RSGB

D-i-Y RADIO

AN INTRODUCTION TO AMATEUR RADIO - FOR BEGINNERS OF ALL AGES

September-October 1994 Volume Four: No 5

Tune in to Jamboree on the Air - 15/16 October

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COVER PICTURE:
The six element multiband antenna and mast used at the JOTA special event radio station GB4AGG.

comment

DURING SEPTEMBER we are going to be at Live '94, the Consumer Electronics Show at Earls Court, London. This year's format will be a little different from 1993, in that there will be an 'Amateur Radio Village' sponsored by the RSGB, Icom (UK), Yaesu (UK), Kenwood UK, Lowe Electronics, Waters & Stanton, Martin Lynch The Electronic Hobbies Exchange Centre, and PW Publishing.

The main aim will be to introduce amateur radio to the general public. So if you can get along to Earls Court between 20 and 25 September, then call in to the RSGB Stand and introduce yourself. You can also take part in the free draw which takes place each day, and perhaps win one of the many prizes on offer during the show.

The show organisers have given five pairs of tickets for *D-i-Y Radio* readers. If you would like to be included in the draw for these, then let me have a postcard with your name, address and a daytime telephone number by Monday 12 September. Winners will be sent tickets that day

Marcia Brimson, 2E1DAY.

CONTENTS

Raratonga - one of the many beautiful islands the Operation Raleigh ship visited during its expedition (page 8).

CONSTRUCTION CODE
- FOR THE COMPLETE BEGINNER . . . . (1 symbol)
- REQUIRES A LITTLE EXPERIENCE . . . . (2 symbols)
- FOR THE MORE EXPERIENCED (3 symbols)

The QSL card sponsored by the RSGB at the Royal Tournament.

[This company has also supplied the enclosed leaflet which explains the art of soldering correctly - Marcia]

The Operation Raleigh QSL card used by John Layton, G4AAL (see page 8).

Managing Editor: Mike Dennison; Editor: Marcia Brimson; Prod Ed: Sid Clark; Tech Ed: Peter Dodd; Draughtsman: Bob Ryan; Prod Asst: Jennifer Preston; Ed Asst: John Davies; Secretary: Erica Fry. *D-i-Y RADIO* is published six times a year by the Radio Society of Great Britain, Lambda House, Cranborne Road, Potters Bar, Herts. Filmset by JJ Typographics Ltd. Printed by Southernprint (Web Offset) Ltd. ISSN No: 0959-843X.

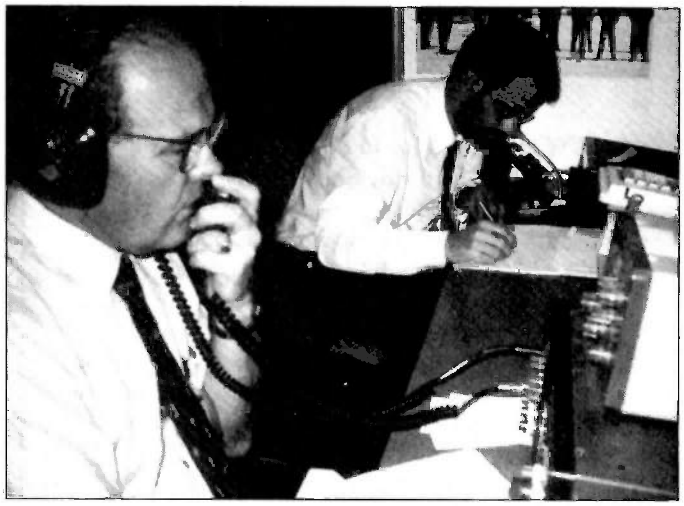
Patients' Radio Link

A GROUP of Canadian radio amateurs has provided patients in Mississauga Hospital, Ontario, with their own amateur radio station, callsign VE3TMH. The idea was that long-term patients would feel less isolated and *The Canadian Amateur Radio Magazine* says: "They're confined to the hospital, but amateur radio allows these patients to travel the world by radio". One patient, too weak to operate a Morse key, was built a special electronic key with two posts connected with a beam of light. By moving his finger up and down through the beam, the break of light produces dots and dashes, and transmits Morse code. The station operates on the first and third Sunday of each month - so listen out for them.

ATC at the Royal Tournament

THE AIR TRAINING Corps is now becoming a regular annual feature as part of the RAF Stand at the Royal Tournament, and this year the familiar callsigns of GB4ATC, GB8RT and G3ATC were back on the air.

The radio, an IC-781, was kindly loaned by Icom (UK), a 2m rig and power supply by Martin Lynch and a 2m antenna by Waters and Stanton. During the first day of the show, the station operators, Ray Degg, G0JOD, Malcolm Wood, 2E1BFL, and John Maunder, G0PKU, ably assisted by Dennis Goodwin of Icom (UK), provided the final tweaks to the rigs and antenna to ensure that all was working well.



Alan Butcher, G3FSN, and John Maunder, G0PKU, operating GB8RT.

In all, just under 1000 contacts were made during the 11 days of the show ranging from Japan to Canada and the United States. All radio amateurs contacted will receive one of the special Air Cadet QSL cards, donated by the RSGB and the British Forces Broadcasting Service.

JOTA Time Again!

THIS YEAR'S Jamboree on the Air takes place on 15 - 16 October, and this is the largest event in the international world of Scouting and amateur radio.

The RSGB has prepared a list of all known participating stations worldwide. Send an SASE to the Amateur Radio Dept, RSGB, Cranborne Road, Potters Bar, Herts EN6 3JE for this JOTA list.

The Gilwell Park amateur radio station will be operational over the weekend and, according to the Scout Association Press Release, it is planned that this will be 'manned' entirely by Novice operators - you never know perhaps even your very own Editor will be on the air!

Denys Hall, GD4OEL, operating GB2MSR in the 1993 Isle of Man JOTA.

- Did you know that there are Morse keys designed for people who can only breathe? With these keys the user blows out or sucks in. One way makes dots and the other way makes dashes.
- Looking for a Pen Pal in Poland? Piotr Ochwal, SP9TNM, a Polish Novice (and member of the G-QRP Club) is interested in transmitting/receiving and would like to write to other Novices. His address is PO Box 41, PL41900 Bytom, Poland.
- Novice Licensee Glenn has produced an economic and attractive Morse Key (the 'LEM Key'), specially designed with the Novice in mind. Details from LEM Keys, Springfield, Staynall Lane, Hampleton, Blackburn, Lancs FY6 9DR.
- For details of RAE and Novice RAE courses in your area, contact the Amateur Radio Department of the RSGB, Cranborne Road, Potters Bar, Herts EN6 3JE. Send an SASE for a list of local courses.

The Light Measuring Photometer

An Instrument for Measuring Light Intensity

BEFORE THE DAYS of automatic cameras a photographer would use a light meter (Photometer) to measure the light level and then manually convert the light reading to shutter speed and lens aperture settings to ensure that the film exposure was correct.

Most modern cameras have a light measuring meter built in, which controls the aperture setting of the camera lens automatically.

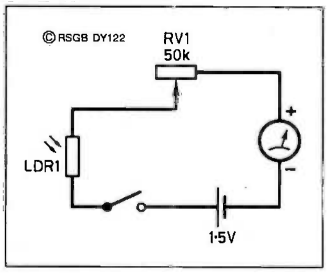


Fig 1: Circuit diagram of photometer.

HOW DOES IT WORK?

THE OPERATION OF the circuit in **Fig 1** is based on a component called a **Light Dependent Resistor** (LDR). In bright light the resistance of the LDR is low - about 1kΩ. In the dark its resistance is high, up to 10mΩ. When an LDR is connected in series with a battery and a meter the rate of current flowing will depend on the light intensity at the LDR. In this circuit a variable resistor, RV1, is connected in series with the LDR, battery and meter. This is so that the range of the meter can be set, in other words you want the meter to read full scale deflection when the light intensity is at maximum and to read zero when the light level is very low.

This instrument is very simple to make. The items required are an LDR, 50kΩ variable resistor and any sensitive 50 or 100μA meter. You could use a multimeter for M1. The connections of RV1 are the centre tab and the left-hand tab, viewed from the rear.

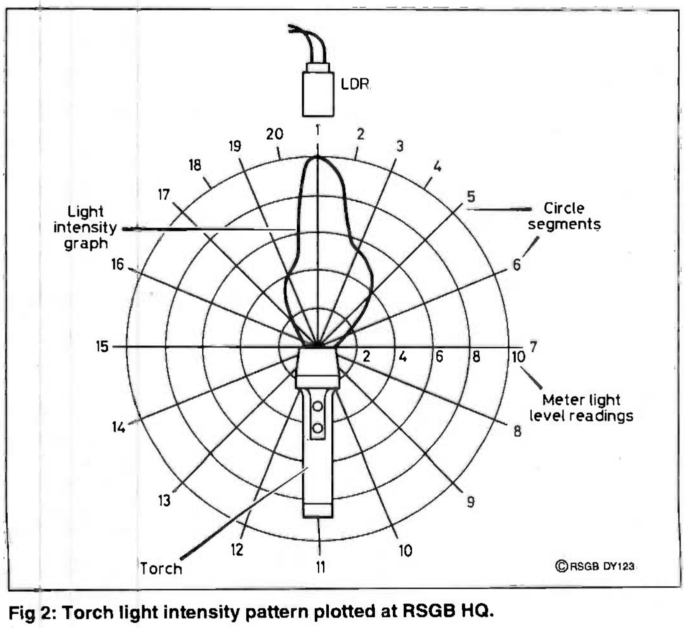


Fig 2: Torch light intensity pattern plotted at RSGB HQ.

THE PHOTOMETER

WHEN THE PHOTOMETER is connected up you will find that it will probably give a reading straight away due to daylight reducing the resistance of the LDR. This instrument is quite sensitive to light. You will probably have to find a dark room where the light is low enough for the meter to read zero.

We can use our photometer to make a graph of the light intensity of a battery-powered torch. Draw a circle on a large sheet of paper and then divide the paper into segments as shown in **Fig 2**. If you have a protractor then you could make a line , say every 10°. Generally the more divisions you have the more accurate the plot will be. The measurements will have to be made in a darkened room with the meter a short distance from the LDR, connected by two wires.

Beam the torch directly at the LDR and set the meter reading to maximum (10 or 100) using RV1. Point the torch to the next segment and take another reading making a note of it. When you have made all the measurements you can use the data to construct a light intensity pattern as shown in Fig 2.

There is a similarity between light and radio frequency waves. Both are known as **electromagnetic radiation**. Can you think of a way of using the Field Strength Meter (FSM), described on page 18, for making a similar plot of a directional antenna?

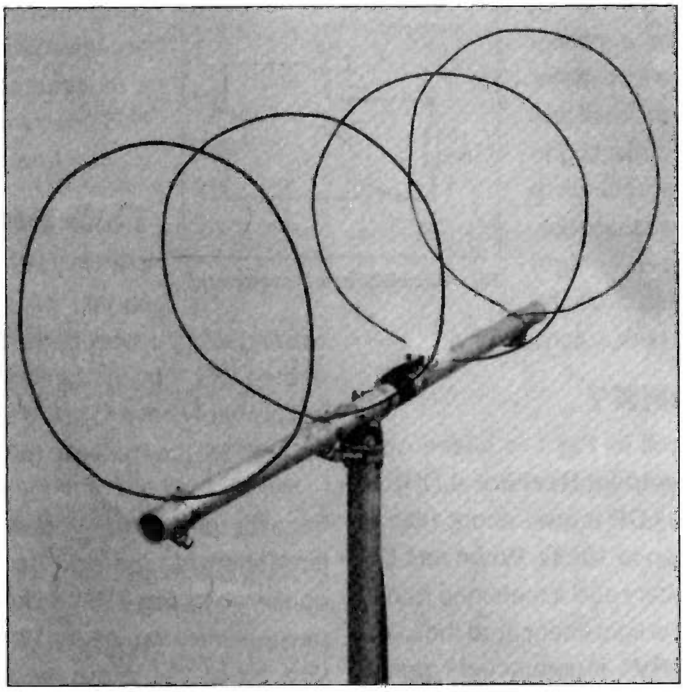
COMPONENTS

Resistors	
RV1	50k potentiometer
Semiconductors	
LDR1	ORP12 Light dependent resistor
Additional Items	
PP3 battery connector	

70cm Quad Antenna

An Easy-to-construct UHF Project

THIS IS A DESCRIPTION of how to make an antenna with gain compared with the rubber duck or a dipole antenna. Additionally this antenna can be dismantled for carrying to a hill-top location and assembled with ease. Antenna gain is described in *Ham Facts*.



HOW DOES IT WORK?

THIS ANTENNA USES the principle of the **Yagi parasitic array**. You can see a Yagi antenna on nearly every house in the UK, which is used for receiving television. Antennas have the same characteristics, whether they are used for transmitting or receiving - that is why you can use the same antenna for transmitting or receiving on your rig. It is easier to describe the principle of the Yagi antenna as a transmitting antenna.

Although there can be quite a lot of elements used on a Yagi only one is connected directly to the coax cable and the transmitter, and is known as the **driven** element. The other elements, known as **parasitic** elements, because they are not directly connected to the transmitter, pick up the radio frequency (RF) energy from the driven element and re-radiate it. One of these elements is physically longer than the driven element and is called the **reflector**. The phase of the re-radiated RF, combined with the RF from the driven element causes it to be reflected away from the reflector element.

Other elements are made shorter than the driven element. The phase of the re-radiated RF from these elements, combined with the RF from the driven element, causes the RF to be directed towards these **director** elements.

The combined effect of all these elements is to cause the RF to be concentrated in one direction. By building the field strength meter, described on page 19, you will be able to experiment with this antenna and measure its **directivity**.

Instead of using straight elements as used in the Yagi this antenna uses wire loops. This is a very well known antenna in amateur radio and it is called a **quad**. Normally, these wire loops are square. For the lower frequency bands the elements are much larger and have to be supported on an X frame. In our case a quad antenna for 432MHz is very small so the elements do not need a supporting frame and can be made in a circular shape.

CONSTRUCTION

THIS ANTENNA IS very easy to construct. The design allows you to use any type of metal tube or even wood for the antenna boom (the support for the elements) and the mast. The antenna elements are made from 14SWG enamel covered copper wire; you can use other gauges of copper wire. 16 SWG hard drawn antenna wire was used (not enamel-covered) and this worked very well. If you use thinner wire the antenna might get a bit floppy. All the separate parts of this antenna are fixed together using hose clips (sometimes known as jubilee clips).

The driven element is fixed to the boom using a hose clamp, with a white plastic connector block (with three terminals) to enable the coax to be connected to the elements. This element should be made 70mm longer than shown in **Fig 1**. The enamel insulation is then cleaned from the ends of the elements (with sandpaper) to a distance of

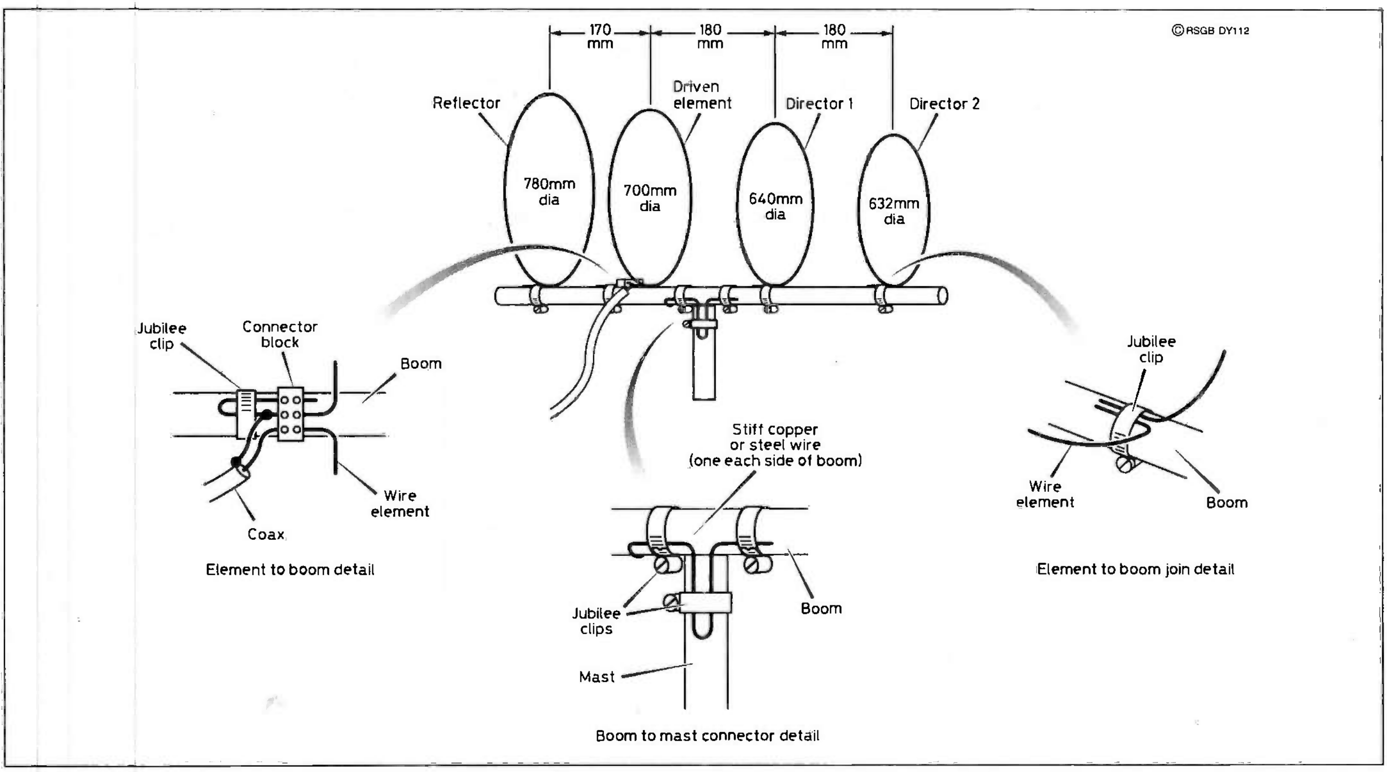
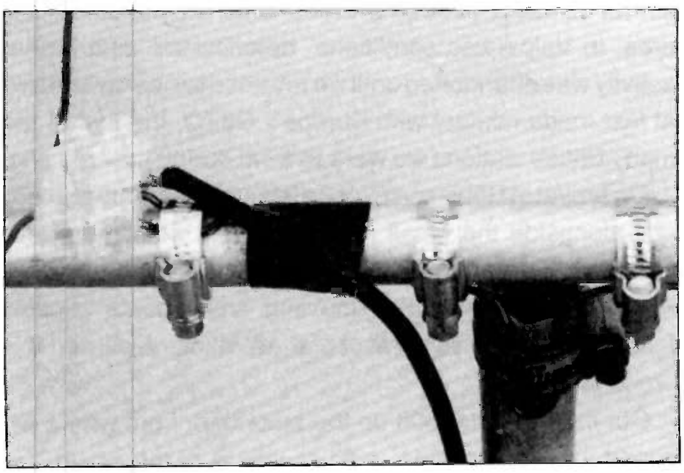


Fig 1: 70cm 4 element quad construction, with detail of how hose clamps are used in the construction.

20mm from one end and 50mm from the other. The ends of the elements are then bent at right angles, formed into a loop and the ends pushed through the connector block and the screws tightened. The long 50mm end is formed into a loop and pushed back though the third connector. This loop is used to connect the driven element to the boom. All this might seem a bit complicated but it is probably easier to see how it is done by looking carefully at Fig 1 and the photo below.

The parasitic elements should be made 40mm longer than the lengths shown in Fig 1. The enamel insulation is then cleaned 20mm from the ends of the elements. Bend the ends of the wire at right-angles and then form the wire into a loop. It is preferable, but not essential, to solder the ends of the wires together, which makes it easier to assemble the antenna.



Detail of construction method.

The antenna is fixed to the mast using hose clips and wire as shown in Fig 1. Finally the coax cable is connected to the driven element connector block, with the braid of the coax connected to the end of the element fixed to the boom and the centre of the coax connected to the free end of the element.

You will have to fit a coax plug on the other end of the coax cable to suit your transceiver or SWR meter if you are using one. See *Training for the Novice,* page 73, for information on how to do this.

TESTING THE ANTENNA

THE ANTENNA CAN NOW be tested. It is best to try antennas outside away from buildings where possible. At these frequencies signals bounce off walls and metallic objects and can give misleading results.

It is best to try the antenna on receive first. Switch on your rig using the rubber duck, or some other antenna that you normally use then tune around the repeater or beacon channels and listen for any signals that might be on. Now disconnect the normal antenna and connect the quad - remember that this antenna is directional so point the antenna at your local repeater if you know where it is. If you can hear a repeater and the signal strength varies as you turn the antenna then it would appear that it is working to some

18 ▶

Operation Raleigh - A Pacific Crossing

By John Layton, G4AAL

Following a request for radio amateurs to take part in Operation Raleigh, a multinational expedition combining scientific, conservation and community prgrammes, a number of amateurs were assigned to one of the three month phases to provide ship to shore links and communications with field parties. *Sir Walter Raleigh*, a converted deep sea trawler, was to visit many rare islands as it followed a route along the Tropic of Capricorn to Australia during 1986.

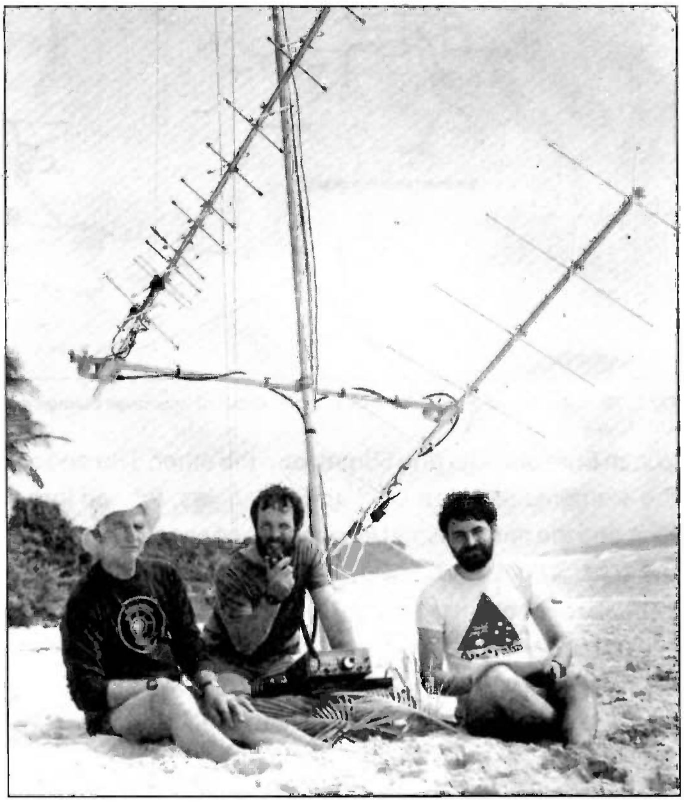
Though limited opportunity for amateur radio existed, the potential for an out of the ordinary DXpedition was realised. Three amateurs, Alastair, G4RUL; Nick, G4TAW, and myself, were given the chance to become involved with this stage of the expedition. The call GB0SWR/MM had already been allocated to *Sir Walter Raleigh*, its holder being David, G3SYF, the ship's radio officer and we each obtained a Maritime Mobile licence with the necessary variation to allow operation of the GB call whilst on board. Callsigns were also obtained for use on the islands we planned to visit.

RADIO EQUIPMENT

EQUIPMENT ON BOARD included Yaesu FT757 transceivers, aerial tuner units, power supplies, batteries, generators, masts and wire aerials for the HF bands, with transverters, linears, and yagi aerials for the VHF and UHF bands. Some satellite work through Oscar 10 was also planned on those islands where our stay was to be longer than a day.

Nick had arranged for a lattice tower, constructed by Carlos, CE7ELG, to be erected on top of the winch house to support an HF beam. Unfortunately the beam had not arrived before we left Chile and a Barker and Williamson broad band folded dipole was used on board for both expedition and amateur purposes until we reached the Cook Islands.

Alastair and I arrived in Puerto Montt with a few days to spare before sailing and these we spent in running cables through bulkheads for the aerials and securing all moveable items of equipment.



(L to R) John Layton, G4AAL; Alastair Turner, G4RUL; Nick Perrott, GJ4TAW.

WE SET SAIL

DURING THE VOYAGE to Valparaiso Alastair made the first reasonable contact with N6KYO, and a succession of similar contacts followed with countries around the Pacific area. In Valparaiso conditions deteriorated and further activity was abandoned until we returned to open water. We at last made contact with Europe - G6ZO, the first of the many British stations we were to work during the crossing.

On arrival at Robinson Crusoe Island it was impossible to pull alongside the small jetty, so all the equipment was made as waterproof as possible with plastic bags, then lowered these over the side into small boats (closely followed by ourselves). Most of the landings repeated this procedure.

Our camp was 1700ft up the mountain, from where we hoped to give complete radio coverage of the island. On arrival at the top the wire HF aerial, an inverted V for 20 and

40 metres was strung between an outcrop of rock and a small pole 10ft above ground.

Other equipment was housed in a small tent and, with a 12V car battery supplying power, contact was established with the ship, base camp in the village and the field parties scattered around the Island. Lying on one side in the tent, a torch in one hand whilst operating a paddle key and writing up the log with the other, 24 stations were worked on 20m in the space of 30 minutes. Nick and Alastair then took over and worked steadily on SSB whilst I retired for the night.

Our success on this island was to establish a pattern to be followed on the other islands. We were now to be considered as part of base camp and as such able to set up the radio equipment ashore.

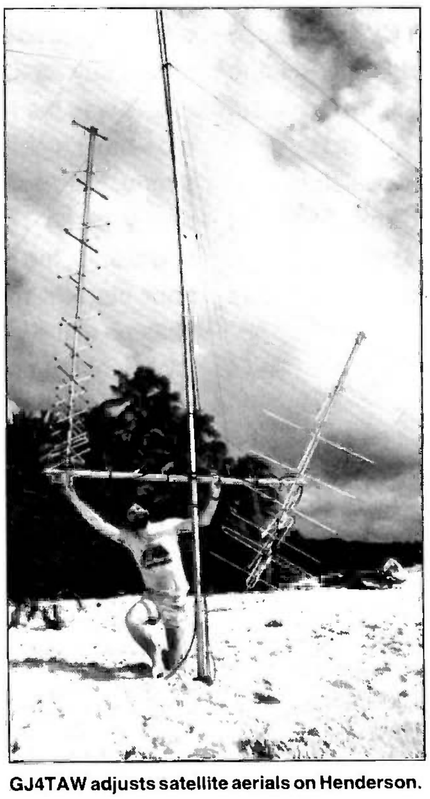
EASTER ISLAND

BETWEEN ROBINSON Crusoe and Easter Island various duties aboard kept us busy and only a limited amount of amateur radio was possible using CW as conditions were still poor. Once ashore we set up a radio station using our FT757 with a vertical whip aerial. On the amateur bands the inverted V for 20/40m was used, but at a low height due to a lack of suitable masts or trees. Contact was established with the various scientific parties, scattered all over the island, but a very high noise level made things extremely difficult. We had access to 230V mains but found the QRN increased to such a level that in the end it was only used to charge the battery. At times local noise masked out most of the signals and we discovered that the overhead power distribution system had many electrical joints exposed to the elements.

HENDERSON AND PITCAIRN

DURING HF FIELD day weekend I listened out for G stations. Only four British stations were worked, G4JKS/P, GU3HFN/P, G6LX/P and G4BTY/P. In fact these turned out to be the only British stations heard or worked from Easter Island. In six days 52 stations were contacted, all except one on the key.

My one SSB contact was with Tom Christian VR6TC. Though I'd had QSOs with a few SSB stations from the ship Tom turned out to be the only station I was to work on phone from any of the islands during the crossing.



GJ4TAW adjusts satellite aerials on Henderson.

A mild case of hepatitis on board delayed our visit to Pitcairn and we changed plans and made for Henderson, an uninhabited coral island 118 miles NE of Pitcairn. Base camp was established on the sea shore and we had to transport everything including enough fuel and water to last seven days as well as a 40ft mast, which provided support for the VHF/UHF yagis. The two yagi aerials were used for our first satellite operations through Oscar 10 and the beacon was heard on our MuTek transverter at good strength. Some time later we learned from *RadCom* that the transponder was out of action.

News of our activities had spread and when conditions improved, pile-ups occurred both on SSB and CW. Our equipment worked perfectly with the exception of the generator. Nick had been waiting patiently for 40m to open into Europe when the generator stalled just after completion of the second QSO. By the time he had stripped down and repaired the generator, 40m was closed.

On the island well over 1500 QSOs were completed. A CW expedition frequency becoming established on 14.023MHz and was used throughout the rest of the voyage.

At Pitcairn I operated from the shacks of Tom and Betty Christian, VR6TC and VR6YL, Irma Christian, VR6ID and Kari Young VR6KY, 163 contacts were made using my call VR6HIJL. We were also to meet up with Tor, LA8HY/MM, who was sailing with two companions across the Pacific. They had left Norway in the 40ft yacht *Free* some 11 months before and would not be returning to Norway for another couple of years. With 10 radio amateurs on Pitcairn during our visit - G3SYF, G4AAL, G4RUL, G4TAW, LA8HY, VR6ID, VR6KB, VR6KY, VR6TC and VR6YL, this must surely be the greatest number of amateurs to have been on the island at any one time!

I delivered a diesel fuel pipe to Tom Christian from Richard, G3WCQ, in Coventry, whom I met the previous April at the RSGB NEC show. He saw my Operation Raleigh sweatshirt and mentioned he was looking for a way to deliver a parcel to VR6TC in Pitcairn. I'm sure Richard didn't believe me when I offered a person-to-person delivery service!

The hospitality received from the 49 inhabitants was tremendous and, on our departure, most of the islanders came down to the small jetty to see us off and to sing their farewell song. Nick was the last to leave and returned to the ship in the Pitcairners' longboat bearing four enormous bunches of bananas. A marvellous and never-to-be-forgotten experience with many lasting friendships made in the short time we were there.

COOK ISLANDS

AT RARATONGA IN the Southern Cook Islands conditions were quite poor though I was able to work stations in VK, ZL, JA and W on the key. At the community centre used as a camp a sight for sore eyes greeted us. A large cardboard box had arrived from the UK containing a three element J beam aerial. We installed this aboard ship a few days later. A total of 117 CW QSOs were achieved with the FT757 and dipole on 20 metres before we moved off the island.

On our next stop - the island of Atiu, we made use of an aerial belonging to the inter-island net, run from Raratonga by Stewart Kingdon, ZK1AA, which took place every morning in the 4MHz band. A 12V battery was used here as a power source, being kept fully charged by permanently - connected solar panels. This aerial served us well and I made 254 contacts.

We then moved on to Mauke where our base camp was located in the local empty hospital. The doctor, Archie Guinea, ZK1CT, lived next door and let us use his shack for both expedition and amateur purposes. With the luxury of a beam aerial and a Kenwood TS430S, my CW accounted for 342 contacts. From here we contacted GB0ORH, the callsign of the Operation Raleigh Support Centre located in Queens Dock Avenue, Hull.

The 900 odd miles between the Cook Islands and American Samoa, using the J-beam, immediately produced better results and I made between 100 and 150 contacts. SSB became a reasonable proposition and many contacts were also achieved using this mode.

SAMOA

IN PAGO PAGO the ship docked for the first time since Valparaiso. The harbour itself is surrounded by mountains but one small gap existed to the north so the beam was pointed in that direction and we operated on the amateur bands with the call GB0SWR/MA/KH8. By the time we left a total of 677 /KH8 QSOs had been made.

On Apia in Western Samoa a survival exercise required a continuous 24hr radio watch. Using a manpack radio and a vertical aerial for expedition purposes, 5W1FK on 14.023MHz was activated at the same time. Over 1000

Nick, GJ4TAW, operates the ship's amateur radio station, GB0SWR/MM.

contacts were made before the exercise was concluded. On Nuku'alofa, on Tonga, 842 contacts were made using the A35JF callsign. Nick simultaneously worked on SSB from the ship using the J-beam.

Fiji was to be my last call on the trip as I planned to return to the UK. However we only had licences to operate from the ship under our own calls. We learnt that for a Fijian callsign we needed to be in residence for at least three weeks but a chance meeting with Dick Northcott, 3D2CM, president of the Fijian Radio Club and the IARU Liaison Officer was to change this plan. Dick offered me the opportunity of living in his home for a few days with the use of shack and callsign. I was able to work some 453 stations on the key as 3D2CM.

CW was the most sucessful operating mode during the trip - most signals were at least workable even if not very strong. From my own log a total of 6354 QSOs were made, nearly all on 14.023MHz. Of these, 2026 took place on board ship, the rest from the various islands. Even with the poor state of the bands, correspondence received from stations in the UK and USA confirm the consistency of the CW signal during the crossing.

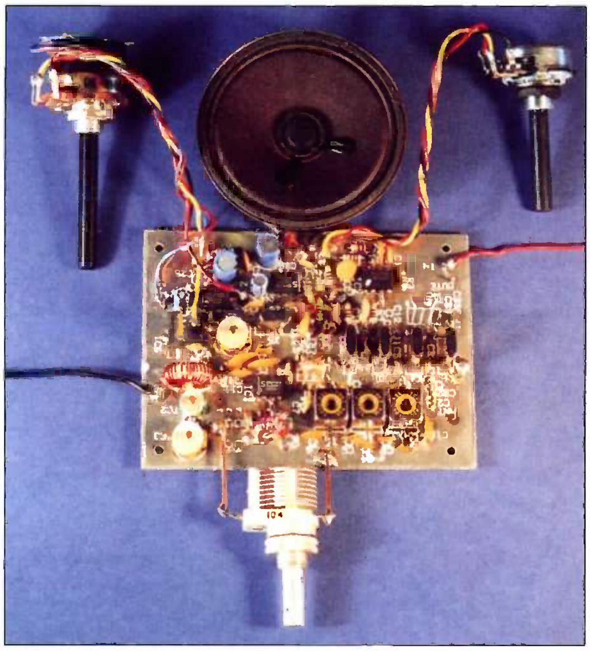
My participation with this worthwhile project ended when I returned to the UK after four months' absence. I am indebted to G3LZQ and G4IVJ who kept everyone informed as to our movements during the trip.

If you would like to join an Operation Raleigh expedition, then contact Raleigh International, Parsons Green Lane, London SW6 4HS. Tel: 071 371 8585 - *Marcia*

Hands RX1 80 Metre Receiver Kit

By Margaret Snary, 2E1AQS

THE RX1 IS A superheterodyne receiver covering either 80m or 40m. It has a 4-pole crystal filter at 4.433MHz and is designed for SSB use; by adding additional componets, the filter bandwidth can be narrowed for CW only. I tested the 80m SSB version. It was more complicated than anything I had previously attempted, but my son, Robert, G4OBE, assured me that I could do it.



The receiver arrived in a large sealed plastic bag with all the components in a number of labelled individual packs. There was also an 8 page manual, which included a component list, a description of the circuit, a wiring and part placement guide and the circuit diagram.

READ THE MANUAL

I FIRST READ the manual and then sorted and labelled the components. The receiver is built on a double sided PCB measuring 103mm x 76mm. The component side of the PCB is used to provide a ground plane and both sides of the board are tinned to make soldering easier. The component side is screen printed with an overlay to locate the components but as the printing was white, reflections from the tinned surface made the print difficult to read. Two C23s were marked, but the placement guide identified the correct location. When inserting the PCB pins and wire links and I found that some of the hole sizes were not correct and had to be re-drilled.

I then soldered the resistors and ceramic capacitors. Sometimes I had to solder one leg to the ground plane and, although I had not attempted this before, the instructions were clear and I had no problems. As I soldered each component in place I crossed it off the parts list. I then soldered in four of the five ICs - so that I did not put these in the wrong way, Robert suggested that I put a small dot of Tippex on each IC beside pin 1. I then wound the transformers and coils and I found this a little fiddly as two of the transformers were wound on 6.3mm diameter formers. There were also three pre-wound Toko coils to solder to the PCB to form the input filter to the receiver and these were all soldered into place without difficulty.

Finally I soldered the electrolytic capacitors, the crystals for the crystal and BFO and finally the voltage regulator IC.

MOMENT OF TRUTH

ROBERT CHECKED for solder bridges and dry joints before making the off board connections to the IF and AF Gain Controls, the tuning capacitor and the power supply - with a short wire aerial, signals were heard. The variable capacitors were then set to the recommended starting positions and a quick tune round the band revealed an Italian and a Swedish station having a CW contact.

The input filter was tuned using an off-air signal. I found that the cores of the tuned circuits did not have to be altered much from their supplied position. The main tuning capacitor needed a slow motion drive for easier tuning across the band but this can be added when the board is fitted into a case. The instructions were reasonably clear and I had no problems in assembling a very sensitive receiver but, due to the size and the number of components that need to be soldered to the top foil of the PCB, some previous construction experience would be useful. In total the construction and setting up took about six hours.

Kit available from JAB Components (see page 18) £47.50.

AMATEUR RADIO AND THE HF SPECTRUM

HF BROADCASTING

THREE PARTS OF the HF spectrum are used for broadcasting: Long Wave (150 - 300kHz) and Medium Wave (540 - 1600kHz) for coverage of a single country or local area, and Short Wave (bands within 4.5MHz - 26MHz) for much greater coverage, including world-wide.

Almost all of the stations use amplitude modulation (AM), though single sideband (SSB) is gradually being introduced.

Some countries are so large and have such a wide-spread population that short-wave broadcasts are needed to reach everybody. In other cases the programmes are intended to reach people in countries far from the transmitter.

HF AMATEUR RADIO

NINE AMATEUR BANDS are available in the HF spectrum, at approximately 1.8, 3.5, 7, 10, 14, 18, 21, 24 and 28MHz. Most transmissions use single sideband (SSB) or Morse code (CW), but there's also plenty of data (computer to computer), teleprinter (RTTY) and Fax/SSTV (picture) signals.

Because propagation conditions change between day and night, winter and summer, and with the sunspot cycle, not all bands are useful all of the time. However, with nine bands to choose from there are always opportunities for amateurs to make worldwide contacts. All radio amateurs must pass a Morse test before they are permitted to use the HF bands: For the full licence 12 WPM and for the Novice licence 5 WPM.

KEY TO FREQUENCY CHART

- AMATEUR RADIO
- AM BROADCAST RADIO
- HF CITIZENS' BAND
- PRIVATE FIXED & MOBILE RADIO
- STANDARD FREQUENCY & TIME STATIONS

HF CITIZENS' BAND

UK CB radio uses 40 channels (27.60125 & 27.99125MHz). All radios are frequency modulated (NBFM). Anyone can operate on CB channels without any qualifications but a licence must be obtained from the Post Office.

FIXED & MOBILE RADIO

THIS INCLUDES military, police, emergency services, telephone etc.

Note that 'radio eavesdropping', or listening to messages that are not intended for *YOU* is an offence.

2's Company

News and Reports from Novice Licensees

FROM THE EXCELLENT *TARS Talk*, the newsletter of the Torbay Amateur Radio Society comes the news that Simon, 2E1AGC, has gone on to get a Full Licence. His new call is G7OZJ.

Another 'AGC', Aaron, 2E0AGC from Norfolk, who is a new subscriber to *D-i-Y Radio*, has also passed his RAE *and* the 12WPM Morse test so he should have a G0 call very soon. He is already planning to build a valved 3.5MHz SSB transmitter!

Congratulations to both and please let us know if you get your first licence, or change to another callsign.

SALTEE NOVICES

TWO NOVICES received special permission to operate, under the supervision of full licensees, from Saltee Island off the Irish county of Waterford. This is the first time that UK Novices have been permitted to operate abroad. The group made nearly 2,500 contacts over five days last June using the callsign EJ2SI.

QSL card of the Saltee expedition.

REPEATER FUNDING

A GRUMBLE IN *Vital Spark*, the newsletter of the Hastings Electronics and Radio Club, is worth quoting: "It is a fact that the Hastings Repeater Group have *never* yet received a subscription from a Novice operator. I'm not one usually to wave the tin under the nose of a user, but considering the number of hours use that 70cm repeaters get by Novices . . . this is where I start!", signed G4BCO, Assistant Treasurer. Repeaters cost money to put on the air and to maintain (electricity bills, site rental, repairs etc) so please try to find out who is in charge of your local repeater and ask how you can help to keep it on the air.

GB CALLS

THE GB PREFIX is used by special event stations all over the UK (unusually, there is no change of prefix for stations in Scotland, Wales etc). Jamboree Cymru at Glanusk Park in Powys gave Lewis, 2W1BIY, his first experience of real operating. He was helping with the GB4JGU demonstration station when the operator heard 2E1BZK. Lewis was put on the microphone for a Novice to Novice QSO.

THE LOG BOOK

CONTEST OPERATION provides most of the news this time. Paul, 2E1DBI, went in for his first contest less than a month after getting his licence. Operating portable in the RSGB 432MHz FM Contest in June, he made 10 contacts in a couple of hours from Dunstable Downs in Bedfordshire. The best QSO was with GW4MGR/P (a multi-operator station which included two Novices), 216km away on a mountain in North Wales. Paul's station was a 1.5W hand-held and a 6dB collinear.

Another Novice experiencing a contest for the first time was Olga, 2E1ASV, who helped her local club in a 24-hour event. She panicked on her first contact -"My brain went to jelly" - but was helped through the experience by the operator at the other end. She sums up: "I thoroughly enjoyed the experience, and as a female, pensioner, Novice I can't wait for my next contest!" We'll be publishing Olga's full report in a future *D-i-Y Radio*.

2E1DBI/P on Dunstable Downs.

More experienced at contests is Margaret, 2E1AQS, who popped up again during RSGB VHF National Field Day in July. Both the weather and conditions for this event were unusually good and another pensioner, Margaret had no less than eight contacts over 300km with her few watts of 70cm SSB.

Band by Band

The Amateur Radio Spectrum: The 160 metre Band

THE 160 METRE BAND, is known as **Top Band** because it is the highest wavelength available to amateurs. The frequency limits are 1.81 to 2.0MHz which is a slightly higher frequency than the Medium Wave (AM) broadcast band. 160m is one of the two high frequency (HF) bands where Novices are permitted phone operation.

Equipment for 160m is easy for the beginner to build, especially for CW. A simple Direct Conversion receiver and a one or two transistor transmitter will give plenty of contacts. Because of the long wavelength, the aerial should be as high as possible and at least 20m (66ft) long - something between 40m (132ft) and 80m (264ft) is ideal (**Fig 2**).

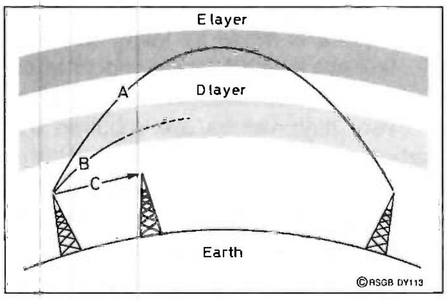


Fig 1: At night, Top Band signals are 'bounced' off the E Layer for DX contacts (A). During the day the sun's rays ionize the D Layer which absorbs sky-waves (B) so most contacts are by ground wave (C).

The performance of the band during the day is quite different from that at night. Daytime contacts are mostly by **ground wave** (**Fig 1**) over a few tens of miles because the **sky wave** is absorbed by the ionosphere's **D Layer**. At sunset, the D Layer no longer stops sky-wave signals and most contacts are made by reflection from the **E Layer**. Typical night-time distances are 500 - 1500 miles, though it is possible to hear and work stations in the USA in the small hours, or even occasionally Africa and Australia mid-evening.

Because of the effect of the sun, the time of year is also important. In the summer, there is much less chance to work DX, though local contacts will suffer less interference. The spring and autumn are best for contacts across the equator.

BAND FACTS

Allocation: (Full A) 1.81 - 2.00MHz, (Novice A) 1.95 - 2.00MHz. Activity: CW 1.81 - 1.85 (+ Novice band), Data 1.838 - 1.842 (+ Novice band), Phone 1.85 - 2.00.

Notes: Some countries have a much smaller band so SSB can be found in the CW section. Packet radio should not be used on 160m.

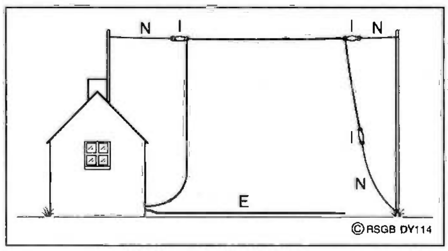


Fig 2: A useful aerial for 160m which will fit into a medium sized garden. The total length should be between 20 and 80m. For lengths less than 60m, one or more earth wires (E) should be run along the ground for as far as possible. Use insulators (I) and nylon cord (N) to anchor the ends of the aerial.

THE LOG BOOK

These included **F6GYA/P** (Locator JN15VU - look it up on the map we sent you when you first subscribed) in the South of **France** at an amazing 675km. Margaret was operating from Shoeburyness Common in Essex.

In the last *Log Book* we mentioned Sporadic-E propagation extending perhaps to 144MHz, and sure enough during June and July there were several 144MHz openings to the **Canary islands, Spain, Italy** and **Malta**. Even if you haven't got a receiver for 144MHz, VHF Sporadic-E can be heard on any VHF (FM) broadcast set - listen out for Italian, Spanish or East European stations with strong signals which rapidly fade to nothing after a few minutes.

2E1AQS/P at Shoeburyness.

Conditions on the HF bands have remained poor, though there has been some DX for those with the patience to dig them out. Some of the more interesting stations heard have been: 3.5MHz - **VO9SF** (Newfoundland); 7MHz - **SX1**MBA (special prefix for **Greece**); 10MHz - **9K2MU** (**Kuwait**), **9M8FC** (**East Malaysia**); 14MHz - **HB0/**PA3ERC/P (**Liechtenstein**); 18MHz - **4U1ITU (International Telecomms Union station in Geneva** - counts as a separate country), **TI9CW** (**Costa Rica**), PY0TUP (**Trinidade Island**, off Brazil).

Resistors - Carbon Film and All That

By John, GW4HWR, Chairman RSGB Training and Education Committee

PROBABLY THE MOST commonly used component in electronic equipment is the resistor, so perhaps it may be a good idea to find out a bit more about these seemingly very simple components.

There are many different types of resistor with a wide range of applications. Some of the early ones were made by mixing powdered carbon with a cement-like substance, making up a paste as in building mortar, and pouring into a mould so that rods were produced when the material sets. A variety of sizes were made from 20mm long by 3mm diameter to 80mm by 15mm diameter. The ends of the rods are tin-plated by an electrolysis process and tinned copper wire wrapped around each end and soldered. **Fig 1** shows the end result.

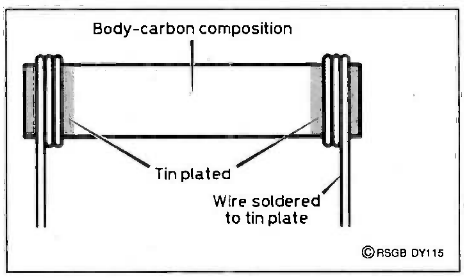


Fig 1: A Carbon composition resistor.

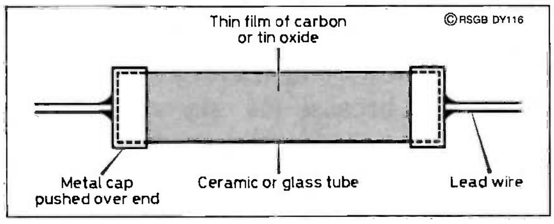


Fig 2: Carbon or tin oxide film resistor.

The resistance was measured and either the value was printed on the body or it was colour coded using the same code as is in use today but the body was one colour (indicating the first figure of the value), one end was coloured to indicate the second figure and a dot was put on the centre of the body to indicate the number of zeros to be placed after the second figure. Some strange looking components occurred due to the use of the colour code in this way. For instance it was quite common to find a resistor which was all red or all orange or some which apparently had no tip or body mark. All these things occurred when the tip and or the spot was the same colour as the body - a 33,000Ω (ohm) resistor would have had an orange body with a tip and spot of the same colour.

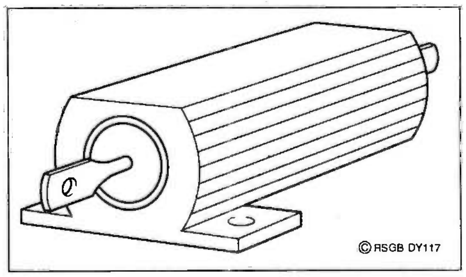


Fig 3: A high power wirewound resistor encapsulated in a metal block.

As you can probably guess the process was not too scientific and resistors were made and the values measured afterwards. The size of the 'stick' of material determined the power of the component. Another disadvantage of this type is its lack of stability - the value changes with age and also with temperature. The value goes down as the temperature goes up. This characteristic is known as a negative temperature coefficient.

CARBON FILM

ANOTHER METHOD OF making resistors involves depositing a very thin film of carbon on a small ceramic tube. Modern manufacturing methods allows the thickness of the film to be accurately controlled and therefore the value can be predicted with much greater success. Once again the ends of the coated tube are tin-plated and the connections are made by means of a small metal tube which fits tightly over the body. The finished article is painted with some neutral colour and the value added by means of the modern coloured bands. This type of resistor is much more stable than the carbon rod type although it still has a negative temperature coefficient.

GLASS TIN OXIDE

A MUCH MORE stable and reliable resistor is made by using a similar technique with tin oxide deposited on a small glass tube. Sometimes, when very high values are required the carbon or tin oxide film is deposited in the form of a spiral making the current path longer and the resistance higher. See **Fig 2** for an example of a carbon or tin-oxide film resistor.

POWER

ANYONE WHO HAS made up some of the projects in *D-i-Y Radio* will have noticed that resistors are often specified as 0.5 watts while occasionally others will have a higher figure. Now power is decided by the value of the resistor and the current flowing through it:

$$W = I^2 \times R$$

(where W is power in watts, I is the current flowing through the resistor in amps and R is the resistance in ohms) and the rating is the ability of the resistor to dissipate (get rid of) the heat generated. Generally the rating is proportional to the physical size but it is rare to find any of the types described so far with a rating of more than 5 watts.

WIRE WOUND

WHEN HIGHER POWER is needed the resistor is usually made by winding resistance wire around a ceramic tube. The component is covered in some form of heat resistant material. This type of resistor can be operated at very much higher temperature. Even higher powers can be achieved by enclosing the wire wound resistor in a brass block which can be bolted to the metal work as a heat sink. **Fig 3** shows a resistor of this type.

A UHF Field Strength Meter

Measure the RF radiating from your antenna

A FIELD strength meter (FSM) measures the level of radio frequency (RF) energy from a transmitting antenna. It is a simple receiver which has a meter connected to the output instead of a loudspeaker. An FSM can be a simple broad-band detector as shown in **Fig 1a** or a detector with a tuned circuit in front of it as shown in **Fig 1b**. The broadband FSM will detect RF fields over a wide range of frequencies. An FSM with an RF choke at the antenna socket will be sensitive to frequencies in the HF band. A loop of wire at the antenna socket will be required to give adequate sensitivity in the VHF/UHF range.

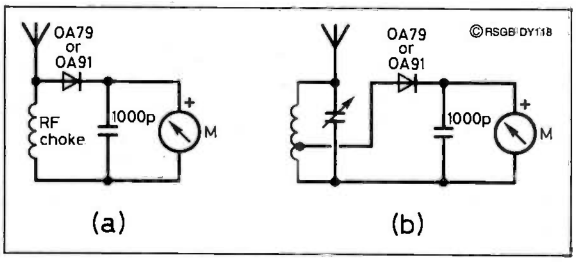


Fig 1: Construction of the UHF field strength meter.

An FSM with a tuned circuit will only detect a transmission on the frequency to which it is tuned. If the tuning circuit variable capacitor has a calibrated dial you will then be able to measure the frequency of the radiated transmission. An FSM with a tuned circuit is sometimes called an **Absorption Wavemeter**, which is useful for measuring the frequencies of any spurious signals, such as harmonics, radiating from a transmitter. Because we want an instrument for checking the performance of a UHF antenna we want an FSM that is sensitive around 433MHz. You can use this instrument for comparing the signal strength of the rubber duck antenna on your rig with any experimental antenna that you might like to make.

CONSTRUCTION

THIS INSTRUMENT IS very simple to make. It comprises a loop of wire, 600mm long, which also acts as the antenna. The other items required are a diode, a capacitor, a connection block and a length of twin wire. The FSM components are not mounted in a box in the conventional way but fixed to a pole with a hose clip (jubilee clip), as shown in **Fig 2**. It does not have a meter built in but has leads from the FSM components that can be connected to any sensitive 50 or 100µA meter, or use a multimeter. By selecting different ranges on the multimeter you have an FSM with adjustable sensitivity. If the meter reading appears to go negative in the presence of a signal just connect the leads to the meter the other way round.

USING THE FSM

CONNECT A METER to the FSM. Place the hand-held transceiver about two metres from the FSM and press transmit. If there is no reading on the meter check the wiring of the FSM. If the reading appears to go negative change the connections around on the meter. If the reading is too high move the transceiver further away from the FSM.

Now try altering the orientation of the transmitter antenna relative to the FSM and note how the signal varies.

If you build the quad, described on page 9, connect this to the transceiver and note how the signal varies as the antenna is rotated.

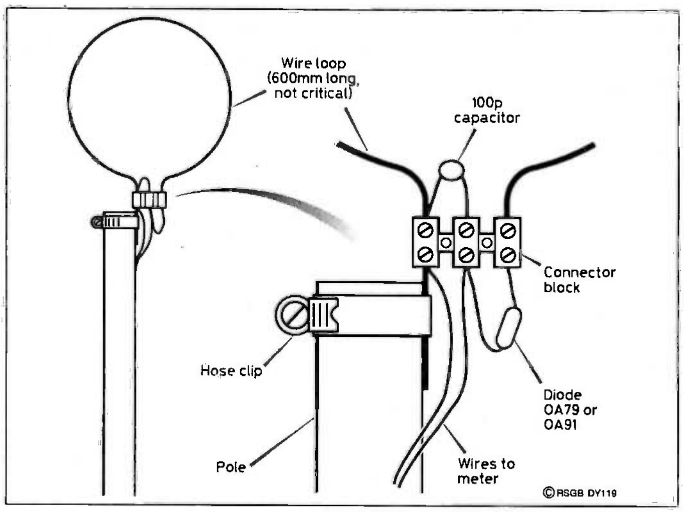


Fig 2: Broadband and tunable field strength meter.

COMPONENTS

Capacitor	100p
Diode	0A79 or 0A91
Connector block	10 amp
600mm long wire	16SWG
Hose clips	

These can be obtained from most hardware stores.

degree, particularly if the signal is stronger than with the original antenna. You should be able to locate the direction of the repeater if you didn't know where it was in the first place.

Now try it on transmit. It will be useful to have a 'standing wave ratio' meter (SWR meter), when the matching is good it generally means that the transmitted power is going to the antenna. This instrument is used to measure that the coax cable and the antenna are **matched**. If the meter reads 1:1 then the match is excellent. Provided the reading is less than 1.8:1 the match is acceptable. All CB SWR meters that have been tried gave good results on 70cm [1].

You can check the directivity of your antenna using a field strength meter (FSM). This instrument measures the level of RF energy around your antenna. How to construct one and how it is used is described on page 19.

MATERIALS

4 metres of 14 gauge enamelled copper wire
Copper tubing
15 amp connector block
7 hose clips
The enamelled copper wire (£3.00 inc P&P) from AA&A Ltd, Sycamore House, Northwood, Wem, Shropshire SY4 5NN.
The rest of the materials can be obtained from hardware stores.

REFERENCES

[1] The SWR meter and its use in checking antennas will be described in a later *D-i-Y Radio* issue.

Frequency Modulation Explained

By Ian Poole, G3YWX

MODULATING the amplitude of a signal is the most obvious way to put audio onto a radio frequency carrier. However it is by no means the only way that it can be done. One method which has a number of advantages over amplitude modulation is called frequency modulation or FM.

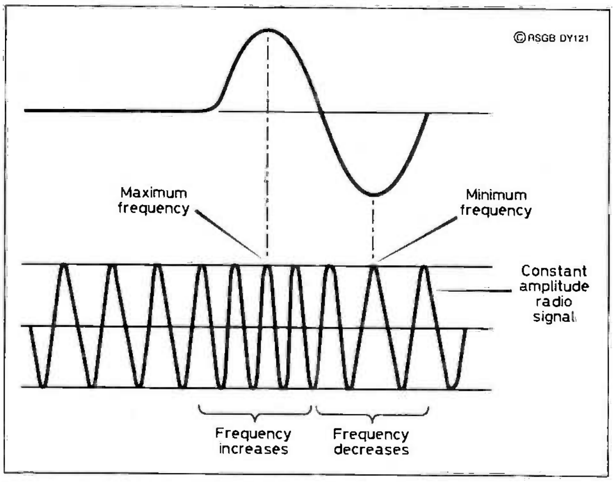


Fig 1: A Frequency Modulated Signal

THE BASICS

AS THE NAME implies frequency modulation entails changing the frequency of the signal with the variations in instantaneous voltage of the modulating audio signal. As **Fig 1** shows, when the modulating voltage rises so the frequency of the carrier rises and, as the modulating voltage falls, so does the carrier frequency. The amount of frequency change is called the deviation. Amateur radio and most radio communication systems use narrow band FM (NBFM). Typically deviations of about ±3kHz are used. Broadcast stations in the VHF FM band between 87.5 to 108MHz use wideband FM. This uses deviation levels of ±75kHz.

IN THE RECEIVER

EXTRACTING THE audio from an AM signal is very easy. A simple diode can be used. To obtain the audio from an FM signal is a little more complicated, although not at all difficult. What is needed is a circuit whose response changes with frequency. This works because as the frequency moves one way the amplitude of the signal will decrease, whereas when it moves the other its amplitude will increase (see Fig 1). In this way the frequency variations are turned into level variations. In practice almost any tuned circuit will perform this function to a greater or lesser degree. This can be demonstrated by listening to an FM signal on an ordinary AM radio. For example 27MHz CB signals which use FM can be heard on a radio which is designed for AM by tuning it slightly off frequency. By doing this the filters in the radio are converting the variations in frequency into variations in amplitude.

In order to demodulate FM properly special FM detectors are used. There are a number of different types which can be used. One common example is called a ratio detector which uses a tuned circuit a couple of diodes and a few other components. One method which works very well and is often used in hifi tuners is a phase locked loop. These circuits can be built into a single IC making them easy to use and in addition to this they perform very well, giving very low levels of distortion.

ADVANTAGES

FM HAS A NUMBER of advantages. The main one is its immunity to noise. As all the modulation is carried as variations in frequency the receivers can be made to be immune to amplitude variations. This will drastically reduce most forms of interference such as ignition noise in cars, general electrical noise, interfering stations and so forth. It will also enable the flutter and amplitude variations caused in mobile applications to be removed.

FM is also very good when it comes to achieving very low levels of background hiss. In fact it is found that the ultimate signal to noise ratio which can be achieved is proportional to the bandwidth used. This is why broadcast stations use wideband FM. The actual level of deviation chosen is a compromise between low noise levels and excessive spectrum usage. From the transmitting point of view FM is superior to AM because it does not transmit any amplitude variations. This means that it is less likely to interfere with televisions, hi-fi sets and so forth. This is a distinct advantage when there is a large number of televisions and hi-fi sets in the vicinity.

What is Antenna Gain?

Why Does One Antenna Work Better Than Another?

IF YOU HAVE only used the rubber duck antenna with your 70cm handheld rig then you will find a full sized antenna with a bit of gain will give an impressive improvement in your communication range. The key to this improvement is **antenna gain**.

So what do we mean when we say that the antenna has gain? Antenna gain is the difference in radiation field strength of an antenna being tested, or considered, relative to some other antenna. So if we have an antenna that has gain compared with the rubber duck antenna on your rig it means that its field strength is stronger. It follows that 'gain' only has meaning if it is compared with another antenna whose gain is known. So what can we use as a standard of comparison?

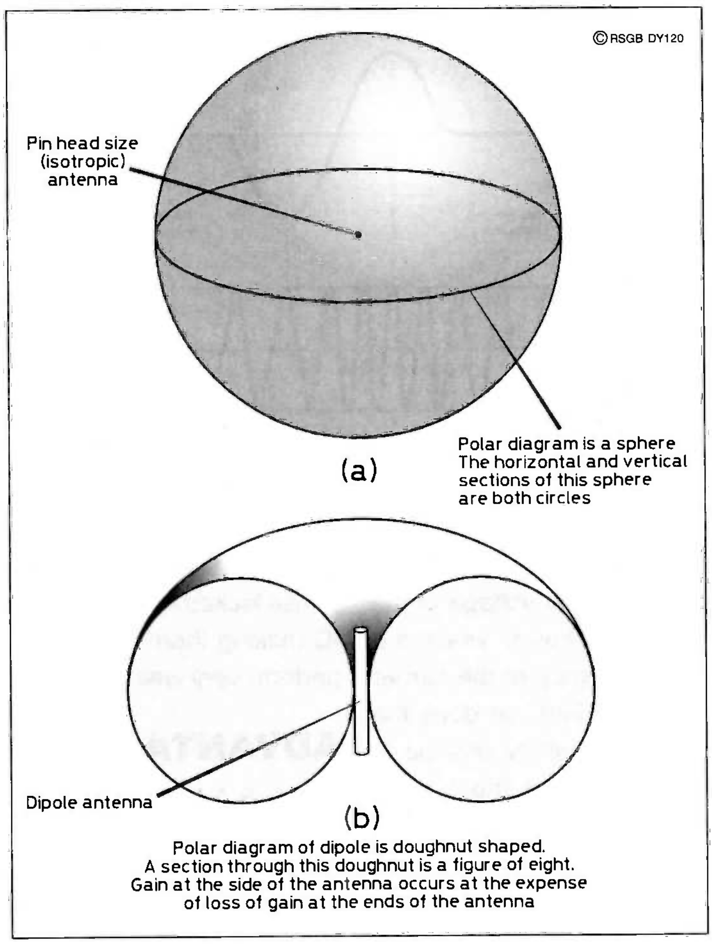


Fig 1: Antenna polar digrams.

THE STANDARD ANTENNA

WELL LETS SUPPOSE we have a tiny antenna the size of a pin head and we have got over the problems of supplying transmitter RF power to such a minute antenna. Let us also suppose that this antenna radiates power equally in all directions. If we used a field strength meter and measured the signal strength , say 5 metres away, in any direction from the antenna the signal strength would be the same.

If we were to plot a graph in one plane, of where the signal strength was constant, then it would be a circle 10 metres in diameter. If we could devise a method of plotting the graph in three dimensions then we would have a sphere. This sphere of equal signal strength is known as the **polar diagram** of the antenna, see **Fig 1a**.

If we were to measure the signal strength 8 meters away, in any direction from the antenna, then the signal strength would be the same but it would be less than the 5 metre distance measurement. Nevertheless the points where the signal strength is constant would still be a sphere.

The pin head size antenna is totally impractical, it is impossible to feed any power to it - so why bother with it at all?

Well, by having a spherical polar diagram it is a very useful theretical basic reference from which we can make comparisons to any other antenna. Such a pin head antenna is called an **isoptropic** (exhibiting equal physical properties in all directions) antenna. When an antenna gain is **calculated** against an isotropic antenna the gain figure is given in **dBi**'s.

This is all very well for calculations but how can I get some idea of the gain of any antenna that I might make?

A PRACTICAL REFERENCE

IT IS MUCH EASIER to feed power to an antenna if the antenna system is **resonant** - like a tuned circuit. An antenna has inductance and capacitance just like any other tuned circuit. The length of the antenna element determines the size of the inductance and capacitance, which decides at what frequency the element is resonant. The trick is to get the antenna resonance at the same frequency as the transmitter. Under these circumstances it is easy to feed the transmitter power into the antenna because the voltage and current are in phase.

However, our resonant antenna is no longer a pin head but a length of wire or metal tube. A practical resonant antenna is the half wave dipole. The polar diagram is no longer a sphere but is doughnut shaped, with the antenna element going through the hole of the doughnut. This means that maximum radiation (gain) is from the side of the antenna element. This gain from the side of the antenna is achieved at the expense of loss in gain from the ends of the antenna, see **Fig 1 (b)**. This characteristic is known as **directivity**.

Because the characteristics of a dipole are so well known it is also used as a standard of comparison when **measuring** antenna gain. Gain measurements using a dipole as a reference are quoted in **dBd**.

The polar diagram of the rubber duck antenna on your hand-held transceiver is similar to the doughnut dipole polar diagram. You can test this if your transceiver has a signal strength meter. Listen to a local repeater with the transceiver held vertically and note the signal strength. Now turn your transceiver horizontally so that the tip of the antenna is pointing at the repeater and note the signal strength reading.

If you dont know exactly where the repeater is you should be able to find it by moving the antenna until you get the lowest signal strength.

BENEFITS OF INCREASED ANTENNA GAIN

IF YOU COMPARE THE two signal strengths as described above then one of them has 1 or 2 'S' points 'gain' compared with the other. Obviously it would be nice if we had an antenna that had lots of gain. The effect would be to increase the sensitivity of the receiver and to also increase the power of the transmitter.

An antenna with gain and directivity for the 70cm band is described on page 6. Try to build this antenna and see for yourself the increase in communication performance that an antenna with extra gain will give.

Readers' Letters

Keep sending your letters and photographs to the Editor, D-i-Y Radio, RSGB, Lambda House, Cranborne Road, Potters Bar, Herts, EN6 3JE, and we will send a pen to the sender of each letter published.

BUDDING CONSTRUCTOR

I THINK AMATEUR radio is fun. I am getting taught by Lindsey Pearson, G3VNT, who is our instructor and is getting us ready for the Novice examination. There are four people doing the course, including my dad, who is a technology teacher. I think *D-i-Y Radio* is fun, it has good ideas for Novices wanting to make their own equipment. It will help me to make things I could not afford to buy. I do have a Sony PRO 80 receiver attached to an ATU I made, with a long wire aerial put up between two trees in my garden.

I go to the Young Engineers' Club at Farlingaye High School in Woodbridge. Engineers from the BT Laboratories come every Thursday after school. We do lots of electronics and we can make anything we would like to build. We all try to think up new ideas and invent useful things. The club will give me the chance to try out some of the ideas in the magazine. I am going to make the crystal transmitter for 80m CW by Steve Ortmayer, G4RAW.

Dad wants to start a radio club at the school once he has his full licence.

Richard M Brown (Age 12).

SON TAUGHT DAD MORSE

CONGRATULATIONS TO 8-year-old Michael, 2E0AHY, passing his Morse, helped by his father, G4VHM.

For me it was the other way round. My son, Simon, 2E0ABW, passed his Morse at 12WPM aged nine in 1992. It was Simon who kept sending me page after page of Morse until I was competent to take the test.

Congratulations to both Novices, to you on your callsign, and to a great magazine.

Dave Moden, G0SAM

TICKET WINNER

I WOULD LIKE to take this opportunity to thank you for selecting me to win the tickets for the Royal Tournament.

I and the members of my family who went to the tournament enjoyed the evening very much.

We visited the ATC stand and met Flt Lt Malcolm Wood, who welcomed us to the stand and showed us the radio equipment of the ATC and the special event station which I found very interesting.

I would also like to thank you all for the very interesting and helpful magazines that I receive each month.

Roy Banks, RS96023.

GRANDSON'S *D-I-Y RADIO*

ALTHOUGH LONG past the age of the average Novice I never fail to read my grandson's copy of *D-i-Y Radio* cover to cover and find much of interest; even an elderly Taylor valve voltmeter I have which originally had an inconveniently large RF probe containg a 6AI5 twin diode valve, now sports a far slimmer one built as per the circuit given in the May-June 1994 issue built into an old shop marker pen body.

Gordon Brown, G3FVW.

D-iar-Y SEPT - OCT

SEPTEMBER

3 RSGB 144MHz Trophy/SWL Contest (1400 UTC on 3rd to 1400 UTC on 4th).

4 Bristol Radio Rally, Temple Meads Railway Station, Bristol.

Telford Radio Rally, Exhibition Centre, Telford. 10.30am. Details from G4LSA, 0785 284388

11 British Amateur Radio Teledata Group Rally (BARTG), Sandown Racecourse. Details from G8VXY, 021 453 2676.

12 Novice RAE

20/25 Live '94, Earls Court, London

25 RSGB 70MHz Trophy/SWL Contest (0900 - 1400 UTC)

North Wakefield Radio Club Rally, Outwood Grange School, Wakefield. Details from G4RCG, 0924 362144.

OCTOBER

1 RSGB 432MHz-24GHz Contest (1400 UTC on 1st to 1400 on 2nd)

2 RSGB 1.3GHz Trophy/SWL Contest (1400 - 2200 UTC)

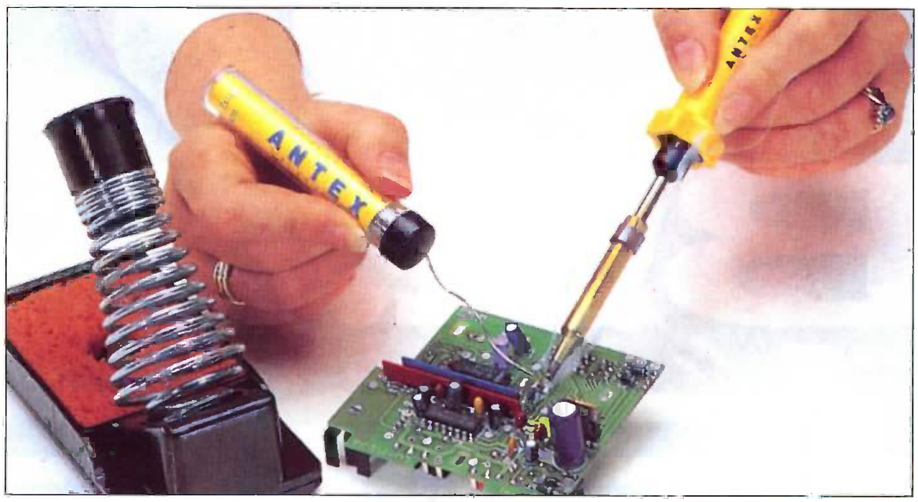
RSGB 21/28MHz SSB Contest (0700 - 1900 UTC)

7/9 RSGB HF & IOTA Convention, Beaumont Conference Centre. Details G3NUG, 0442 62929.

15/16 JOTA

21/22 Leicester Amateur Radio Show, Granby Halls, Leicester. Details G4PDZ, 0533 871086.

DI-DI-DAH-DAH-DI-DIT



Win a Soldering Iron

WIN THIS SUPER SOLDERING IRON which has been donated by Antex (Electronics) Ltd specially for this issue's competition.

1st Prize: Antex Soldering Iron

2nd Prizes: 3-hour blank Video Cassette

3rd Prizes: World Prefix Maps

THE MAIN EVENT in the amateur radio calendar during October is Jamboree on the Air, or JOTA as it is more commonly known. This is an ideal time for those people who have already gained their Novice Licence to contact scouts running JOTA stations. Even if you do not yet have your Novice licence, you can listen in and record JOTA stations you hear.

Listen for special JOTA stations operating on the 15 / 16 October and fill in the mini-log below. The first correctly completed entry out of the 'hat' on 31 October will win first prize.

Completed entries should be sent to the Editor, D-i-Y Radio, Radio Society of Great Britain, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE by 31 October. Winners will be announced in the Jan-Feb 1995 issue of *D-i-Y Radio.*

DATE	TIME (UTC)	BAND (MHz)	CALLSIGN WORKED/HEARD	LOCATION OF STATION WORKED/HEARD

WINNERS!

WINNERS OF OUR Scanner Competition (May-June issue):

1st Prize: Tricia Davenport, of Derby wins the PRO-44 Scanner.

2nd Prize: Philip Green, 2E1BUB, of Ipswich and Mr Simms from Angus, wins a copy of *Amateur Radio for Beginners* by Victor Brand.

3rd Prize: Mr H L Millard, G8LWK, of Burnley and Ronald Smith of Chesterfield win Receiving Log Books.

Incidentally, the answers to the questions were 1-*Power Supply*; 2-*Receiver*; 3-*Band*; 4-*Antenna*; 5-*Tuner*; 6-*Novice*; 7-*QRP*, which produced the word *SCANNER*

Special Offers

Every *D-i-Y Radio* includes a special offer, indicated by the 50p coin symbol. This issue's offer appears on page 18.

If you would like to save 50p off the price shown, then send in this corner token with your order. If you still have any of the old coupons left you can still use these instead, but remember - just one coupon per order.

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