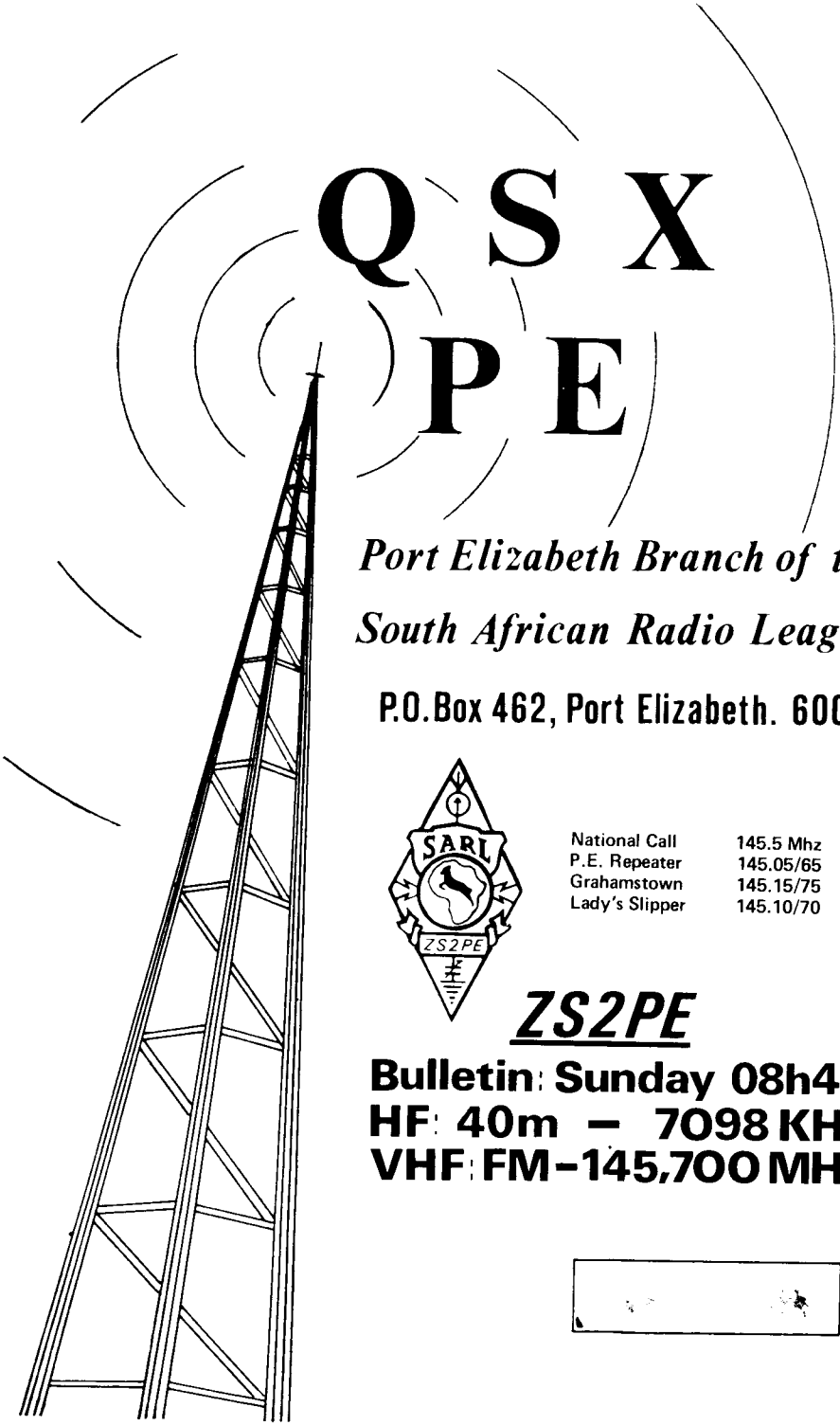


QSX PE

Port Elizabeth Branch of the South African Radio League

P.O.Box 462, Port Elizabeth. 6000.

National Call	145.5 Mhz
P.E. Repeater	145.05/65
Grahamstown	145.15/75
Lady's Slipper	145.10/70

ZS2PE

Bulletin: Sunday 08h40
HF: 40m – 7098 KHz
VHF: FM-145,700 MHz

Port Elizabeth Branch

›NOTICE OF MONTHLY MEETING‹

THE MONTHLY GENERAL MEETING OF THE PORT ELIZABETH BRANCH OF THE SOUTH AFRICAN RADIO LEAGUE WILL TAKE PLACE AT THE SUNRIDGE PARK SCOUT HALL, BROADWAY AVENUE, SUNRIDGE PARK, ON FRIDAY 17th FEBRUARY, 1985 at 8P.M.

****

Committee

CHAIRMAN:	Dick ZS2RS (322111)	VICE CHAIRMAN:	Trevor ZS2AE(321746)
SECRETARY:	Marge ZS20B (303498)	TREASURER:	Brian ZS2AB (303498)
PROJECTS:	Lionel ZS2DD (321770)	SPECIAL EVENTS:	Colin ZS2AO (312471)
P.R.O.:	Pete ZS2PJ (301493)	AWARDS:	Attie ZR2DY (325449)

QSX-PE - ZS20B and ZS2AB.

****

NEWS

Welcome We would like to welcome the following who have recently joined or re-joined the Branch and hope their association is a long, happy and beneficial one:
Van van der Merwe ZS2Y, Maurice Garcia, Angus and Patricia Mackay, Errol Levendall and Dup du Plessis.
CONGRATULATIONS: to Neil Villet who did exceptionally well in the November P.M.G. Examination with A for Regulations, B for Technical and A average. We hear that Langley, Lynn, Andre and Neil are getting stuck into the c.w. and intend going for their ZS calls straight off. Very best of luck to you all and we hope to hear the new calls on the air soon.

Welcome back to Brian and Sheila Gruss who previously held the calls of ZS2TY and ZS2BF and who were in Div. 6 for a while. Nice to have you back and wonder if you will get your old calls back. Happy house hunting!
NEW BEAM: Percy Buckley ZS2RM is the very proud owner of a new beam and in fact is so thrilled with it that he wrote an article which you will see later in the Newsletter. Percy has worked well over 300 countries and so perhaps will be looking for the last few he hasn't heard yet. Good luck.
ANNUAL GENERAL MEETING - EASTER WEEKEND: A well-attended meeting was held recently and arrangements are well in hand, but a few more volunteers are needed. If you feel you can help, please contact any of the Committee.
It seems that Clive Cornell ZS2GG is overseas at the moment, but we don't know where or whether it is business or holiday, but anyway hope that he is having a good time.

****

bulletin roster

February 19th	Colin ZS2AO
February 26th	Attie ZR2DY
March 4th	Pete ZS2PJ
March 11th	Dick ZS2RS

MINUTES OF THE GENERAL MEETING OF THE PORT ELIZABETH BRANCH OF THE SOUTH AFRICAN RADIO LEAGUE HELD AT SCOUT HALL, SUNRIDGE PARK, PORT ELIZABETH ON FRIDAY 20th JANUARY, 1984.

****

PRESENT: 26 members and visitors.

APOLOGIES: ZS2EX, ZS2LO, ZS2BR, ZS2KS, ZR2VV, ZS2WF, ZS2ZR.

The Chairman extended a welcome to the ladies, to all members and also to Fred ZS2JS, Wolfie ZS2WG, Viv ZS2VM and Norman ZS2RT and Cheryl. Congratulations were extended to Lynn Crothall on passing the R.M.I. exam. A vote of thanks was proposed to Athol ZS2CM and Tess who had helped organised the change of venue and for getting the kitchen ready. This would not be done by them every month and members should be prepared to lend a helping hand. Dick said that he believed the new venue was more convenient and certainly more pleasant for the bulk of the members as was shown by the attendance.

MINUTES: The Minutes of the Meeting held in November, 1983, having been published and circulated in ZS2X-P2 were taken as read, proposed by Brian ZS2AB and seconded by Bill ZS2BX.

ARISING: Mention was made of the Slide and Video show presented by Hans ZS6AKV re AMSAT and the first Ham in space. Lionel ZS2IF reported that it had gone off very well but that he had been disappointed that so few members of the Branch had attended as it had been very topical. The Secretary was asked to write to Hans and thank him on behalf of the Branch.
The Field day operation, the children's Christmas Party and the Branch Christmas Party had been very satisfactory and thanks were extended to all concerned.

FINANCE: Brian ZS2AB reported that the A.G.M. fund stood at R2200 and a further R72 had just been received.

ARISING: The Chairman said that he hoped that those members who had not yet contributed would see fit to help reach the original target figure.

CORRES: Application forms from Van ZS2Y.
Letter from Pretoria Branch.
Several Newsletters.

GENERAL: The Chairman extended a welcome back to Van ZS2Y who was one of the original members of the Branch.
The Pretoria Branch were offering blue and chrome metal car badges for sale which would have the member's call sign printed thereon. These were for sale for R7.50 and the Secretary would take orders after the meeting.
Dick said that it was decided to have a further meeting of the A.R.M. working group and this would be held on the first Friday of February, preceded by the Committee meeting. A meeting of the ladies helping with the catering for Friday night would also be held shortly.
The Cockscomb repeater had been on the air for 4 months and although it received little use it was behaving well. Trevor had received the makings of a duplexer and it was hoped to have it operational on site before the A.G.M.
The entries for the Competition in December QST were scrutinised and the joint winners were Pete ZS2PF and Bill ZS2BX who each received a sheet of QSL stickers.

There being no further business the meeting was closed.

sgd:
R.J. Schönborn ZS2RS
Chairman

sgd:
M.T. [illegible]
Secretary

Wise Words

When working with the very popular "ribbon cable" used so extensively in logic and computer equipment, there are a number of things which can easily happen to make OM Murphy jump for joy. I have suffered at this man's hands all too frequently recently, and have devised a couple of little tricks to wipe the grin off his face. Try these next time you use the cable.

The cable has a very tough but relatively thin outer insulation, and the wire size is not very large either, these two combining to produce broken strands when the wire is stripped, if one is not very careful. I have found an excellent way to overcome this. When you are preparing to strip the cable for soldering, draw a line with a pen across the cable at whatever distance back from the end that you wish to strip it, lay a ruler or other straight edge across the cable, and, with a VERY sharp, fairly rigid blade, make a cut across the insulation. Do this gently, so as not to nick the strands inside. Turn the cable over and do the same on the other side. You will find that only a gentle pull with your sidecutters will cleanly remove the insulation from the wires. When doing this cut, use a blade with a fairly rigid body. The so-called "carpet knife" blades are ideal. A razor blade is a bit thin and is not always easy to control.

When separating the wires of the ribbon cable prior to stripping, the blade trick can be very useful as well. Again, mark the cable by means of a line drawn across its width at whatever distance from the end you wish to start separating the cores. Place the cable flat on a hard surface, and, holding the blade at about 45 degrees to the horizontal, press the sharp point of the blade into the web between the first two strands at the line you have drawn. Hold the blade in this position, and draw the cable slowly along under the blade. Keep the cable parallel with the blade, and you will find that the two strands are separated perfectly without removing the plastic from either core. The process is merely repeated for each core.

When you need to connect a ribbon cable to a plug which is wider than the cable, or does not have all its contacts in a convenient layout, merely stripping and connecting the cable, leaving its ends all the same length, you will invariably find that the end cores are stretched onto the outer pins, whilst the inner cores all bunch up causing an unsightly mess with other possible problems. This can be overcome by trimming the cable end before stripping. Here a little experimentation may be required depending on your particular socket or plug, but the principle remains the same. It consists of taking a pair of scissors (don't let the XYL find out !!)and, starting at one edge of the cable, cut through the strands so that the end of the cable is curved in towards the centre and back out to its full length at the other side. This will result in the outer cores getting progressively shorter as the centre of the cable is approached, and when the cable is made off, all, or certainly most, of the cores will end up looking as though each were cut to the right length. Actually cutting each one to the correct length as you are making off the cable can be a very tedious process which may result in several broken cores before you have finished.

One last tip which can save alot of trouble. When soldering such cable to a plug, slip a small piece of systoflex over each core and push this down over the completed connection after soldering. This supports the joint very well, and will overcome the problem of broken wires after a bit of movement of the cable.

de Brian ZS2AB.

AGM'84

Arrangements are going ahead well for the A.G.M. to held here in Port Elizabeth over the Easter weekend, and now in return for your help and generosity, we want to offer you something. On Friday evening 20th April, there will be a finger supper at the Drill Hall, Central. This will be an opportunity for members to meet Councillors and Delegates from other Branches and to have a big get-together of local hams. There will be no charge for this, but you can appreciate that in order to be able to cater sufficiently, it is necessary to know how many people will be there. Entrance will be BY TICKET ONLY and therefore we must know by 16th March if you are coming in order to be able to get your tickets to you in time and arrange the catering. Please contact the Secretary on 303498 (preferably mornings) or Dick on 5[illegible] (business hours) and let us know.
On the Saturday 21st April, the A.G.M. proper takes place at the Edward Hotel, and if you intend being present at the meeting, please also let us have your name, as seating is fairly limited. The A.G.M. starts at 8a.m. and usually continues most of the day.
On Saturday evening at 7 for 7.30p.m. the Dinner and Cabaret will be held during which the speeches and Presentation of Trophies are made. Tickets are R12 each and seating is also limited, so it is ESSENTIAL that we know by 16th March if you are attending. Contact Dick or Marge.

****

Hamnet News

The holiday period proved to be quiet for Hamnet, something to be grateful for. The only accidents known of where a radio amateur was on the scene, was where the amateurs did not belong to Hamnet!

As from the 1st January 1984, Hugo ZS6OH takes over as the national Co-ordinator from Geoff ZS1LM. Thanks go to Geoff for all his hard work in the past and congratulations and good wishes to Hugo for the future.

73, de Al ZS2U.

(Taken from QUA, Algoa Branch Newsletter)

****

CQ DX CQ DX CQ DX

Thanks to Percy ZS2RM for the following information:
Excellent openings on 14 MHz on 2nd February with the following DX heard and worked. All times GMT and all CW.
0557 KH6BGE 14026. 0608 JF2DJK 14026. both longpath.
1905 5H3SB 14025. 1910 TU2AL 14040. 1935 TL8SR 14026 QSL via F6GQK.
1940 9V1OK 14029. 1946 FM7WH 14026 QSL Leo Duillet, 7 Rue Bolivar Terres Sainville, Martinique.
1950 VQ9AC 14026. All the latter shortpath.
Operational for a week or two - K4SW/VP2K on Sts Kitts and Nevis Island. 1934 GMT 14040. Al. QSL via K4FJ.

****

An energy crisis for a lot of people occurs just after the alarm goes off in the morning.

One of life's hardest decisions is which line to stand in at the supermarket.

SIR JOHN TURTON RANDALL

Ian Sinclair

Not well known to the public, his experiments with the magnetron effect brought about a breakthrough in the generation of microwaves.

This is no exotic mid-European name, and yet Sir John Turton Randall's fame is of a distinctly select variety. Like many distinguished academics, Sir John Randall is famous to a fairly small number of people who know of his achievements.

That is by no means to say that the achievements themselves are obscure — his work on microwaves enabled radar to play a crucial part in Britain's defences during the Second World War, quite apart from opening the way for the many roles radar has played since that time. In a very different context, it has given rise at some removes to that increasingly familiar phenomenon of our time, the microwave oven. Behind the headlines and high-street familiarity of winning wars and microwave cookery there are always the back-room boffins, rewarded perhaps but rarely renowned.

Sir John Randall was (and still is) one of these. Born in 1905, he pursued a brilliant academic career, and gained his MSc degree from the University of Manchester in 1926, at an age when most students are struggling with a lower degree. He worked in electrical research in the laboratories of GEC between 1927 and 1937, but then returned to academic life as a Warren Research Fellow of the Royal Society in the years 1937 to 1943.

Microwave Generation

This was no return to ivory towers or dreaming spires. His research in those years was very strongly connected with his work at GEC, and centred on the generation of microwaves. At that time, "microwave" was the term loosely applied to any frequency of more than about 1GHz (1000 MHz), and there was at that time no satisfactory way of generating these frequencies at high power. The first radar experiments were, in fact, conducted using frequencies around 50MHz.

To see why such difficulties existed, we have to think of the methods that were used for constructing oscillators. A conventional high-power oscillator of the mid-30s would use a triode valve, not so very different from the type we still use for the same purpose, with the cross-section shown in **Figure 1**. Electrons are emitted from the hot tungsten filament which, for a large transmitting valve, would typically use 115V 200A just in heating. These electrons are then attracted by the high positive voltage of the anode, a metal cylinder which forms the outside of the valve and which is water or air cooled.

The flow of electrons between cathode and anode is controlled by a "grid", a coil of wire or a wire-mesh cylinder placed between anode and cathode, whose voltage can be varied. With a high negative voltage on the grid, electrons will be repelled back to the cathode, none reaching the anode, with a positive voltage on the grid, a few electrons land on the grid but most travel on to the anode. The voltage on the grid controlled is the anode current, just as the voltage on the gate of a FET controls the drain current.

Oscillation Limitations

Triode valves of this sort were used and still are produced for radio transmitters, and they could be used as high power oscillators by adding some positive feedback, using circuits such as the one in **Figure 2**. Such oscillators could

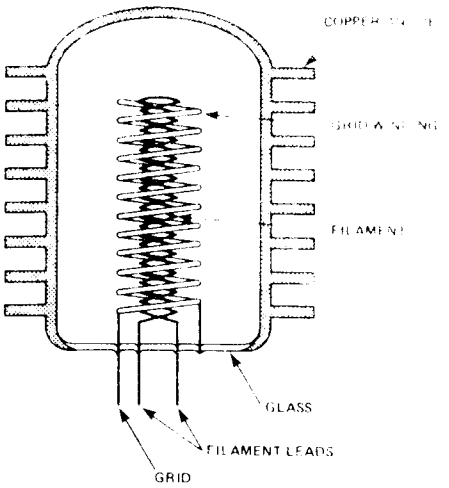


Figure 1. Cross-section of a typical triode transmitting valve.

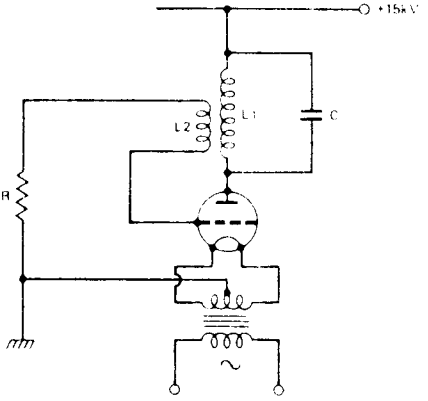


Figure 2. The type of circuit which would be used as an oscillator with a triode valve.

produce an output whose frequency is controlled by the inductance of the tank coil and the value of capacitance connected across it, but there was a limit to the frequency that could be obtained. One limitation was simply that it's difficult to make a "coil" of less than one turn, but the more serious limitation was due to the valve itself.

The action of the oscillator depends on the positive feedback from the anode to the grid so that as the anode current increases, and its voltage decreases the grid voltage is forced to increase. This works normally at low frequencies, but at higher frequencies it starts to suffer from the effect called "transit time".

The voltage between the grid and the filament is never very large, so that the electrons move comparatively slowly between these electodes — slowly meeting at a few million metres per second! What we're comparing this with, however, is how quickly the voltage at the grid will change if a frequency of a 1GHz is being generated. One complete cycle of a 1GHz wave takes just one nanosecond, and the grid voltage would change from maximum to zero in a quarter of this time, 250 picoseconds. At the lower electron speeds, it would be possible for an electron to leave the filament when the grid voltage was positive, but for the grid voltage to have become zero or negative by the time the electron reached it!

An electron struggling along at a speed which is one hundredth of the speed of light, for example, will cover 3mm in one nanosecond, which is a lot less than the distance between the filament and the grid of a large transmitting valve. The snag is that if you close up the gap, you are likely to have problems of sparking across the gap, particularly as the metal expands and even more so if there is any vibration.

Enter The Magnetron

Much was done to develop the transmitting triode, but transit time remains a problem that can't be got around in valves any more than we can get around it in transistors. This was the problem that faced two men working at Manchester in the early days of World War II. One of the two was John Randall, the other Dr. Henry Boot. Together, they made the valve that won the war.

For a long time before those days, an effect called the "magnetron effect" had been known — it is used today in an 'A' Level Physics experiment to measure the ratio of charge to mass for the electron. The cross-section down a simple magnetron is shown in **Figure 3**; it consists of a diode valve using an electron-emitting cathode and a cylindrical anode in a glass tube, evacuated and sealed, all within a coil which provides a steady magnetic field.

Without any magnetic field, current flows between cathode and anode when the anode is at a positive voltage and the cathode is hot. When the magnetic field is switched on, the electron path becomes bent, and if the field is strong enough, the electrons will move in circles, just missing the anode, so that the anode current drops to zero.

Now the interesting thing about this device is that the electrons can be moving very fast, so the time needed to perform each revolution inside the anode is very short. The other point is that if a tuned circuit is connected between anode and cathode, the valve will generate oscillations as the electron beam alternately touches and misses the anode (**Figure 4**). Randall and Boot's great step forward was to combine the valve with the oscillating circuit to form the cavity magnetron.

Perhaps they had been watching a flautist, because what occurred to both of them was that as the electrons travelled past a bottle-shaped cavity in the wall of the anode, the cavity might act as a tuned circuit for microwaves, just as the air inside a flute acts as a tuned circuit for the breath of the flautist. They suspected already that the cavity would act as a resonant circuit; the question was — would it be forced into oscillation by the electrons?

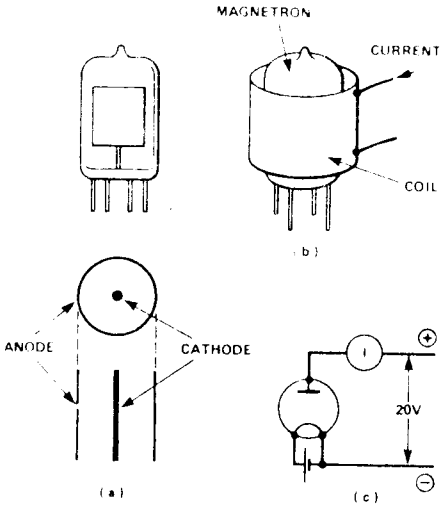


Figure 3. The magnetron. (a) Views of the structure. (b) The valve, which is a simple diode, is used inside a magnetic field provided by a large coil. (c) The circuit connection to the valve — the current drops suddenly as the magnetic field is increased

It Works!

Randall and Boot constructed a prototype to test their ideas. The prototype still exists — it would nowadays be classed as a CW magnetron, because it generated microwave radiation continuously, rather than in pulses. To their delight, the frequency of oscillation was very high, well above 1GHz, and the power, even with continuous oscillation, was also very high. A breakthrough in the generation of microwaves had been made just at a time when such a development was sorely needed.

Pulsing the cathode voltage of the magnetron produced even more dramatic effects — the generation of very large peak powers (up to 100kW even in these days) which greatly extended the range of the early radar transmitters.

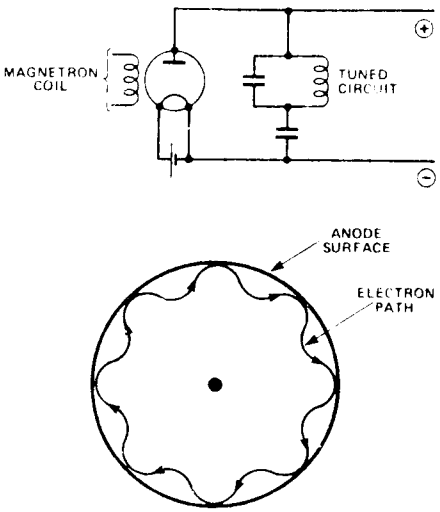


Figure 4. Using the magnetron valve with a tuned circuit. This causes the electron path inside the valve to be corrugated as the anode voltage oscillates.

This, combined with the use of high frequencies (which allowed the radar to distinguish between smaller targets, and to see more details of large ones) formed the basis of our radar early in the War, and allowed us to concentrate our pitifully small airforce, reduced to a shell by well-meaning pacifist politicians, on facing the enemy, rather than trying to patrol the whole of our shores.

John Randall, like so many distinguished academics, quietly resumed an academic career after the War, and a grateful Government presented him with a prize of £12,000 in 1949. To understand what that means, you have to realise that you could buy a semi-detached house in Essex for around £900 at that time. He had been elected as a Fellow of the Royal Society in 1946, and he held several professional appointments in physics before changing his interests to zoology. He was knighted in 1962, and is at present Professor of Zoology at Edinburgh University.

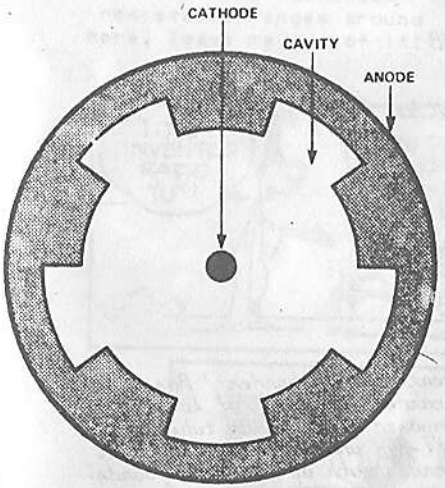
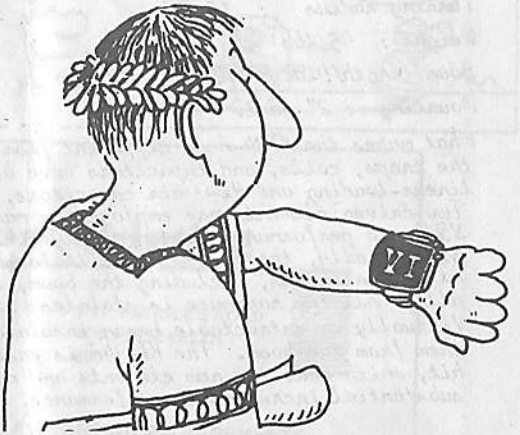


Figure 5. Cross-section of a cavity magnetron. The cavities act as tuned circuits for a microwave frequency.

Mr John St Clair, scientist, inventor and electronics enthusiast, demonstrates the speed of light to children at his home in Port Elizabeth. He fired a red laser beam, recording the frequency of a million vibrations a second on a screen, and then recorded the lag when the beam was bounced back from a mirror outside. Looking on (back row) are Alexa Greensmith, Bruce Hill, David Stewart, with Garry Alleman, Robert Stewart and Barry Abernethy in front Weekend Post



KLM KT34-A Bandpass Tribander ********** de ZS2NI Percy Pudney.

The KT-34A Tribander is innovative in concept, unique in its practical design, consistent in superior performance.

All four of the elements work on each band. Ten meters is a full-sized element using a trap formed with a small amount of linear loading(also used to shorten 20 meter section) and an air capacitor. Fifteen meters uses a tuned decoupling stub with another air capacitor and is also a full-size element. Twenty meters is approximately 75% of full size and defined by the element extending beyond the 15 meter decoupling jumper. Twenty and fifteen meters tune with total independence.

Two driven elements(log cell) with all three resonances are employed to achieve a broadband driven structure which allows almost constant flat VSWR and performance across each of the three bands. Basic feed impedance is 200 ohms balanced and is transformed to 50 ohms unbalanced with the 4KW PEP KLM balun (supplied).

Power handling capability is excellent with no lossy coils or capacitors. Consequently efficiency is high(a conventional tribander may be rated at 8db but if it's only 50% efficient, the effective gain is really 5db).

Normal operation (14.-14.350) , (21.0-21.450), and (28.-29.50MHZ) requires no adjustments other than the original assembly dimensions.

Specifications

Frequency of Operation :-

20M 14.0 - 14.35 MHz

15M 21.0 - 21.45 MHz

10M 28.0 - 29.75 MHz

Elements ; 4 on each band

Max element length : 24 feet

Gain : 7 dB over a dipole reference

F/B : 20M - 25DB , 15M - 22dB , 10M - 20dB

F/S : 30dB or better

Feed impedance : 200 ohms balanced/50 ohms with 4:1 balun supplied

Power Rating : 4KW P.E.P.

Wind Area : 6 sq. ft

Wind survival : 100 M.P.H.

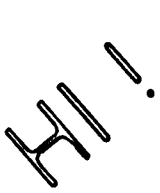
Turning radius : 15 ft.

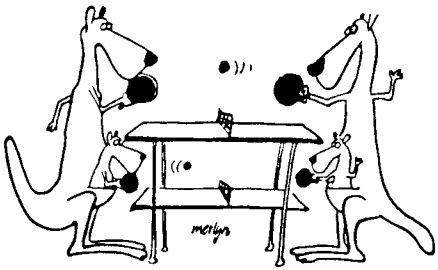
Weight : 45 lbs

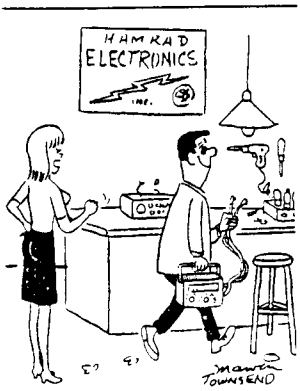
Boom length/Dia. : 10ft./3" O.D.

Mounting : 2" mast.

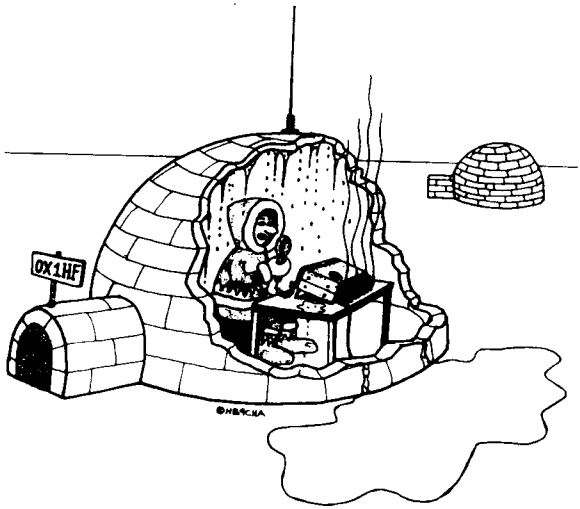
What makes the KT34-A so different from a conventional tribander ? Basically the traps, coils, and capacitors have been discarded in favour of lossless linear-loading and Hi-Q air capacitors, all composed of aluminum tubing. Two driven elements are employed to make the KT-34A unusually broadbanded. VSWR and performance remain nearly constant across each of the three bands. Structurally, the KT-34A is built tough. No boom support is required. All the aluminum, including the boom, is strong weather resistant 6063-T83 alloy. All the hardware is stainless steel except for the mounting U bolts. Virtually indestructable Lexan insulators support the elements and insulate them from the boom. The KT-34A is easily expandable. The KT-34XA Upgrade kit, which adds two new elements and doubles the boom length, produces substantial increases in performance. The KT-34A cannot become obsolete.

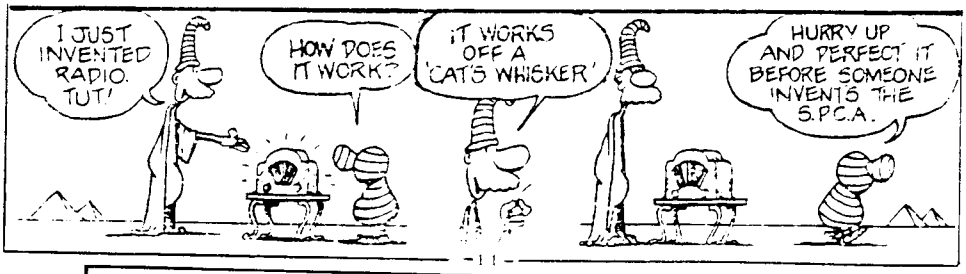






"Next time you check resistance ranges around here, leave me out of it!"





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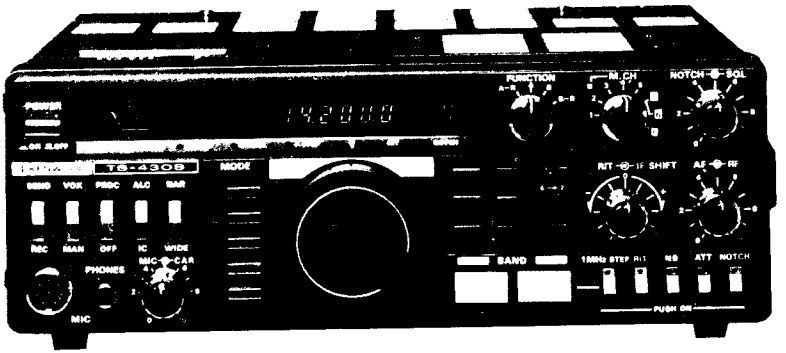

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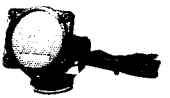

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