



ZR6FD logo

Drukwerk printing ZS6BAQ
Papier / paper Errol ZR6VDR

WATTS

05 - 2006

Year 76+5m

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 / Sondag
Relays : 1840, 3700, 7066, 10135, 14,200 MHz (Seasonal)
Swapshop : After bulletin 2m and 40m (also on-line)
Bulletin repeats : Mondays 19:45 on 145,725 MHz only

PARC Fleamarket 1 April

Martinho ZS6BQP and his wares in the foreground



In this issue

- Minutes of meeting 04/2006
- Editorial
- Member news and diary
- Repeater project
- History ZS6PTA
- Technical
- Page eight

in hierdie uitgawe

- Vergadering notules
- Redaksioneel
- Ledenuus en dagboek
- Herhaler projek
- Geskiedenis
- Tegnies
- Bladsy agt

Next Meeting 3 May/Mei 2006

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

PARC Management team / Bestuurspan Aug 2005- Aug 2006:

Committee members

Chairman, SARL liason, Fleamarkets	Alméro Dupisani	ZS6LDP	almero.dupisani@up.ac.za	012-567-3722	082-908-3359
Vice Chairman, Secretary Rallies, Social, Hamnet	Johan de Bruyn	ZS6JHB	johandbr@absa.co.za	012-803-7385	082-492-3689
Treasurer, Clubhouse, Database, DF hunts	Richard Peer	ZS6UK	peerrk@safrica.com	012-333-0612	082-651-6556
Newsletter Kits	Hans Kappetijn	ZS6KR	zs6kr@wbs.co.za	012-333-2612	072-204-3991
Historian Awards	Tjerk Lammers	ZS6P	zs6p@iafrica.com	012-809-0006	
Repeaters , Technical Public Relations	Craig Symington	ZS6RH	craigsym@global.co.za	012-997-4504	083-259-3233
Repeater custodian	Pine Pienaar	ZS6OB	janpienaar@ananzi.co.za	012-345-1801	082-447-7823

Co-opted / Geko-opteer:

Repeater, technical	Johan Lehmann	ZS6JPL	jlehmann@csir.co.za	012-804-6173	083-300-8677
	Hans Gurtel	ZR6HVG	adele123@absamail.co.za	082-940-0623	082-940-0623
	Pieter Human	ZR6AHT	humanp@telkom.co.za	012-800-2888	082-565-6081
Repeater Maintenance (70cm)	Willie du Plessis	ZS6AEA	hesterdup@webmail.co.za	012-565-5555	083-653-2101
Auditor	Position open				
Asset control	Andre v Tonder	ZS6BRC	andre.vtonder@absamail.co.za	361-3292	082-467-0287
Tydrenne	Johann de Beer	ZR6YV		011-918-1060	082-857-1561
Klubfasiliteite, vlooiemark	Willie Greyling	ZR6WGR	willie@up.ac.za		082-940-2490
Webmaster,	Edwin peer	ZR6ESP	zr6esp@peer.co.za	012-333-0612	
RAE	Brian Scott	ZR6BJS	scottbri@gmail.com	084-312-7407	
Hamnet, projects	Roy Newton	ZS6XN	newtonr@telkomsa.net	012-547-0280	
Morse testing	Bill Ingleson	ZS6KO		012-331-2327	
Tea	Molly Peer	ZR6MOL	molly@peer.co.za	012-333-0612	
	Doreen de Bruyn	ZR6DDB		012-803-7385	

Minutes of the monthly club meeting of the Pretoria Amateur Radio Club held at the South Campus of the University of Pretoria on 4 April 2006

Welcome: The chairman Almero ZS6LDP declared the meeting open and welcomed all present.

Attendance: The meeting was attended by 33 members and 1 visitor. 9 apologies were received.

Personal/Lief en Leed: Egbert ZS6AZG is na 'n kort siekbed oorlede. Almero het die vergadering versoek om 'n minuut stilte. Stan ZS6SDZ het 'n operasie ondergaan om weer sensasie in sy arms en vingers te kry. Bill ZS6KO en Mary verhuis binnekort na Boksburg. Bertha lv van Hans ZS6KR wag op 'n operasiedatum

Minutes of previous meeting: The minutes were approved Proposed by Johan ZS6JPL and seconded by Willie ZR6WGR

Matters arising from the previous minutes: none.

Club Activities

Rallies: Johan ZS6JHB: Next event Sasol Rally 21/22 April 2006: Sabie, Graskop, Whiteriver and Nelspruit. Still need members or mobile stations. Otherwise all under control

Social/Sosiaal: Johan ZS6JHB: No date yet for the annual day in the sun – hope to finalize within the next week.

Vlooiemark/Fleamarket: Die 1 April vlooiemark is goed bygewoon. Dankie aan die van Wyk's, Richard en Molly, Willie ZR6WGR.

WATTS/kits/projects: Nothing new – same kits still available.

Finance/Clubhouse: Richard ZS6UK: Finances satisfactory. The club received a R1000 donation from Errol van der Riet ZR6VDR. Almero to draft a letter of thanks.

DF Hunt: 29 April 2006

Technical: Pine ZS6OB: Repeater site at CSIR: Thanked Pierre ZS6PJH, Pieter ZR6AHT, Hans ZR6HVG, and Johan ZS6JPL for their hard work. Still plenty to do, need to look at antenna and possibly replace.

Pierre ZS6PJH: Effort to sort out interference appears successful.

Technical talk on 2m: Thanks to Wynand Z6ARF for his contributions over the last few weeks.

Club bulletin: Rebroadcast Monday evenings 19:45

General/Algemeen: - Certificates were received from SARL: 2nd place SARL HF Contest Club Participation and 2nd place SARL HF Field Day. Both were for 2005.

- RAE: Pieter ZR6AHT gaan 3 weke voor die eksamen hulp verleen aan Henry en enige ander voornemende amateurs is welkom om hom te kontak vir bywoning van die kort inligting sessies.

- Dankie aan Bill ZS6KO vir die skenking van toerusting aan die vlooiemark.

Presentation / Aanbieding: Dankie aan Hannes ZS6JDE vir die aanbieding oor HF data / epos.

Closing / Sluiting: The meeting closed at 21:20

Dankie Hannes ZS6JDE Vir 'n baie interessante lesing oor Winlink 2000 wat basies 'n e-pos-oor-HF-radio stelsel is. Dit is onmisbaar by by noodsituasies waar alle ander stelsels af is, en spaar baie selfoongeld in geval van afgeleë persone wat moet kommunikeer. Drukstukke is moontlik van alle kommunikasie om misverstande uit te skakel en rekords van alle boodskappe is dan beskikbaar. Wat nodig is, is *Widows XP*, *AGWpe* en sagteware van winlink.org/clients.html en om *Airmail* en *Paclink* te verstaan. Nuwe verwickelinge is *RDFT* (Redundant Digital File Transfer) en *SCAMP* (Sound Card Amateur Message Protocol) wat nog meer spoed kan gee binne 'n klein bandwydte.

Editorial

Your editor has decided to do a re-run of the series: "Let's Go Complex" published several years ago in the then A5 paper version of WATTS. The purpose is again to bring home some understanding of transmission line behaviour and the use of a Smith Chart. For the many non-technical members that we have gained in the past years this will be a first exposure to complex numbers and network theory. The series is in 11 parts and will be published exactly as scanned from the original. It is my wish that you print every issue and study it. As you progress, your understanding of resonance, feeders and antennas will give you a much better knowledge-base to install- and experiment with antenna systems. Page 7 has the first installment.

Redaksioneel

U redakteur het besluit om die reeks "Let's Go Complex" van etlike jare gelede in die destydse A5 formaat WATTS weer te publiseer. Die doel is om weer 'n begrip van voerlyn-gedrag en die gebruik van 'n Smith Kaart tuis te bring. Vir die baie nie-tegniese lede wat ons in die afgelope jare verwerf het sal dit 'n eerste blootstelling aan komplekse getalle en netwerktheorie wees. Die reeks het 11 dele en sal gepubliseer word soos geskandeer vanaf die oorspronklike. Dit is my wens dat u dit elke deel uitdruk en bestudeer. Soos u vorder, sal u begrip van resonansie, voerlyne en antennas u 'n baie beter kennisbasis gee om installasies en eksperimente met antennastelsels uit te voer. Op bladsy 7 verskyn deel 1.

Tegniese Net: Wynand ZS6ARF het sy laaste lesing oor buisversterkers gelewer op Maandagaand 10 April. Ons soek nou dringend nog lede of nie-lede wat kan kom vertel van hulle ondervinding in enige tegniese gebied wat van nut is vir ons stokperdjie. Kontak ons asb.

Long Term HF Propagation Prediction for May 2006

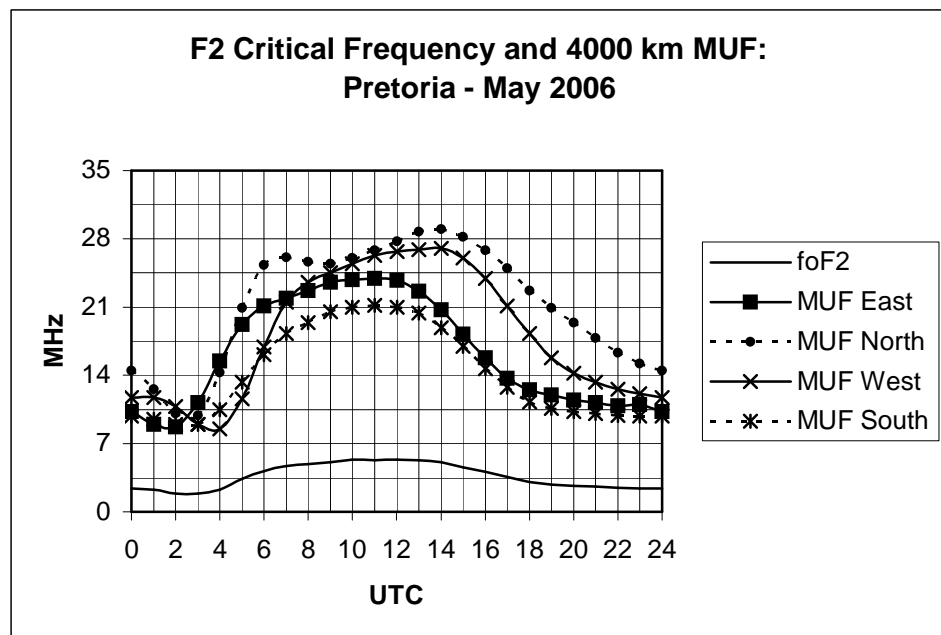
Vince ZS6BTY

DX Operating

The graph shows the 4000 km maximum useable frequency (MUF) to the East, North, West and South from Pretoria for the first hop using the F2 layer.

Local Operating

The F2 critical frequency (foF2) is the maximum frequency that will reflect when you transmit straight up. E-layer reflection is not shown.



----- PRODUCTS AND SERVICES FROM OUR MEMBERS -----

ICOM in Pretoria: Pine ZS6OB has most of the whole ICOM line-up for demo/sale at his QRA. Phone 082-447-7823

VHF/UHF antennas: Pine ZS6OB builds to your requirements. Best performance and materials guaranteed.

Battery condition indicator kits: Roy ZS6XN has 3-LED indicator kits available at R20 each. Phone 012-547-0280

Connectors and adapters, legal limit 40m traps, Nissei SWR/wattmeters and component bargains: Hans ZS6KR always has stock. Also **Radio Protection kits:** Build this over-voltage sensing electronic circuit breaker into your 12V supply and prevent 12V radio burn-out in case of supply series-transistor failure. New: 30A **Anderson powerpole connectors.** Phone 012-333-2612.

J-poles 2m, 70cm: Pieter ZS6PVW se netjiese 'J' antennas is nou al welbekend. Bel 012-386-4901.

WESTERN UNION TELEGRAM SERVICE ENDED 27 Jan 2006

The era started in 1844 with the first ever telegraphed words by Samuel Morse: "what hath God wrought". The art and skill of the telegrapher lives on to the 21st century; "thanks to the Amateur Radio Service" (QST Apr 2006)

Birthdays

Verjaarsdae

Mei



- 01 Hannie ZR6JMP
- 01 Amanda, dogtervan Martie en "JB" ZR6YV
- 06 Suzette, dogter van Magda ZS6MVW en Pieter ZS6PVW
- 09 Heilie, daughter of Heila and Melvyn ZS5MF
- 09 Diana, dogter van Louie ZS6LVW
- 10 Roy ZR6RV, son of Marieta and Roy ZS6MI
- 11 May, sw of Wally ZS5WP
- 12 Jani, dogter van Elza en Jan ZR6BKL
- 14 Johannes ZS6BPB
- 14 Pieter ZS6PVW, ok van Magda ZS6MVW
- 17 Vince ZS6BTY
- 18 Karen, daughter of Pat ZR6AVC and Frank ZS6GE
- 20 Dawid ZS6DSG

May

Anniversaries Herdenkings

- 04 Ronel en Pieter ZR6PSR ()
- 22 Elza en Jan ZR6BKL ()

- 22 Otto ZR6ZRO
- 23 Lily, sw of Harry ZS6AMP
- 25 Tjerk ZS6P
- 26 Vitor ZS6VG
- 27 Marlene ZS6SMA, lv van Kalie ZS6KCS
- 28 Flip ZS4GE
- 31 Dave ZS6JW

Sick Parade | Krukkelys

- Stan ZS6SDZ has emerged well out of a 5½ hour lower-back operation and is home again. He already reports in on bulletins!
- Heard on the grapevine that Dave ZS6JW also made a turn in hospital but is apparently active again.
- Bertha, lv van Hans ZS6KR sal waarskynlik 12 Mei geopereer word.

PARC Diary | Dagboek

May	01	Workers Day
	03	PARC Club meeting
	07	Mother's Day
	18	RAE
	27-28	CQWW WPX CW Contest
Jun	03-04	Pears Digital Contest
	03-04	IARU Region 1 CW Field Day
	07	PARC Club meeting

Pay subs early and save.

Subs are bound to rise as the current R50 does not adequately cover running expenses. Payments made before the August 2nd AGM will still be R50 but after the AGM – who knows?

Betaal ledegeld vroeg en spaar

Ledegeld sal moet verhoog word want die huidige R50 dek nie meer ons lopende onkoste nie. Vereffening voor die AJV op 2 Augustus sal bly op R50 maar daarna – wie weet?

Snippets | Brokkies

- OM Bill **ZS6KO** and Mary are moving to Boksburg.
- Pine **ZS6OB** is alweer oupa...The pine forest is expanding...
- The Symington family gained another son on 10 April. Congratulations to Craig **ZS6RH** and sw Philip.
- The 144,300 intruder saga has been resolved. A comms company had wrongly programmed and supplied security radios on this frequency instead of 141,300MHz. When the error was brought to their attention, they took immediate action and rectified the situation with an apology to us and the ham community.
This was the result of **our longest fox-hunt ever – a club record now held by Pieter ZR6AHT and Hans ZS6HVG** who spent about 5 hours to pin down the exact locations far north of Pretoria where the QRM was transmitted.
- Pine **ZS6OB** was co-opted to SARLCouncil at the SARL AGM on 8 April.
- Pine **ZS6OB** was awarded the Joseph White Plaque for 432MHz EME promotion and antenna array development.
- Hans **ZS6KR** was awarded the Silent Keys Memorial Trophy for the highest CW score in the 2005 SARL HF CW Contest.
- PARC needs to fill the **satellite reporting slot on bulletins**. Any volunteers?
- Tobie ZR6ZT is nou **ZS6ZX**. Baie geluk.

PARC benefits from generous donations and voluntary work

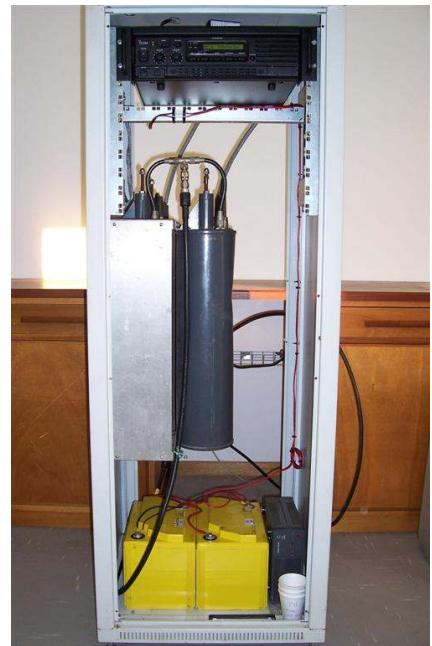
Although known to some members, it was officially announced on bulletin and the last club meeting that we received a brand-new ICOM FR-3000 repeater, charger and collinear antennas from **Nico ZR6VT**.

Although there have been serious external interference problems, this repeater is now successfully working from an alternative high-site on the CSIR campus. Our repeater development team consisting of Pieter ZR6AHT, Hans ZR6HVG, Johan ZS6JPL, Pierre ZS6PJH, Craig ZS6RH and Pine ZS6OB as co-ordinator have done a very professional installation job with 1¼" semi-rigid coaxial cables and fancy connectors to match. Much of these members' spare time was dedicated to this task over the past months. By the time this is read, the antenna system may have its final configuration to reach as much of greater Tshwane as possible. A very persistent interference source on-site was also identified and remedies applied on 6 April. See pictures on p.5

A big thank-you to the company **Hiconnex** who via their Johan Lubbe and the mediation of Johan ZS6JPL, donated enough semi-rigid coaxial cable and expensive connectors for the vertical tower run with enough to spare for another such run. The company has also undertaken to supply bona-fide amateurs with high-quality hardware at very favourable prices.

Who says it does not pay to advertise? **Errol ZR6VDR** responded to a strong hint in last month's WATTS for sponsorship to print our ZS6PTA QSL cards. He kindly donated R1000 for this - and paper to print WATTS. Thank you Errol.

Our new (experimental) repeater site and hardware



The E and W whiskers (5th level) are a twin collinear experiment.

Neat cabinet and installation



ICOM FR-3000 (remote controllable) just above the duplexer.

The way the cabling had to go

Our apology to the wives and kids who had to (and may still) spend many a lonely evening or weekend...
Let's hope the scenario below will not happen...



Wireless Widows of the world unite!

ZS 6 PTA

1930-2006

3

2

METRE OMNIDIRECTIONAL HIGH GAIN COAXIAL COLLINEAR ANTENNA.

Paul ZS6YS & Bill ZS6KO.

With many elements arranged in this manner, the radiation pattern is flattened into a "bun" shape resulting in a lower angle of radiation when vertically polarised, giving an increase of radiated energy in a horizontal plane.

The top element is made of rod, the rest of the elements are made of 50 ohm coax, cut into $\frac{1}{4}$ wave sections keeping in mind to take the velocity factor into account. The bottom section is stripped of its insulating sleeve midway & 4 $\frac{1}{4}$ wave radials soldered to the braiding.

The antenna is fed with 50 ohm coax.

The whole system can be placed in plastic electrical conduit. This assembly can be supported by an arm from a mast near its top section. It can also be supported near the base & stayed.

To calculate the $\frac{1}{4}$ wave coax sections, the following formula will assist.

Eg velocity factor 0.66

$$\frac{1}{4} \text{ wave} = \frac{162.3}{145 \text{ mhz}} = 1.119 \text{ ft} = 13\frac{1}{2}" = 343 \text{ mm}$$

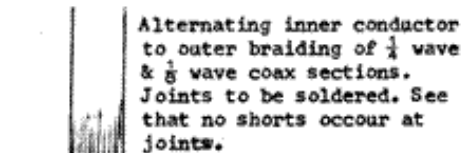
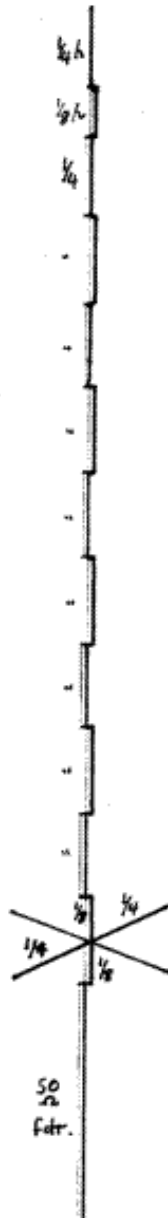
$$\frac{1}{8} \text{ wave} = 6\frac{3}{4}" = 171.5 \text{ mm}$$

Normal vertical & radials :-

$$\frac{1}{4} \text{ wave} = \frac{234}{145} = 1.6 \text{ ft} = 19.2" = 488 \text{ mm}$$

The described antenna thus consists of 12 sections. Top - full $\frac{1}{4}$ wave; $\frac{1}{8}$ wave; 9 $\frac{1}{4}$ wave coax sections; $\frac{1}{4}$ wave section with $\frac{1}{4}$ wave radials at its centre. Except for the top & the radials, the rest of the antenna is made of coax.

Some hints on assembly.



Alternating inner conductor to outer braiding of $\frac{1}{4}$ wave & $\frac{1}{8}$ wave coax sections. Joints to be soldered. See that no shorts occur at joints.

solder

Radials bound & soldered to bottom section.

Radials

solder

Half waves of rod or heavy gauge wire are bent at 90° to encircle the coax, bound with hook-up wire & soldered into position. Take care not to over heat the inner insulating material.

Top section

The top rod is also bound with wire & soldered.

NB . At the last meeting there are persons that feel that the $\frac{1}{4}$ wave sections should be $\frac{1}{2}$ wave. The article referred to with Paul did say $\frac{1}{4}$ wave. Is being investigated. Ed.

Do you have any photos or cuttings related to our Club's past? Your Editor has just about run out and will appreciate anything useful for publication.

1. INTRODUCTION

This is the first of a series of articles that will put a simple mathematical basis on passive circuit electrical behaviour. This is known as Network Theory which in its simplest classical form will need knowledge of imaginary numbers, their manipulation and their combination with real numbers to create complex numbers or quantities.

In Ham language this means an ability to properly understand, calculate, and even design your own networks with resistive, inductive and capacitive components. A very commendable goal would be to make home-brewers proficient with a Smith Chart which is a very useful shortcut tool when working with transmission lines, real or complex loads, matching sections, etc.

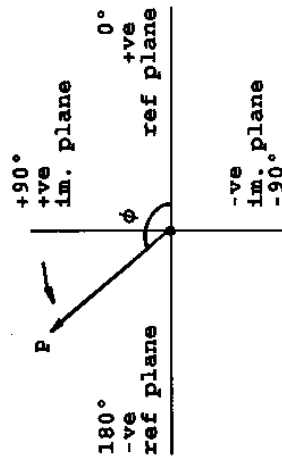
2. SOME MATHS

The mathematics of imaginary numbers is not so difficult. There are some simple rules and concepts to understand.

Here we go:

A phasor is a quantity that can have an amplitude and phase angle with respect to some reference. In fact a rotating phasor will cover 360 degrees and then repeat itself. Such a phasor is shown below using normal convention. Zero degrees is always horizontal right and the phasor (vector) always rotates anti-clockwise.

How do we define such vector as a mathematically useful quantity so that its value (amplitude) and angle with respect to the reference are manipulable?



The answer is in fact graphically in front of you. The vector shown above lies in the second quadrant. It has moved ϕ° and has an amplitude P . One way of representing it is in the 'polar' form $P \angle \phi$. This is derived from geometrical analysis where old man Pythagoras comes in handy: $P = \sqrt{[x \cdot x + y \cdot y]}$ arctan(y/x). Yet another way is what we will concern ourselves with:

$$P = -x + jy$$

What is j ? Well, it is just a symbol for a concept. The concept of presenting 'imaginary' +ve and -ve 90° quantities. Using normal trigonometrical analysis it

can be shown that for mathematical manipulation purposes

$$j \cdot j = -1$$

Else quantities expressed with the prefix j can be added and subtracted algebraically in the normal way. As an example consider the vectors $p = (2 + j4)$ and $q = (5 - j3)$. Observe the following results:

$$p + q = 7 + j1$$

$$p - q = -3 + j7$$

$$p \cdot q = 10 - j6 + j20 + 12 = 22 + j14$$

You can prove the first two very simply on graph paper. Mark all x and y values for p and q , again mark the resultant x and y values and draw a new vector. Those new vectors should have co-ordinates as calculated above.

There is one more concept to understand.

Why were a capital letter and lower case letter used? The lower case value needs no angle description as its x and y components fully define its electrical position. The upper case (polar) value is just a dumb quantity known mathematically as the 'modulus' and needs an angle description also.

Of course any symbols can be used but one has to be careful to convey what you are trying to express.

It is also common practice to show the vector amplitude as for instance $|p|$ which is then also associated with an angle description.

It is at this stage where we can possibly bring together all these concepts and the real world.

The above phasor or vector can represent a sine wave. As the vector rotates and you watch the y component continuously, a perfect sine wave can be plotted on a 0-360° horizontal scale.

Such a vector can show the phase difference between an applied voltage and the resulting current in a circuit.

Last but not least, and related to the above, circuit impedance can graphically be shown in this way. The component quantities that make up an impedance vector can be shown on the horizontal and vertical axes.

These components are either resistance, inductance or capacitance. Presto we can thus represent resistance as a vector $+R$ inductance as a vector $+jXL$ capacitance as a vector $-jXC$

Where X is generally the symbol for the AC resistance of a reactive component conventionally referred to as inductive or capacitive reactance. These reactance values are calculated as $XL = 2\pi fL$ Ohms and $XC = 1/2\pi fC$ Ohms, where L is in Henries, C in Farads and f in Hz.

Next time we shall discuss the proper application of these concepts in circuit theory.

MORE TREASURES FROM THE STAN ZS6SDZ COLLECTION (all in good working order)



NATIONAL MOD. NC - 44



HALLICRAFTERS MOD. S - 76

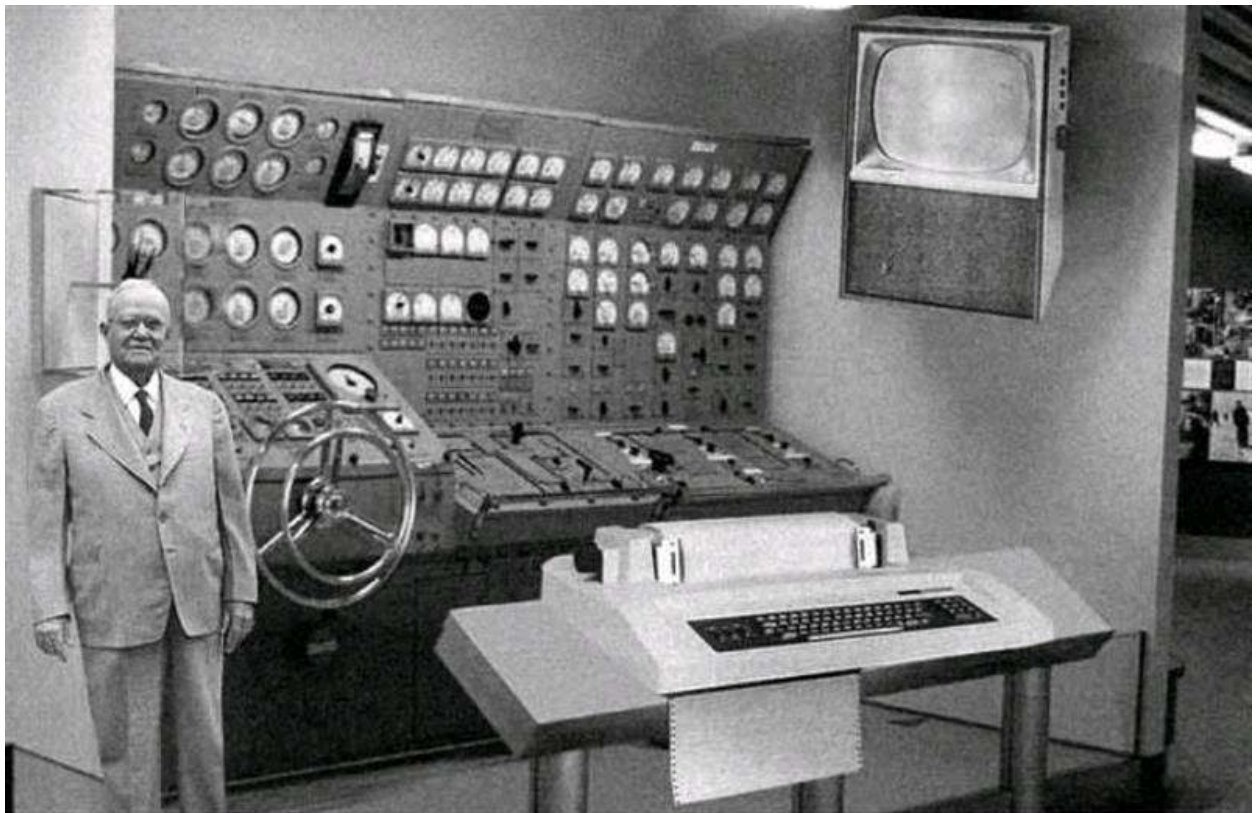


NATIONAL HRO - 7

SET - 3



NATIONAL HRO - 7



Scientists from the RAND Corporation have created this model to illustrate how a "home computer" could look like in the year 2004. However the needed technology will not be economically feasible for the average home. Also the scientists readily admit that the computer will require not yet invented technology to actually work, but 50 years from now scientific progress is expected to solve these problems. With teletype interface and the Fortran language, the computer will be easy to use.

Try this: { [(first 3 digits of your landline x 80) + 1] x 250 + (2 x last 4 digits) - 250 } / 2 = **Surprise!**