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# WATTS

01 - 2004

Year 69

Monthly newsletter of the Pretoria Amateur Radio Club  
Maandelikse nuusbrieff van die Pretoria Amateur Radio Klub.



PARC, PO Box 73696 Lynnwood Ridge 0040, RSA



<http://www.qsl.net/zs6pta>

Bulletins : 145,725MHz 08:45 Sundays / Sondae  
Relays : 1840, 3700, 7066, 10135, 14,200 MHz  
depending on season

Swapshop: After bulletin 2m and 40m (also on-line)

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Ledenuus  
Vergadering hoogtepunte  
Dagboek  
Algemeen / Tegnies  
Bladsy agt

## Next meeting

Date: 08-01-2004  
Time: 19:30 for 20:00  
PARC Clubhouse,  
South Campus,  
University of Pretoria.  
SE cnr University and  
Lynnwood roads.

## Editorial – new year's wish

The new number in our lives is 2004 and nothing else. The New Year ahead should not be fuzzy with the cobwebs of the past – Amateur Radio can be very prone to this if old gripes are maintained especially when considering what has transpired during the past year. Surely the bigger picture is the more important one – your club membership is the first step in showing solidarity with the hobby and what it stands for – while SARL membership - controversial as it was - is now more important than ever to be put into proper perspective from a personal point of view.

Using this forum I am probably preaching to the converted, but ask you to be pro-active in this respect and entice those lost members that you may personally know to return to the fold, especially to that of the PARC. Over the past two years at least twenty members have apparently thought it unimportant to renew membership and this is of personal concern to myself and your Committee.

On the positive side we are slowly gaining new members and will eventually make up for this loss. New members bring in new ideas, enthusiasm and expertise. It surely is any club's wish to grow and prosper. Let us all do an effort this coming year to ensure our collective future.

**The PARC wishes all its members and their families a happy and prosperous new year.**

**"SPRAINED THUMB, THEN LARYNGITIS -- THE BEST PAIR OF EXCUSES A CLUB MEMBER EVER HAD."**



### *Another Wish...*

*This is also an opportune time to to speak my mind on the matter of club meeting attendance.*

*Please consider club meetings as a hobby highlight in your month.*

*Support the hobby - meet old pals and make those members who are prepared to give a technical presentation feel their efforts are worth while..*

**Die PARK wens aan al sy lede en hulle families 'n gelukkige en voorspoedige Nuwe Jaar.**

## Redaksioneel - nuwejaarswens

Die nuwe nommer in ons lewe is 2004 en niks anders nie. Die nuwe jaar vorentoe behoort nie gesluit te wees met spinnerakke uit die verlede – Amateur Radio kan daaronder ly as ons ou ergernisse laat voortleef veral as ons die gebeure van laasjaar in oënskou neem. Die groter prentjie is tog sekerlik die meer belangrik – u klub-lidmaatskap is die eerste stap om saam te staan vir die stokperdjie en waarvoor dit staan – terwyl SARL lidmaatskap - twisbaar soos dit was – nou meer belangrik is as ooit om vanuit 'n persoonlike oogpunt in die regte perspektief te plaas.

Deur middel van hierdie forum preek ek waarskynlik alreeds vir die bekeerdes, maar vra dat u in hierdie aspek pro-aktief sal wees en die verlore lede wat u dalk mag ken, weer na die kraal terugbring, veral die van die PARK. Oor die laaste twee jaar het ons tenminste twintig lede verloor wat dit waarskynlik onbelangrik geag het om lidmaatskap te hernu, wat my persoonlik en u Komitee bekommer.

Aan die positiewe kant is ons stadig besig om nuwe lede te werf en sal dus mettertyd die verlies inhaal. Nuwe lede bring nuwe idees, geesdrif en kundigheid. Dit is sekerlik enige klub se wens om te groei en gedy. Kom ons doen almal 'n poging in die komende jaar om aan ons gesamentlike toekoms te werk.

# Minutes of the monthly club meeting of the Pretoria Amateur Radio Club held at the South Campus of the University of Pretoria on 04 Dec. 2003

- 1a) Welcome:** Hans ZS6KR declared the meeting open and welcomed all present.
- 1b) Attendance:** The meeting was attended by 27 members and 6 visitors.
- 1c) Apologies:** Apologies were received from Almero ZR6RY, Don ZS6CRT and Hal ZS6WB.
- 1d) Lief en leed:** Almero ZR6RY se vader is Maandag 1 Desember oorlede. Die begrafnis vind plaas op Saterdag 6 Desember om 9:00 vanuit die N G Kerk Florana. Jac ZS6QA is steeds in die Medstep kliniek net oorkant die Eugene Marais Hospitaal. Aanduidings is dat Jac eerskomende Maandag ontslaan kan word. Roy ZS6XN se LV het bosluiskoors onder lede. Roy het berig dat dit nou heelwat beter gaan. Callie Pistorius ZS2CWP is nog steeds ernstig siek en is ook nog steeds in die hospitaal.
- 1e) Minutes of the previous meeting:** The minutes as published in Watts were approved. Proposed by Ed ZS6UT and seconded by Richard ZR6CK.
- 1f) Matters arising from the previous minutes:** None.
- 2) Club Activities:**
- 2a) DF Hunt/Jakkalsjag 22 Nov. :** Bill ZS6KO het rapporteer dat daar nie n Jakkalsjag was nie omrede niemand opgedaag het nie.  
**Kom aan manne, wat is fout? Kom ons wys dat daar wel belangstelling is en dat ons 'n sukses daarvan kan maak!**
- 2b) Financial report:** Richard ZR6CK reported that there were no changes as there were no funds received or any monies paid since the last club meeting.
- 3) General:** Pine ZS6OB informed the meeting that there is a sked on the 13th December with W5UN at 07:00. Members were invited to join Hal ZSWB and Pine ZS6OB to participate in this event.  
  
"JB" ZR6YV gave a brief overview of all the motorsport activities the club was involved in the past year. In total there were 10 rally events and 4 track events (Kyalami) Twenty nine amateurs were involved of which nineteen were from the **Pretoria Amateur Radio Club**.
- 4) Awards:** The following awards were made:  
**a) Certificates:** Special Award of Merit - Andre van Tonder ZS6BRC and Johann de Beer ZR6YV – Rallies. Also Willie ZS6AEA in absentia for 56m of repeater power cable replacement.  
**b) Trophies: HF constructors trophy:** Vitor Gouveia ZS6VG – Ginpole / tower lift device.  
**c) VHF constructors trophy:** Ed Willers ZS6UT - Jpole dual band antenna for 70cm and 2m.  
**d) Desert Island trophy:** Hans Kappetijn ZS6KR.
- 5) Next meeting:** The next meeting is scheduled for 8th January 2004 at the clubhouse 7:30 for 8:00.
- 6) Closing:** Hans wished everybody a Merry Christmas and a prosperous New Year and the meeting closed at 20:36.
- 7) Social:** Refreshments organized by Willie ZR6WGR were enjoyed by all.

ZR6JHB

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## PARC shop

We still have a number of **caps** with the PARC logo available at R25 each.  
PARC **shirts** are out of stock but orders are awaited from members – an order of 20-25 will be the minimum – get your name on the list!  
**Magnetic callsign-stickers** approximately 160x40mm are also subject to a minimum order.

## PARK winkel

Ons het nog 'n aantal **pette** met die PARK logo teen R25 beskikbaar.  
PARK **hemde** is uit voorraad maar ons wag vir u bestellings – 'n bestelling van 20-25 sal die minimum wees – plaas u naam op die lys!  
**Magnetiese roepsein-plakkers** ong. 160x 40mm is ook onderhewig aan 'n minimum bestelling.

## Birthdays Verjaarsdae

Januarie



02 Alf ZS6ABA  
03 Stan ZS6SDZ  
04 Mike ZS6AFG  
05 Pierre ZR6PJH  
06 Carmyn, daughter of Gary ZR6GK  
08 Darren ZR6TY, son of Joe ZS6TB  
08 Robert ZS6ARC  
09 Brian ZS6CID  
12 Ivan ZS6AUT  
13 Edna, sw of Peter ZS6RX  
14 Gert ZS6ZB

## Anniversaries Herdenkings

05 Louise en Almèro ZR6RY  
05 Elsa and Jorge ZS6JOR  
07 Doreen ZR6DDB en Johan ZR6JHB

18 Mary, sw of Bill ZS6KO  
20 Errol ZR6VDR  
24 Miemie, lv van Hennie ZR6HEN  
24 Mariet ZS6NR, sw of Ken ZS6NB  
29 Willie ZS6AEA  
30 Stan ZS6AAO  
31 Elize, lv van Pieter ZR6AHT

## New Members

None this month.

Current membership: 113 (67 on e-mail)  
Still unpaid: 20 who will not be reading this!

## Sick parade



Jac ZS6QA is back home.

## Krukkelys

Calie ZS2CWP is terug in Knysna.

## Afleegeboel

Ons wens Almero en familie sterkte toe met die onlangse verlies van sy vader.  
Ons wens Doreen ZR6DDB en familie sterkte toe met die onlangse verlies van haar moeder.  
Ons wens Carl ZS6NCC en familie sterkte toe met die verlies van sy vrou.

## Ham diary // Dagboek

**Dec** 26 DARC Christmas Contest  
27 RAC Winter contest  
28 SARL President's Net  
**Jan** 03-04 Eu CW 160m contest  
08 PARC HF Awards applications to be handed in at meeting  
10-11 Hunting Lions on the Air SSB/CW 0000-2400  
18 SARL Intecnet  
23-25 PEARS VHF/UHF contest  
end SARL Tinus Lange Awards call for submissions

## Snippets / Brokkies

- **Sertifikate** sal aan PARK lede uitgereik word wat 10 jaar of langer lid was – Laat weet asb of u kwalifiseer, want ons het nie rekords van u aansluitdatum nie. Wees egter geduldig tot ons al die data bymekaar het.
- **Certificates** will be awarded to PARC members of 10 years or more – Let us know if you qualify as we do not have records of your date of joining. Please be patient however as we first need to gather all the data.

- Two PARC members participated in the **CQWW CW** contest (Nov 2002 results)

- **Hal ZS6WB** has contacted 11 countries on 2m with the latest WSJT software and 100W to a 17el beam on a 5/8 boom:  
EME: Southern Africa: 3  
DX: 5 countries plus USA 5 states  
Meteor scatter: RSA: 5 and DX: 1  
Well done and we hope to hear from more members!

	SOUTH AFRICA		Q's	Z	C
ZS6KR	3.5	3,081	43	16	23
*ZSØE	<b>A</b>	<b>103,212</b>	<b>303</b>	<b>53</b>	<b>88</b>
			<b>(Op: ZS6AJS)</b>		
*ZSØM	*	3,256	29	16	28
*ZS5NK	28	2,024	64	15	29
*ZS6EGB	<b>21</b>	<b>28,512</b>	<b>288</b>	<b>24</b>	<b>57</b>
*ZS4U	*	16,029	184	16	23
*ZS6MG	<b>7</b>	<b>86,020</b>	<b>276</b>	<b>30</b>	<b>80</b>

## DECEMBER MEETING HIGHLIGHTS // HOOGTEPUNTE BY DESEMBER VERGADERING



**Certificate of Merit: Johann ZR6YV relating the past year's PARC involvement in motorsport.**



**HF Constructors' Award: Vitor ZS6VG explaining his ginpole design from a professional drawing.**



**Vitor receiving his award.**



**VHF Constructors Award: Ed ZS6UT for his Dual band Jpole.**



**Ed ZS6UT receiving various awards he earned during the year.**

- a) DXCC 160m CW
- b) SARL Top Band Award CW
- c) SARL All Africa Award CW

**Guess who got the Desert Island Award again.**



## Rechargeable batteries vs single-use batteries – Economic comparisons

(Condensed from *Quantum* June 2002: *Long term performance of rechargeable alkaline batteries* pp 9-12)

Rechargeable batteries are viewed as an excellent remedy to the resource and energy-wastage inherent in manufacturing single-use batteries. Capacity per Rand was compared between rechargeable alkaline manganese (RAM, Grandcell) and the best selling brands in both of the single-use chemical construction formats such as zinc-carbon (ZC, Eveready) and alkaline manganese (AM, Duracell).

ZC batteries require a longer recovery period between discharge cycles than AM types. To match consumer behaviour for portable appliances, long-term tests with rest periods were applied with several household appliances as loads consuming various levels of current over a period of more than a year. Quicker continuous test cycle methods such as used by manufacturers were purposely not followed.

### General behaviour

Single use batteries showed a steady deterioration and reached the end of their useful life in a fairly predictable manner.

Rechargeable cells showed an erratic and unpredictable performance about halfway through the tests. It was determined that one in four under-performed and this appeared to happen in a random pattern amongst a large selection, with some sort of self-healing process taking place after a cycle of below-average performance, with the cell then going on to perform normally again for a good number of cycles.

### Results

Radio	Tape	Torch	Battery type	Radio	Tape	Torch
19,25	12,24	12,45	RAM	281	Spoiled	17,8
14,47	14,09	11,23	AM	223	93,9	16,0
7,19	7,45	4,45	ZC	111	49,7	6,4
Total capacity (ampere hrs)				Hours typical use		

### Conclusions

The single-use AM capacity is thus twice that of ZC and also last about twice as long. With cost data, together with the total capacity, we can determine the cost effectiveness (Ampere-hrs/Rand) of each type of battery with each appliance. Keeping it simple, the following conclusions can be drawn:

**ZC is more cost-effective than AM (price is 30% for ½ capacity) but is poor for high current.  
RAM is more cost-effective for all applications (+58% over AM but only +14% over ZC)**

## Batteries for embedded systems

(Brief extract from *Quantum* June 2002 pp 5-7)

A cell's self-discharge rate becomes an important factor where very low currents are required or long standby periods are involved. Such conditions exist typically in memory circuits, calculators, clocks, circuits involving sleep and idle modes, etc. Temperature sensitivity is also a consideration as well as voltage stability during its useful life. The correct battery technology must thus be chosen to obtain an optimum lifetime in the application involved. The table below will help in making the right choice.

Technology	Open circuit voltage	Peak pulse current	Self discharge	Cost	Voltage stability
AA NiMH	1,25	High, 5A+	High, <6months	High	High, 10%
AA Alkaline	1,5	Medium 2A+	Medium <7 yrs	Low	Low, 40%
AA Lithium	1,6	Med-high, 3A+	Very low, 10yrs	Medium	High, 10%
2032 Lithium	3,0	Low, 15mA	Low, ±7yrs	Medium	High, 10%

The latter will typically fall to 2,8V after 500 hrs of service with a 10k load (300µA) and give 2000 hrs of service with a 30k load (100µA). These figures will increase even further with lighter loads. If the application requires a few years of life, these figures will be reduced somewhat due to self-discharge.

# LINEARITY AND THE 10% RULE

A 'linear amplifier' gets its name because the graph of output power against drive power is a perfect straight line – the solid line in Fig. A. This line describing the relationship between input power and output power is called the 'transfer characteristic'. For an amplifier to be truly linear, what comes out must be purely a larger-scale replica of the drive signal.

You can easily plot the transfer characteristic of your own PA using a pair of wattmeters and a variable single-tone source (Fig. B1). If your PA has a bypass switch you can manage with only one wattmeter (Fig. B2).

Any distortion of the straight-line transfer characteristic will give rise to intermodulation products. The most common form of non-linearity is gain compression; the transfer characteristic bends downwards until eventually no further output can be achieved, no matter how hard you drive the amplifier (the broken line in Fig. A). Some solid-state amateur PAs exhibit gain compression even at very low drive levels, and almost all are well into the region of severe intermodulation distortion and splatter at the manufacturer's rated output. Valve PAs, on the other hand, tend to be much more linear unless incorrectly biased, tuned or loaded.

A reliable method to stay out of gain compression and keep your signal clean is to follow...

## The 10% Rule:

- 1 Advance the drive level until the output is hardly rising any more.
- 2 Back off the drive until the output falls by 10%.
- 3 Then make sure that the drive level on speech at no time rises beyond the value you've set.

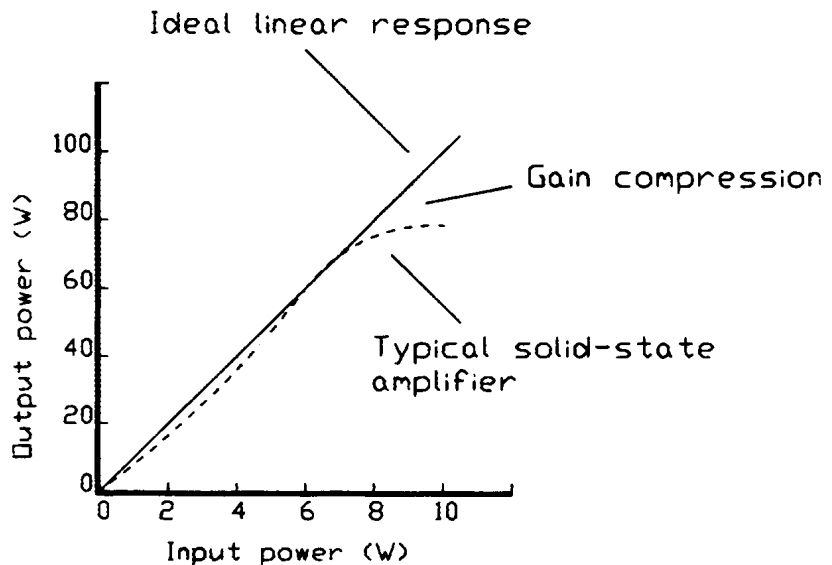


Fig. A. Transfer characteristic of a perfect linear amplifier (solid line) with a power gain of 10 times. The broken line shows a more realistic transfer characteristic with gain compression at 80W output, and some non-linearity even at low drive levels

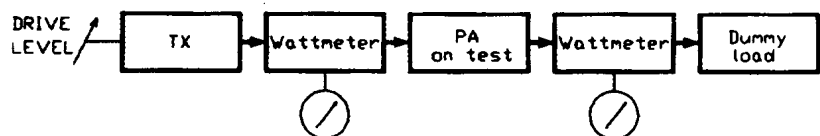


Fig. B. (1) Test arrangement for plotting a linearity curve like Fig. A

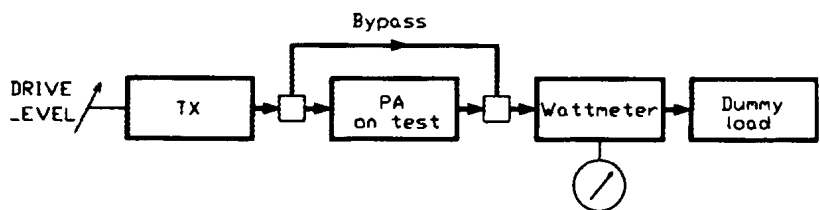


Fig. B(2) Alternative arrangement for an amplifier with a switchable bypass, using only one wattmeter

This method will work with any amplifier that is reasonably linear until it reaches a point of gain compression. It won't work if your amplifier has a transfer characteristic that starts to bend even at low drive levels – the broken line in Fig. A shows some tendency to do this. If the problem is serious, your only course then is either to try realigning the amplifier (preferably with a 4lb adjusting tool) or to sell it to a dedicated FMer who doesn't need a true linear and promises never to venture on to SSB...

Why are the numerical digits on a computer keyboard laid out upside-down compared to those on a telephone? The numerical keypad layout of the Comptometer developed in 1887 was copied by subsequent manufacturers of calculators and now computer manufacturers follow this as a standard. There is some debate why telephone keypads did not follow suit. The most likely explanation is that telephone keypads were designed to be as similar as possible to the dial telephones, where 1 and 2 were at the top. Hence it is the telephone keypads that are upside-down.

## Rival capacitor manufacturers...

### AS CHIEF CONDENSER BLOWER OUTER OTTO OOMPH WAS A FLOPPEROO

Ever since Otto Oomph was a boy, he suffered from a strange disease. Smashophobia, the doctor called it—the horror of breaking things—but there was nothing to be done about it. When he broke a Christmas tree ornament one year, poor Otto cried for two days. When he grew up, he wouldn't shoot as much as a clay pigeon and even the thought of denting the fender of his car would make him sick.

Eventually, however, Otto became an electrical expert. That got him a job in the Sprague laboratories and Otto was really happy for the first time—that is, until someone made him Chief Condenser Blower Outer in the Test Division.

Now, voltage in the electric chair at Sing Sing is 1,200 volts. In contrast, controllable AC voltages in the Sprague lab run as high as 7,200 (and much higher in the special high voltage lab) for here is where Sprague condensers really get "the works." They are torn apart, blown apart, tortured and blasted, not only to see how good they are, but how to make 'em even better.

WHAM! Poor Otto jumped six feet when a can condenser, deliberately loaded with supercharge to determine its break-down point, exploded in a cage.

BAM! SNAPPEY-CRACK. Otto shivered as another condenser gave its life under 4,000 volts of DC. . . .

CLICKETY-CLICK in monotonous regularity as AC refrigerator motor starting condensers were switched tortuously on and off 150 times an hour.

SIZZ-SIZZLE and SISS as vapor streams played on condensers to prove their moisture-proof ability.



In a massive oven, dozens of units were undergoing life tests at 200° F. Elsewhere, Television condensers were telling their story under 3,000 to 10,000 volts of DC; tiny electric razor condensers were getting the equivalent of 14 years of the hardest kind of use; and, almost every minute some condenser gave up the ghost and another fact was added to the science of constructing condensers that excel in the rough and tumble usage of the field.

"I can't stand it—I can't stand it," wailed Otto at last, weeping over the remains of an 8 mfd. 450 V. Atom midget dry electrolytic.

"Gosh, Otto," consoled an engineer. "What you worrying about? That condenser is only rated at 450 V. We had to smack it with a surge of almost 700 V. before it went."

"Sure," sobbed Otto. "But I can't stand this business of busting things. It ain't fair to treat such swell condensers so downright mean. It makes me sick. I—I wanna quit."

And quit Otto did.

'Twas a year before we heard from him again and then he wrote:

"Dear Boss: Maybe you think I was silly to quit my job, but it just isn't my nature to bust things up. I'd go home nights and dream about condensers on those torture racks—the finest condensers in the world just waiting to be blown up even if it took all the power in Massachusetts to do it.

"But all's well that ends well. I'm in the radio service business and doing fine. I use Sprague Condensers—and boy, are they real! Not a blow-out in a carload. No failures from moisture—or anything else in fact. I realize it's largely because of the work you guys are doing back there in the lab, but I still say blowing up condensers is a helluva job for a sensitive man like me. Love and Kisses.

OTTO OOMPH"

SPRAGUE PRODUCTS COMPANY  
North Adams, Mass.



## Particular People--

those folk at Sangamo! They know that top-notch rigs need precise, stable capacitors to stay on the air—and they have been making just such dependable capacitors for a quarter of a century."

Old-time hams recognize Sangamo Quality . . . Get acquainted with the Sangamo line today. Your jobber can supply you.

In New York, FedEx, the shipping giant, triumphed in a three-year battle against a coffee shop that called itself Federal Espresso. Agreeing to a change, they came up with Ex-Federal Espresso, which still was not accepted. An agreement was reached on the name of Freedom of Espresso.