	TLHV27	M5AFY
	GG100KL	Kings Lynn	Kings Lynn	TLHV27	G1KLP
04 SEPT	GB4AC	Age Concern	Isle of Wight	LH27	G0NTH
	GG100GGL	Girl Guiding Leicestershire	Belvoir Castle	LHV27	M0DBG
	GB1ASG	Astley Scouts & Guides	Manchester	L27	M1VIP
05 SEPT	GG100UG	Upton Guides	Pontefract	LH27	G0BPK
	GG100SG	Girl Guides 100 Sir Garth	nr Nantgaredig	LHV27	GW7VJK
	GB2SWW	Second World War	East Kirby	L	G0EUN
07 SEPT	GB0CAS	Campton All Saints	Campton	L	G3JNB
	GB6SMD	St Matthews' Church	Worthing	LH27	G6JVT
09 SEPT	GB1WT	Wickham Telegraph	Wickham	LHV27	M0XIG
10 SEPT	GB2TAM	Thorpe Abbotts Museum	Diss	LH27	M0IEO
	GB2SNW	St Nicholas Withernsea	Withernsea	TLH2	G4HYY
11 SEPT	GB0AWE	All Wales Explorer Scouts	Crickhowell	LH	GW7VJK
	GB0SMW	St Michaels' Workington	Workington	LH27	G0ORO
	GB1SOC	St Osmonds Church	Derby	LV	G1VAB
	GB2GHW	Gloucester Heritage Weekend	Gloucester	LHV27	G3TDT
12 SEPT	GB2CCA	Christ Church Abingdon	Abingdon	27	M0CIW
	GB2CCC	Christ Church Cathedral	Oxford	LH27	G3NGX
	GB4SMT	Saint Marys' Todmorden	Todmorden	TLH	G4RCJ
	GB2ANG	Angel (of the North)	Gateshead	L27	G7SPN
	GB4BLR	Battlefield Line Railway	Shackerstone	LHV27	M0JAV
	GB0MTM	Mount Tabor Methodists	Halifax	TLH2	G0PFH
13 SEPT	GB2STI	Steam Trains Ireland	Whitehead	TLH2	GI0KPF
	GB4WWM	Wellesbourne Wartime Museum	Wellesbourne	LH	G0MRH
14 SEPT	GB0SIS	St Sampson Infant School	Cricklade	LHV27	M1WIN
15 SEPT	GB1NCC	Northallerton College Centenary	Northallerton	TLHV27	M0RBY
18 SEPT	GG100GGR	Girl Guiding Renfrewshire	nr Kilmalcolm	LH27	MM1AWV
	GB4BVF	West Wight Carnival	Isle of Wight	LH27	G0VZV
	GB0BSR	Bedfordshire Steam Rally	Biggleswade	LHV27	M0AZZ
20 SEPT	GB4WLR	West Lancs Railway	Hesketh Bank	L27	G1PIE
25 SEPT	GB1AO	[one] And Other	Trafalgar Square	LV27	G8CIX
	GB4DSR	Darlington Steam Railway	Darlington	LHV27	G1JER
	GB6VMR	Vintage Machinery Rally	Richmond (Yorks)	LH2	M0DCD
26 SEPT	GB0HBL	Helston Branch Line	Helston	TLH	G7THT
27 SEPT	GB4CHC	Crewe Heritage Centre	Cheshire	LH2	M0JCD
28 SEPT	GB0WRH	Waverley Route Heritage Railway	Roxburghshire	LH2	GM7LUN

RSGB MEMBERS' ADVERTISEMENTS

RSGB members wishing to place an advertisement in this section by post should use the official form printed in RadCom each month and send it to 'Memads', RadCom, RSGB, 3 Abbey Court, Fraser Road, Priory Business Park, Bedford MK44 3WH. No acknowledgement will be sent. Ads not clearly worded, or which do not comply with these conditions will be returned. If an ad is cancelled no refund will be due. An advertisement longer than 60 words will be charged pro rata.

The RSGB believes that it is inappropriate for members trading in whatever way in radio equipment to place members' advertisements. We therefore regret that we are unable to take such advertisements, although we do welcome these in the 'Classified' advertising section of RadCom. The editor reserves the right to refuse any advertisement for any reason. In such matters, the editor's decision is final.

The RSGB accepts no responsibility for errors or omissions, or for the quality of goods for sale or exchange. Each advertisement must be accompanied by the correct remittance, as a credit card payment, cheque or postal order made payable to the Radio Society of Great Britain.

Please note that because this is a subsidised service to members, no correspondence can be entered into. Members may submit one photograph of equipment being sold / wanted at an additional cost of £5.00. This must be a .jpg or .gif file and the file name must be included on the Order Form. The photograph may be e-mailed to radcom@rsgb.org.uk or sent on a floppy disk or CD.

Licensed members are asked to use their callsigns and QTHR, provided their addresses in the current edition of the RSGB Yearbook are correct. RS members will have to provide their names and addresses or telephone numbers. Please include your town and phone number in the free boxes provided to assist readers. Advertisements will be placed in the first available edition. Please do not send Members' Advertisements to Danby Advertising (advertising agents). The closing date for copy is the first day of the month prior to publication, eg the deadline for the May issue is 1 April.

Warning: Members are advised to ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The 'purchase' of goods legally owned by a finance company could result in the 'purchaser' losing both the goods and the cash paid. Members' Ads also appear on the members-only website: www.rsgb.org/membersonly/membersads

The Members' Ads order form is published below. If members do not wish to cut the form out of the magazine, photocopies will be accepted, as will recent copies of the form from previous months. As a last resort, members may also send in their advertisements on separate sheets of paper, but if you choose to do this, you must supply an accurate word count and, of course the correct fee in the normal way.

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EXAM REWARDS

Sue, M0HUG

Having just finished running my first Foundation course, I thought I would write to encourage other amateurs to think about becoming an instructor. I was the lead instructor with Alec, M0PUD my very able assistant. The course was run for seven young people ranging in age from 13 to 18 and with no prior experience seemed quite a daunting task.

The course was held over three weekends; one day only for two of them, then a complete weekend with the exam a fortnight later preceded by a fun revision session. Throughout the course, we tried to make it as fun and interactive as possible. As it was our first course we were very much 'playing it by ear' and adapted our plans to what the young people needed. The weekend of the exam we held a short fun revision session, which included surprise fun questions like "What is the colour of the instructors socks!" it all helped to relieve the tension about the exam. Alec and I had great fun when it came to laying the tables out for the exam, what had seemed a very large hall now seemed exceedingly small! We did fit them all in just in time for when the invigilator arrived.

We were exceedingly happy and surprised when all seven passed. The young people were duly rewarded with their pass certificates and a piece of chocolate cake to celebrate. Our reward was from the youngsters themselves in seeing their excitement and pleasure.

To anyone I would say have a go, it is a very rewarding way of sharing the hobby and the sharing doesn't stop with the exam.

Congratulations to Sue and her Foundation exam successes. We wish them many more. We also hope she enjoys the use of the VX-3E, kindly donated by Yaesu UK.

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STILL ENJOYABLE

Tom, GM4FDM

I couldn't help but notice a short e-mail on the CDXC Reflector about a station working a couple of KH6 stations yesterday morning. For those newer members who might need to check a prefix list, these are Hawaii call signs. I couldn't resist getting up this morning early and trying to work into the Pacific. I'm afraid the bug is still as strong as it was 30 years ago when I got my licence.

I can remember the thrill of short wave listening in those days before cell phones and the internet when I was smitten with the ability to talk to people in far off lands and KH6 – Hawaii was somewhere you only saw on TV (remember *Hawaii 5-O*?). In those days I operated with an old KW Viceroy and a dipole and I'm afraid to say it took me several years to work my first Australian or Hawaiian station.

Why do I tell you this? It was nice to see in this month's *RadCom* the pictures of many new amateurs proudly holding up their Certificates. Will they still be holding up their certificates in six months time I ask, because I seldom hear any of them on the air. Perhaps, like me in the early days, they are afraid of trying their CW skills or still a little mic shy, or perhaps they are afraid they won't be able to work long distance with a piece of wire for an antenna.

As I said, my first antenna was a simple home-made 20m dipole – or, put another way, a piece of wire – which I made up as a short wave listening antenna. When I obtained my licence, I had to trim it a little to lower the SWR, but I used the same antenna for over 2 years, using 100 watts or as near 100 watts as I could muster.

I urge the newcomers of today to get up their own piece of wire. I used a telephone pole at the bottom of the garden for a support when BT wasn't looking. Try out your new found and hard won skills. You will always find someone willing to slow down to your speed. Have a go. The DX Bug is out there, you just have to find it. It will seem hard at first when nobody replies to you CQ call, but persevere. Respond to the CQ calls of others. Many times you will be overpowered by louder stations, but hang in there, Rome wasn't built in a day. Please excuse me now, I hear another DX station calling.

RECYCLING YOUR OLD *RADCOMS*

Clive Harding, G1XOZ

Having been a member of the RSGB for some years now I have, on occasion, found myself with a pile of *RadCom*s from the last year(s) taking up space. I have happily spread them around people I know, most of them radio amateurs that are not members of the RSGB, hoping to interest them enough to join up.

But, of late, I have had a different idea, stemming from my many visits to my local hospitals and my GP, I now have to have regular blood test to test my INR (many I'm sure know all too well why). Have you sat waiting for your time with the specialist or doctor, reached over and flipped through the piles of magazines hoping to find something to take your mind of the wait? I have, and hence I have been 'spreading the word of radio' through the simple act of leaving something interesting for someone else to read.

I have been leaving some of my older *RadCom*s in waiting rooms around and about as I'm sure they are of more interest than 4 or 5 year old magazines that usually lie around? And hey, you never know, there may be a new radio amateur waiting in that room.

THANK YOU RSGB

Derek, 2E0DEQ

There I was, sat at my desk trying to write an interesting letter when I got onto the news about Ofcom releasing the UK callbook. The internet forums are full of various opinions on the subject and I am sure *RadCom* readers will want their say. I support the RSGB totally on their intervention, having worked under the Data Protection Act within the Civil Service, I believe Ofcom have been totally irresponsible and have no respect for the amateur community. We have to protect our personal information and know how it is to be handled by the people we entrust it to.

I have no problem with the RSGB releasing a callbook and charging for it, only serious radio fans would want the information and why shouldn't the RSGB have this income they have worked hard to keep the hobby advancing through the years and we need to support the RSGB as they have supported us. As for Ofcom, I have a problem with Ofcom releasing the information in such a way that you can Google your own callsign and see your name and home address in a matter of seconds, what a disgrace. I finish with a big thank you to the RSGB for keeping are best interests at heart, it's a shame not everybody realises that fact.

BEING A BEGINNER

Annas, 2M0BWM

I passed the Foundation licence exam in November 2008 and, after working abroad for a spell, returned to sit and pass the Intermediate exam. During the short time I have been a licensed amateur, I have built a few kits, leading me closer and closer to a multiband homebuilt station.

I found that I really enjoy the construction aspect of the hobby, dare I say it, even more than going on air.

It isn't only the sense of accomplishment from soldering hundreds of components onto a PCB, but also the fact that there isn't the frustration of calling CQ, hearing somebody tune up to me, only to deliberately key on top of me! Quite annoying to say the least, especially since I was told by some old timers at the radio club that they have a very good idea who the culprit is… I was told that it is a person with deep loathing towards M3 callsigns. The shame is that everyone, myself included, have been reluctant to report this person. Nobody really wants to see his licence revoked. Then again, I might change my mind…

This lovely person may have a similar colleague south of the border, as the exact same thing happened while I was operating /P at the Glastonbury festival… Not sure what the reason was this time, as I was using my newly acquired Intermediate call. Perhaps a dislike of QRP?

So far, these individuals have been the exception to the general attitude of amateurs that I have met, both online and in person at the West of Scotland Amateur Radio Society. The latter group, especially Ross, GM7WED, has led a group of us newbies through both the Foundation and Intermediate courses, as well as

preparing some of us for the Full licence exam in the beginning of August.

I wonder if getting an M0 call will make me an equal citizen of the air? Or would I be loathed for being a Johnny-come-lately, unlike a real gentlemanly G call?

Ach, well. See how it goes…

Martyn, GW6ITJ

I sympathised with Paul, M3UEF when I read in June's TLW about *RadCom* articles being too technical and I am sure he is not alone.

I can assure him that being a G is not a guarantee of understanding all the articles! I'm sure all of us find some months more onerous to read than others. Then we get a month where the articles are just right, with excellent opening sections to tempt the reader to read on and maybe even do a bit of research.

As an authoritative resource, *RadCom* will always contain some articles that leave some of us cold, fair enough. There are articles that are 'bleeding' edge and necessarily advanced and focused on a limited audience. Balance is the key.

But Paul and others should not be discouraged. If an article is too technical but there is a desire to know more then try to e-mail the author, ask at the club or even better, ask on air.

For less focused research a spread of monthly reading is a great way to learn and I've recently learnt a great deal from the US magazines, they just have a different slant on things that sometimes opens the mind a little. If you can't afford 'yet another magazine' on pain of death from the XYL (mine knows nothing of my 'CQ' habit) then try 'World Radio Online' which is an excellent free download. It has opened up new insights into US operations and DXpeditions for me and with Krusty olde Kurt's Aerials column on aerials is always a good humoured read (I think it's G3LDO's alter ego!).

Maybe a 'beginner's corner' could become a 'Regular' with helpful hints and tips to encourage the new starters and youth to understand more and feel more included?

Jeanie Hill, 2D0JEA

Thank you Mr Harris, G7NJB, you hit the nail on the head. Some of the articles are a bit over the head of a lot of us Foundation/Intermediate licence holders. I'm luckier than some not only is my other half a full licence holder, he's an electrician and very much into the home brew stuff. I may not have the inclination nor the knowledge to build a transceiver, ATU, etc, but I think I know enough to notice SWR problems and if my radio won't tune on 80m to go out and check the antenna. I have a small radio/receiver kit that I am just starting to build and, when finished, will probably sit next to the egg timer I built on the kitchen window sill. This is about my ability, I admit. A beginners' blog sounds great, who knows I may be able to keep my ageing TS-430S going longer and leave all the singing all dancing cost plenty £££££ rigs to those who can afford them. Either way, I will stick to the lovely long chats and the friends I have all over the world and the only contest I worry about is who gets to the shack first, not how many times an hour I get to say my callsign and 5/9!

INTERFERENCE

Andy Hearn, G3UEQ

With regard to the comments made by David Oliver, G4HMC, I too decided to contact Ofcom regarding BT Vision interference from my neighbours house. This was done on 23rd June and I received a visit on Friday 3rd July.

He was most helpful, measured the field strength of the interference and confirmed there was a problem from this equipment. He was most courteous, we spoke to the neighbour who also was quite happy to have his details passed on to BT, who will remove the offending equipment and hardwire his house free of charge. I do encourage other people to take this route as it adds more weight to the argument for removal of these awful devices.

UNDERSTANDING PROPAGATION, USING WSPR

Alan, G4ZFQ

Thanks to Steve, G0KYA, for his article on WSPR in the August *RadCom*. This software is certainly good for indicating potential communication quality between participating stations. However, I am not convinced it is a good tool for investigating propagation, especially on the lower frequencies where a simple signal to noise reading may be interpreted incorrectly. The difference between day and night noise levels can vary by more than 20dB. He quotes tests by F6IRF who interpreted differing signal to noise readings between two antennas to mean the signal on one antenna was increasing and proving his beliefs.

I am not saying this is not true but I have carried out similar experiments using techniques learnt from Steve, measuring signal and noise independently.

I have monitored the Ecuador time signal on 3810kHz, recording signals from a horizontal wire and from a vertical Butternut. Over a period of several weeks, I noted that some times after sunrise the received noise on the vertical dropped more than it did on the horizontal. In WSPR this would just give a higher signal to noise figure, it might suggest that the signal strength increased, but it did not.

In a modified form, WSPR could be a good tool. It identifies weak transmissions, if it gave separate signal and noise readings and used with a receiver with AGC switched off it would do what is required.

If anyone wishes to see my results go to http://homepages.wightcable.net/~g4zfq/3810-0409.htm. Look at the bottom two jagged lines for the noise traces. 'Googling' 'G4ZFQ greyline' may save typing that lot!

You are quite right - WSPR can only tell you the signal to noise ratio, which as you say can lead you to believe you are seeing a signal increase, not a drop in noise. However, the good thing about WSPR is that there are a lot of users and it is easy to use. While you can perform better tests with something like Spectrum Lab (which could measure the noise level at the same time) this is actually more difficult to set up and you need to arrange for someone to put a signal up. WSPR can also handle multiple signal sources and the instant web reporting makes it useful. I like to think of WSPR as yet another tool for propagation research, but not the definitive answer! Steve, G0KYA

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NEW 40m BANDPLAN

Brian Waddell, GM4XQJ

Since the introduction of the new IARU Region 1 40m bandplan there seems to be a great reluctance by many UK data operators to use the correct part of the band 7.040 to 7.050MHz. Some of the PSK-31 ops are getting quite abusive to CW ops operating in the correct part of the band for CW, which is now 7.000 to 7.040MHz.

Another problem is the number of GB special calls operating in the new data section. I understand many amateurs do not like bandplans but they are there for a reason.

James Hill, G0FHM

I'm well aware that bandplans are a 'Gentlemen's Agreement', however, there are a few amateurs in the Horncastle/Boston area of Lincolnshire who regularly use 70.450 as their 'chat frequency'.

Sure, there may be no activity in their particular area and they may well have the whole of 4m to themselves. But, what if there is a tropo event? On a number of occasions now, 4m has 'opened' to tropo, and these people ragchewing on .450 has caused all sorts of problems when trying to work 'Weak DX' on FM.

Here is a plea: If you can hear other stations on the calling frequency, then the chances are that they will be hearing your signals too. Normally, under flat conditions, one of the group is just about strong enough to lift the squelch on my radio, but still be unintelligible with the end result being I have to raise the squelch, with the possibility of missing other stations.

4m is relatively under used and, due the actions of a few, it is even less used, as others cannot use the calling frequency as it is intended!

Please, stick to the bandplan and everybody will be happy!

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*Weight: 5kg *Cable: 7-core cable (not supplied)
*Requires MC-2 lower mast clamp if mounting on pole

£559.95 D

RC5-3 £679.95 D
Same as above but with preset control.

RC5A-3 £929.95 D
Same as above but heavier duty.

Hari 200W Baluns
For HF Antennas

These German baluns are available in versions: 1:1; 4:1; & 6:1. They are designed to be used as dipole centres and are fitted with SO-239 sockets 3 - 30MHz . £29.95 A

Fujikon
Noise Cancelling Headphones

NC-2

NC-4

These Active Noise Cancelling Headphones, from Fujikon, blockout annoying ambient background noise. Powered by an AAA battery noise cancelling is controlled by an on/off switch. NC-4 has a folding design for easy storage.

£16.95 A £17.95 A

Watson
Power Supplies

Power-Mite-NF

Compact Cont. 22 Amp Switch Mode Power Supply with variable voltage & noise offset. £69.95 C

Power-Max-25-NF

22 Amp cont, 25 Amp Peak, Switch Mode Power Supply with variable voltage, V/A meters, & noise offset. £89.95 C

Power-Max-45NF

38 Amp cont, 45 Amp Peak, Switch Mode Power Supply with variable voltage, V/A meters, & noise offset. £119.95 D

W-25AM £89.95 C
25A (30A Peak) Variable PSU with Meters.

Power-Max-65-NF

65 Amp Low Noise power supply. Patented Noise Control that permits you to move any noise away from the operating frequency. £209.95 C

W-3A £24.95 C
3A Cont. (5A Peak) Fixed Voltage PSU.

W-5A £29.95 C
5A Cont. (7A Peak) Fixed Voltage PSU.

W-10AM £59.95 D
10A (12A Peak) Variable PSU with Meters.

W-10SM £49.95 D
10A Cont. Switch Mode Power Supply.

SEC-1223 £89.95 D
23 Amp Switch Mode PSU

Manson
Power Supplies

EP-925

30 Amps Peak

A general purpose 3-15V DC, 25A (30A peak) power supply able to provide the needs of the modern 100W HF transceiver. **Dual analogue meters *Over current protection *Large power terminals for rigs *Quick snap connectors for ancillaries*

£99.95 D

Avair "Value"
Power SWR Meters

Great Value Superb Performance!

All models have 12v backlight and include DC cable

AV-201 £49.95 C
Large scale, 1.8-160MHz, 5W, 20W, 200W, 1kW

AV-400 £49.95 C
Large scale, 140-525MHz, 5W, 20W, 200W, 400W

AV-601 £69.95 C
Large scale, 1.8-160MHz(S1), 140-525MHz(S2)

AV-1000 £79.95 C
1.8-160MHz, 430-450MHz, 800-930MHz, 1240-1300MHz. 5W, 20W, 200W, 400W

Cross Needle Models Even Lower Prices!

AV-20 £34.95 C
Cross needle, 0-30W, 0-200W, 3.5-150MHz

AV-40 £34.95 C
Cross needle, 0-15W, 0-150W, 144-470MHz

Watson
Dummy Loads

They feature high tolerance, air-cooled housings with extremely efficient heat ducting. This results in a realistic continuous power rating, together with an impressive VSWR curve.

DM-150PL £34.95 C
DC-1GHz PL-259 30W cont 100W 90 secs

DM-200N £49.95 C
DC-3GHz N Type 35W cont 100W 2 mins

Miracle Whip
Antennas

This is a tuneable telescopic whip covering 3.5 to 460MHz. It will take up to 25 Watts pep and is fiited with PL-259 plug. Great for FT-817 & IC-703 or any other QRP radio. Amazing results can be achieved and with a short earth radial wire it is even better.

£109.95 C

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www.jayceecoms.com

Watson & Peet Bros. Weatherstations

W-8681 Wireless Weather Station

* LCD Touch Screen
* Atomic Locked Date & Time
* In / Out Temp.
* Wind Speed & Direction
* Rain Gauge
* In / Out Humidity
* Barometer with Trend Data * Forecaster & Weather Alarm * USB Connection to PC * PC Software Control & Data Programme * Historic Data Storage & Display

W&S £79.95 D

W-8683 Compact Weather Station

* Digital Clock 12 / 24 hours
* Radio controlled time
* Auto daylight saving
* Alarm clock
* In / Out temperature
* In / Out Humidity
* Min / max temp. & humidity
* Barometer 24 hr. history
* Forecaster display
* Perpetual calander
* Remote wireless sensor
* Pressure Alarm

W&S £24.95 C

W-8682 Wireless Weather Station

All you need to obtain a complete weather picture. The W-8682 is very similar to the W-8681 weather station, it offers all the same weather measurements & external sensors for temp, wind & rain. However, it does not feature a touch screen, or USB port for weather data.

£69.95 D

W-8684 Clock & Temp Display

- Digital Clock 12 / 24 hours
- Inside temperature
- Outside temperature
- Min / Max temperature.
- Remote wireless sensor
- Additional sensors option
- Panel size: 11 x 7.5cm

W&S £10.95 A

RadarBox™ 2009 - Accurate and Reliable

The First ADS-B Receiver in Space

Designed by Professional Pilots

See Local Traffic in Real-Time

Why Do So Many People Prefer RadarBox?

The Only ADS-B Receiver with:

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- *No Add-On Programs Required*
- *NASA Maps Overlay*
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Powered by AirNav Systems The Most Trusted Name In Flight Tracking

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Waters & Stanton Exclusive Distributors

ACARS Decoder Software

Stand alone or integrate into RadarBox programme.

£99.95 C

RADAR-COM Complete Antenna System with All Cables

Radar-Extender Antenna, All Cables required, Pre-amp & Bias-T. You Just Need A 12V 1 Amp PSU.

RADAR-COM-10 10m cable **£249.95 A**

RADAR-COM-20 20m cable **£289.95 A**

Tigertronics SignaLink Interface

Tigertronics Signalink Sound Card Interfaces do not require the use of a com port to trigger PTT on the rig.

SignaLink have internal links which make them compatible with most of the rigs on the market. Radio lead is supplied, state which when ordering. Extra mic leads are available.

SL-USB-4R	4-Pin Round	**£89.95 C**
SL-USB-13PDI	Icom 13-Pin Din	**£94.95 C**
SL-USB-13PDK	Kenwood 13-Pin	**£94.95 C**
SL-USB-8R	8-Pin Round	**£89.95 C**
SL-USB-RJ11	Modular RJ-11	**£89.95 C**
SL-USB-RJ45	Modular RJ-45	**£89.95 C**

Diamond Power Supplies

New Lower Prices!

GSV-3000

*Output voltage: 1 - 15V DC
*Output current 30A continuous
*Built-in cooling fan
*Supply 230V AC 50Hz
*Size 250 x 150 x 240mm
*Weight 9kg

£199.95 D

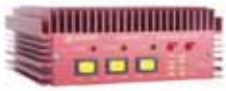
GZV-2500 **£139.95 D**
Output 25A, 5-15V DC, supply 230V AC Switch mode over volts protected. 21x11x22cm

GZV-4000 **£189.95 D**
Output 40A, 5-15V DC, supply 230V AC Switch mode over volts protected. 21x11x30cm

GZV-6000 **£369.95 D**
Output 60A, 1-15V DC, supply 230V AC Switch mode over volts protected. 21x11x36cm

Microset HF Linear Amplifier

27-200T *200W



This new amplifier is ideal for lower powered radios. Drive levels of between 3-125W (switched ranges) give 120-200W output. makes your FT-817 a 100W + radio! For maximum power you need a PSU (like Watson W30AM) that delivers up to 30 Amps. For customers purchasing with W-30AM psu, phone for package deal.

£179.95 C

Nissei X-Needle Meters

NEW

A Cross Needle Meter means no more having to adjust for full scale deflection. Instant VSWR and power readings. This new range are amazing value and all have PEP selectors & fwd/reflected average/PEP.

RX-103	1.6-60MHz 20/200W/2kW	**£49.95 C**
RX-203	1.8-200MHz 2/20/200W	**£49.95 C**
RX-403	125-525MHz 20W/200W	**£49.95 C**
RX-503	1.8-525MHz 20W/200W	**£69.95 C**

Ameritron HF Linear Amplifiers

New Lower Prices!

AL-811XCE

Ideal for UK Licence Limits. Low cost valve replacement.

- *1.8 - 30MHz (Inc WARC)*
- *Output: 600W PEP (800W AL811HXCE)*
- *Valves: 3 x 811A • Weight: 14.51kg*
- *Size: 380 x 350 x 210mm* **£899.95 D**

AL-811HXCE **£999.95 D**

AL-800XCE

This linear is a real workhorse and will coast along at normal UK limits. This means that everything is kept very linear. For contests it can be run endlessly and of course the gain available from this linear far exceeds any normal HF beam - you get around 9dB gain!

- *1.8 - 30MHz (inc WARC)*
- *Output: 1.25kW • 3CX800A7*
- *Voltage: 2,300V • Weight: 23kg*
- *Size: 420 x 369 x 216mm* **£2195.95 D**

AL-800HXCE 2x3CX800A7 **£3199.95 D**

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eBay

Go to www.wsplc.com then click on the link to our eBay shop

DCI Band Pass Filters

New Lower Prices!

Razor Sharp Professional Filtering

DCI-145-2H **£199.95 C**
144 - 146MHz, 68dB @ 136MHz / 55dB @ 155MHz. Less than 1dB loss. 200W. 30 x 8 x 13cm. SO-239

DCI-145-2HN **£219.95 C**
144 - 146MHz, 68dB @ 136MHz / 55dB @ 155MHz. Less than 1dB loss. 200W. 30 x 8 x 13cm N socket

DCI-435-10C **£239.95 C**
430 - 440MHz, 47dB @ 415MHz / 50dB @ 455MHz. Less than 1dB loss. 200W. 30 x 8 x 19cm N socket

DCI-145/435-DB **£299.95 C**
Similar performance to above 2m & 70cm filters. 200W Duplexer inside. N socket. Designed for single coax dualband operation.

Watson Mobile/Portable Whip

Multi-Ranger-9

1000's Sold! ***Back In Stock!***

80m - 70cms Mobile/Portable Whip

Great value. Fitted PL-259 base, it covers all bands (ex WARC). For portable use, just mount on suitable SO-239 base and add radial wires. Bandswitching uses the wander plug method. Just like the old Outbacker, but a fraction of the price.

£39.95 C

W&S @ Jaycee, 20 Woodside Way, Glenrothes, Fife, KY7 5DF. Tel: 0845 5050128

HOW CAN THE YAESU FT-450AT BE ANY GOOD WHEN IT COSTS LESS THAN £650?

When the FT-450AT was recently introduced, customers queried how could a rig offering proper IF DSP, Auto ATU, 100 Watts on HF & 6m, a roofing filter plus a whole host of other class leading features be any good when it costs less than £650?

To answer, in a recent review in Radcom, Peter Hart wrote: "For a budget priced radio covering HF and 6m, the FT-450 is an excellent all-rounder for general use. With a high level of features for SSB, CW and data modes, easy to use and a good overall performance, it will suit the home station operator or someone looking for a lightweight radio which is easily transportable".

THE UK'S PREMIER REVIEWER CONFIRMS THAT IT IS!

FT-450 shown with optional Bail Stand.

CDXC portable package including the FT-450AT & MyDEL MP-8230 23Amp PSU.

Chairman of the CDXC, Neville Cheadle G3NUG says:

"The FT-450 is a great little rig - I really like it. Easy to operate, lightweight and ideal for a home station, DXpeditions etc. CDXC have chosen to use three of these rigs in their new portable stations"

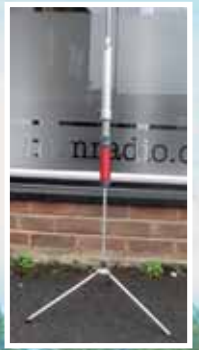
Yaesu FT-450 without ATU: £589.95

Yaesu FT-450AT with ATU: £639.95

Options:

MyDEL MP-8250 23Amp PSU	£69.95
Stand-FT450 Bail Stand	£19.95
ATU-450 Optional internal ATU	£159.95
MMB-90 Mobile Bracket	£18.95
MHG-1 Carry Handle	£9.95
MH-36E8J DTMF Mic	£69.95
MD-100 Desk Mic	£149.95
MD-200A8X Super Deluxe Desk Mic	£199.95
YH-77STA Headphones	£54.95
MLS-200 High Power weatherproof speaker	£27.95
ATAS-120A Fully Auto Mobile 7.50MHz Antenna	£239.95

Add a Super Antenna Chapstick MP-1 80-6M portable antenna system including tripod etc for only £155.85



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