



ZR6FD logo

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WATTS

02 - 2007

Year 77+2m

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.zs6pta.org.za> e-mail: zs6pta@qsl.net

Bulletins :145,725MHz 08:45 Sundays / Sondae
Relays : 1840, 3700, 7066, 10135, 14200 kHz, 51,4 and 438,825 MHz
Activated frequencies are announced prior to bulletins

Swapshop: Live on-air after bulletin 2m and 40m

Bulletin repeats | herhalings : Mondays 19:45 on 145,725 MHz

Joe Noci ZS6JGN: - farewell show of home brew equipment - more on p3



In this issue

- Minutes 3 Jan Notules
- Meeting presentation Aanbieding by vergadering
- Member news Ledenuus
- Calibrate your Fluke
- Technical | Curve Tracer | Tegnies
- Let's go complex part 11
- Page ten Bladsy tien

In hierdie uitgawe

Next Meeting 7 Feb. 2007

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

PARC Management team / Bestuurspan Aug 2006- Aug 2007:

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, Database, DF hunts	Richard Peer	ZS6UK	zs6uk@peer.co.za	012-333-0612	082-651-6556
Public relations	Craig Symington	ZS6RH	craigsym@global.co.za	012-997-4504	083-259-3233
Repeaters, Technical	Pine Pienaar	ZS6OB	janpienaar@ananzi.co.za	012-345-1801	082-447-7823
Co-opted / Geko-opteer:					
Repeaters, 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				
Newsletter/Kits	Hans Kappetijn	ZS6KR	zs6kr@wbs.co.za /arrl.net	012-333-2612	072-204-3991
Asset control	Andre v Tonder	ZS6BRC	andreh.vtonder@absamail.co.za	361-3292	082-467-0287
Tydrenne/Rallies	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	
Hamnet, projects	Roy Newton	ZS6XN	newtonr@telkomsa.net	012-547-0280	
Morse testing	Position open				
Historian/Awards	Tjerk Lammers	ZS6P	zs6p@iafrica.com	012-809-0006	
Public Relations	Jaco Lubbe	ZR6JLL			082-494-1959
	Thobile Koni	ZS6TKO	toko40@mweb.co.za		082-493-2483
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 3 Jan. 2007

Welcome / Verwelkoming. Almero ZS6LDP welcomed all present and declared the meeting open .

Attendance / Bywoning. The meeting was attended by 23 members and 4 visitors .

Apologies / Verskonings. Apologies were received from Bill ZS6KO , Pine ZS6OB, Hillary ZR6HAL and Edwin ZR6ESP .

Personal Matters / Lief en Leed. Johan ZS6JHB reported that he received an SMS from Lynette, daughter of Bill ZS6KO informing him that Mary, sw of Bill was hospitalized with a lung infection.

Jack ZS6QA is to have a hip replacement op in January 2007.

Tjerk ZS6P se vader is oorlede.

Vlasta, sw of Ivan ZS6CCW recently lost her father.

Minutes of the previous meeting ./ Notule van vorige vergadering .

The minutes of the previous meeting as published in Watts were approved. Proposed by Alf ZS6ABA and seconded by Ed ZS6UT.

Matters arising from previous minutes. None.

Club Activities

Rallies / Tydrenne.

Johan ZS6JHB – Die eerste tydren van die jaar vind plaas op 24 Februarie 2007 in die Belfast omgewing.

Social / Sosiaal. Daar word beplan om 'n bring en braai te reël om almal wat die afgelope jaar betrokke was by tydrenne te bedank vir hulle bystand .Alle klublede en hul families is ook welkom om die braai by te woon. Sodra die perseel gereël is, sal die datum bekend gemaak word.

Foxhunt / Jakkalsjag. Richard ZS6UK will announce the date of the next foxhunt on the club bulletin.

Financial report / Finansies. Richard ZS6UK reported on the club's finances.

Technical / Tegnies. In the absence of Pine ZS6OB, Craig ZS6RH reported that the technical team is busy with backup plans for the 70cm and 2m repeaters.

Almero ZS6LDP informed the meeting that he received an e-mail from Willie du Plessis ZS6AEA that he is relocating to Australia and that the current site for the 70 cm repeater is no longer available.

Fleamarket / Vlooiemark. Almero ZS6LDP het berig dat daar reeds twee vlooiemarkte gehou gaan word deur onderskeidelik Magalies- en Oos-Rand klubs. Die Mega Vlooiemark van Pretoria Amateur Radio klub sal vir Maart 2007 gereël word.

Ham Diary / Dagboek van gebeure .

January / Januarie 2007.

08 – NARC opens.

13/14 – Hunting Lions on the Air.

19/21 – PEARS National VHF/UHF Contest.

27 – Magalies Amateur Radio klub vlooiemark

March / Maart 2007.

01 – ZU licence exams.

April 2007.

14 – SARL AGM.

Presentation / Aanbieding.

Thanks to Joe Noci ZS6JGN for his presentation on his home-brew DC SSB Transceiver and various measuring instruments.

Next meeting / Volgende vergadering. – 3 Feb 2007 .

Closure / Sluiting.

The meeting closed at 21.35

February / Februarie 2007

03 – ERB fleamarket

16 - Closing date for submission for entries for Tinus Lange 7066 Technical Excellence Award.

24 – Belfast Rally.

Joe's 'Jewels' shown at our January meeting

(Joe is relocating to Namibia)



Full fledged direct conversion SSB Transceiver 220W



.... and that's how it started



1mW – 1 kW Wattmeter with built-in two-tone generator



Meteosat FM Receiver



Synthesized FM transceiver



LC meter with <1% accuracy down to 15µH and 100pF



Network vector analyzer (requires 0dBm input)



Explaining improvements for Mk2

Birthdays

Verjaarsdae

Feb



03 Nico ZR6VT
 03 Willie ZR6WGR
 03 Alletta, lv van Alf ZS6ABA
 06 Ellen, lv van Joe ZS6AIC
 06 Ada, Sw of Jay ZS6BUD
 07 Andre,, son of Andre ZS6GCA
 07 Victoria, dogter van Diana en Louis ZS6LVW
 08 Melvyn ZS5MF
 09 David, seun van Ellen en Joe ZS6AIC
 11 Leanne, sw of Allan ZS6AVC
 12 Yvette, daughter of Rika and Errol ZR6VDR
 13 Gerda ZR6BDL,lv van Hennie ZR6LOM
 13 Sander ZS6SSW
 15 Phil, sw of Craig ZS6RH
 16 Pat ZR6AVC, sw of Frank ZS6GE
 17 Freddie ZS6JC

Feb

Anniversaries Herdenkings

03 Heather and Vince ZS6BTY (17)
 10 Angy and Trevor ZS6-2510 (28)
 18 Sarina en Willie ZR6WGR (7)
 28 Martie en 'JB' ZR6YV (31)
 28 Phil and Craig ZS6RH

20 Ivo ZS6AXT
 22 Christopher, Son of Joey and Graham ZR6GJR
 24 Kenneth, Son of Angy and Trevor ZS6-2510
 24 Claire, daughter of Anne and Jac ZS6QA
 24 Petro, lv van Gert ZS6ZB
 25 Bernice, lv van Pieter ZR6KSA

Sick Parade | Krukkelys

Mary, sw of Bill ZS6KO is recovering from a lung infection
 Bernie ZS6ANU has been taken ill and is in hospital in Nelspruit
 Bertha, sw of Hans ZS6KR is again in hospital with lung bugs

New Members | Nuwe lede

PARC Diary | Dagboek (UTC times)

Feb	16	Closing date for Tinus Lange Tech Excellence Award	Ma	01	ZU Licence exams
	10-11	CQWW RTTY Contest 00:00-24:00		03-04	ARRL Int DX SSB Contest 0000-2400
	10-11	Dutch PACC Contest 12:00-12:00		04	DARC 10m Digital Contest
	10-11	RSGB 1 st 1.8MHz contest CW 21:00-01:00		07	PARC Club Meeting
	17-18	ARRL International DX CW Contest 0000-2400		10-11	RSGB C'wealth Contest 1000-1000
	24	Belfast Rally		31	PARC Fleamarket
	23-24	Russian WW PSK Contest 2100-2100	Apr	14	SARL AGM
	24-25	REF SSB Contest 0600-1800			
	24-25	UBA CW DX Contest 1300-1300			

Rally Calendar 2007

DATE	S A NATIONAL'S	REGIONAL	OFF ROAD
24/2/2007		BELFAST	
17/3/2007		ELLISRAS	
21/4/2007	SASOL RALLY		
28/4/2007		SCC ER	
19/5/2007		TZANEEN	
26/5/2007	ZULU RALLY		
09/6/2007		BRONKHORSTSPRUIT	
23/6/2007	TOTAL RALLY		
04/08/2007		WITBANK	
15/9/2007		TMCC	
06/10/2007		SCC PTA	
27/10/2007	TOYOTA PMC		
10/11/2007			TOYOTA OFF RD

Rally info from Johan ZS6JHB:

The major change this year is the return of the Total Rally in Ermelo and the Toyota PMC which in the past was run in Tzaneen but this year will be staged in Babsfontein and surroundings.

I will be grateful if you guys (and girls) can let me know for what events you will be available.

At the same time you can also provide me with your shirt size of you and your partner who normally assists you on these events.

73's Johan ZS6JHB

Snippets | Brokkies

- **Pine ZS6OB** se 3e kleinseun is onlangs in Engeland gebore.
- **Hamnet frequencies** were announced as 145,725MHz and 7070kHz
- **Joe ZS6JGN** (front page) has been allocated the callsign **V51JN**
- **Willie ZS6AEA** verhuis na Australië
- **Hubert ZS6HVM** het onlangs weer in die huwelik getree. Baie geluk aan hom en Anne

CALIBRATION PROCEDURE FOR JOHN FLUKE MODELS 75 AND 77 MULTIMETERS (no AC or current adjustments possible)

8. Dc Voltage

a. Performance Check

- (1) Connect TI V Ω and COM jacks to calibrator output.
- (2) Set calibrator for an output of .3000 V dc. If TI does not indicate between 298.4 and 301.6 mV (for model 77, indication will be between 299.0 and 301.0 mV), perform b(1) through (5) below.
- (3) Set function switch to V $_{DC}$.
- (4) Set calibrator for an output of 3.000 V dc.
- (5) If TI does not indicate between 2.984 and 3.016 V (for model 77, indication will be between 2.990 and 3.010 V), perform b(3) through (5) below.
- (6) Adjust calibrator for settings as listed in table 3. TI will indicate within limits specified.

Table 3. Dc Voltage Accuracy
Test instrument indications (V dc)

Calibrator settings (V dc)	Model 75		Model 77	
	Min	Max	Min	Max
.3000	298.4	301.6	299.0	301.0
300.0	298.4	301.6	299.0	301.0
300	294	306	295	304

b. Adjustments

- (1) Set function switch to V $_{DC}$.
- (2) Set calibrator for a 3 V dc output.
- (3) Adjust R8 (fig. 1) for a TI indication of 3.000 V dc.
- (4) Set calibrator for an output of .3000 V dc.
- (5) Set function switch to 300 mV; perform a(2) through (6) above.

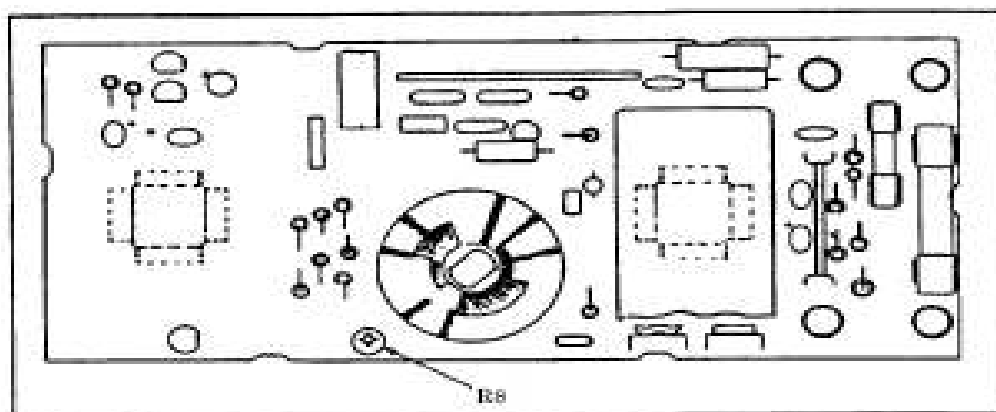


Figure 1. Dc voltage - adjustment location.

End of an Era: FCC to Drop Morse Testing for All Amateur License Classes

NEWINGTON, CT, Dec 15, 2006 -- In an historic move, the FCC has acted to drop the Morse code requirement for all Amateur Radio license classes.

Also today, the FCC adopted an Order on modifying the Amateur Radio rules in response to an ARRL request to accommodate automatically controlled narrowband digital stations on 80 meters in the wake of rule changes that became effective today at 12:01 AM Eastern Time. The Commission said it will designate the 3585 to 3600 kHz frequency segment for such operations, although the segment will remain available for CW, RTTY and data as has been. Currently, Amateur Radio applicants for General and higher class licenses had to pass a 5 WPM Morse code test to operate on HF. Today's R&O will eliminate that requirement all around.

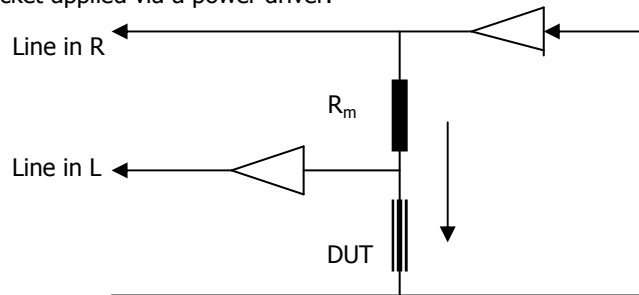
Build a Curve Tracer using a PC and sound card

ZS6KR

A recent QEX/QST publication* - or rather the author's name - caught my eye as he was well known to me since 1980 when he started publishing electronic projects in various magazines. This publication described a curve tracer to characterise components such as diodes and various linear and non-linear devices using a PC sound card and software to emulate a CRT display. The Device Under Test (DUT) is connected in series with an accurately known resistor $R_m = 100\Omega$ and a $\pm 10V$ p-p sinusoidal wave packet applied via a power driver.

The current through the DUT is monitored by the resistor and the voltage across it fed to the sound card L and R inputs. This information is then processed by software to produce a record of swept voltage across - and current through - the DUT.

The oscilloscope display then produces a graphic representation of the voltage and current which we analogue humans can understand.



There is however an important requirement that measuring system must conform to before we can believe what we see. The effects of large capacitor AC coupling in the sound card must be reversed with a software digital filter to get a flat step response. This is achieved as a once-off preparatory procedure by applying an accurately known DC step and using on-screen compensation control to shape the scope trace for amplitude and flatness. L and R channel balance control can also be adjusted to perfection. Once done, the system is ready for use.

It is suggested that the more inquisitive reader consult the original article for a more detailed technical explanation.

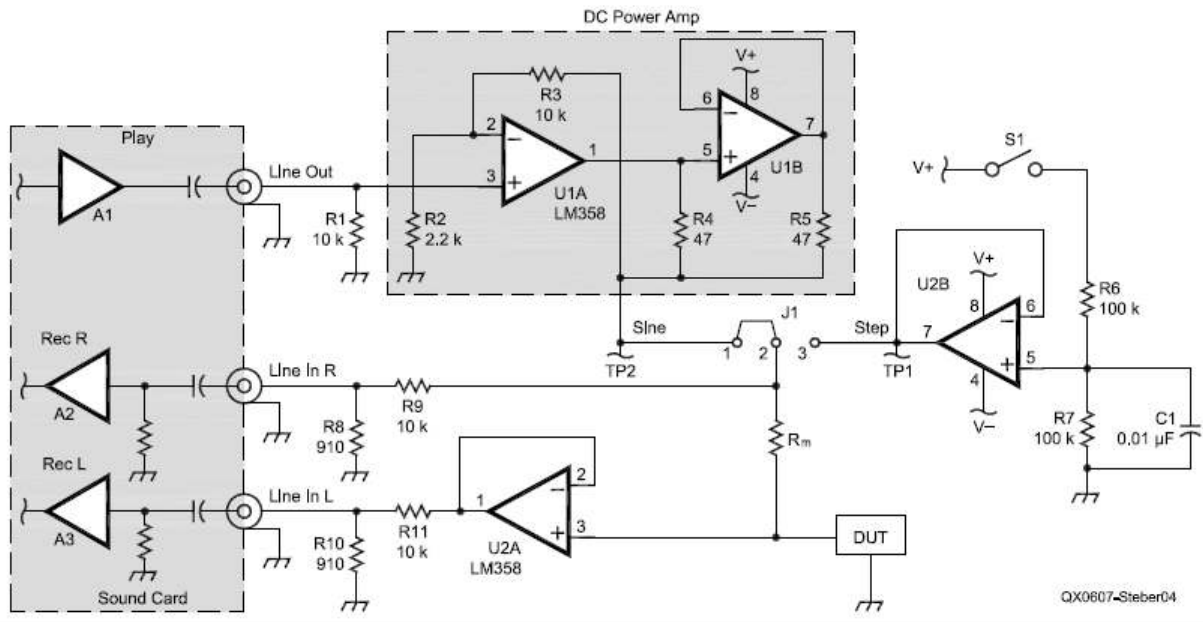


Figure 4 — Curve tracer circuit and the interface to the PC sound card.

* **I-V Curve Tracing With a PC.** Dr George R. Steber PhD.
Software available on the QEX website. Else from this author.

QEX Jul/Aug 2006 5

Concentrating on practical aspects, it can be seen that only a few components are required and I have designed a PCB for the job as shown. (true size 55 x 31,5mm)

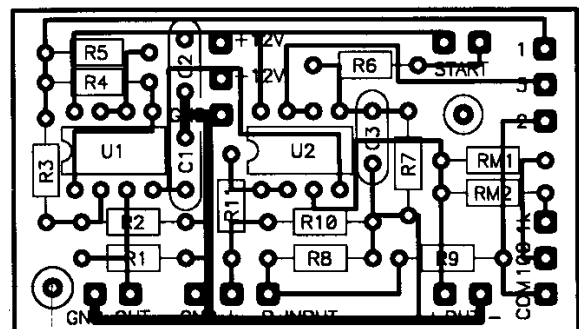
The PC sound controls are recommended to be set as follows:

Play: Enable only WAVE and OUTPUT

Rec: Enable only LINE/MIC IN

All slider controls set to maximum. Maximum is convenient to remember but it may be necessary to adjust the values of R8 and R9 down to honour this rule.

Calibration is done by connecting 2 and 3 of J1, pressing SW1, measuring the voltage at TP1 with an accurate DVM and doing on-screen adjustments for a display as shown.



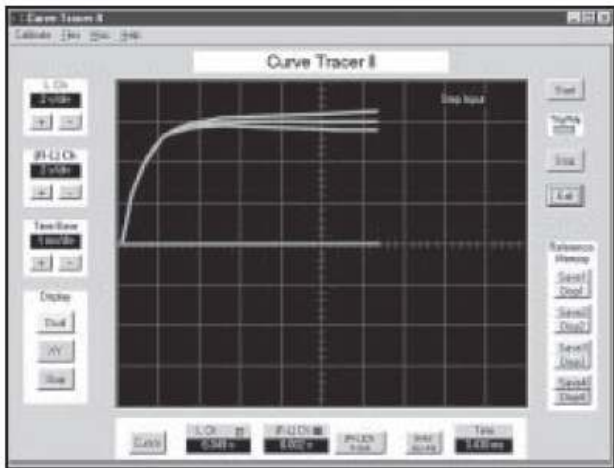


Figure 6 — The main window of the curve tracer program showing step voltage input.

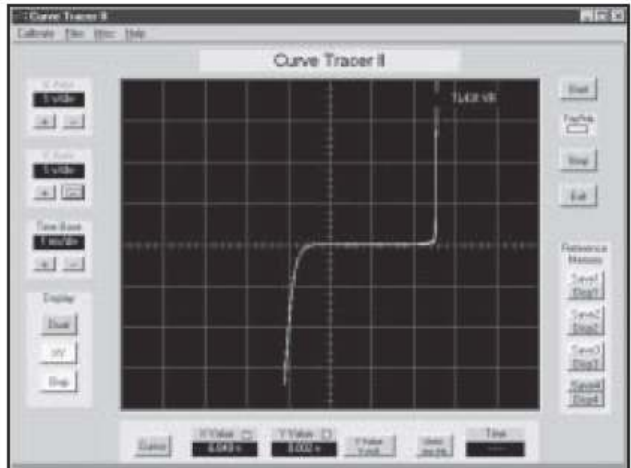
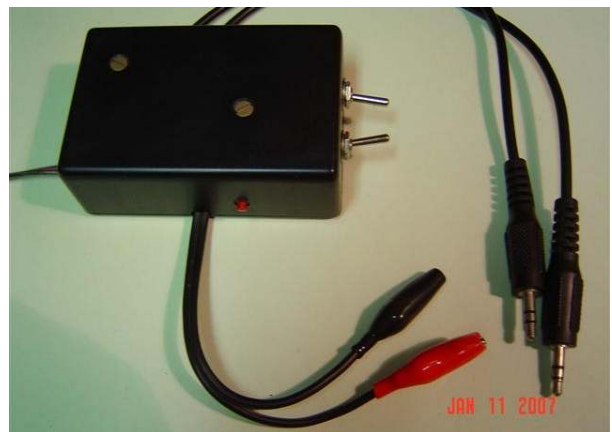


Figure 8 — Voltage reference diode I-V curve.

The first screen shows a superposition of slightly over-, under-, and ideal compensation. The top middle trace is what to aim for and the amplitude must be = DVM voltage previously measured. The trace at the screen centre must run perfectly along the zero line indicating perfect L-R stereo balance. The control for this is available via the CALIBRATE button (top left). The trace is initiated by clicking on START, wait for the trigger indicator to go red and pressing the hardware TEST button.

Once done, further operation is simple. Connect a DUT, click START and a trace will appear. X and Y scaling is adjustable and the trace can be stored for further reference. There is also a cursor for precise measurements.

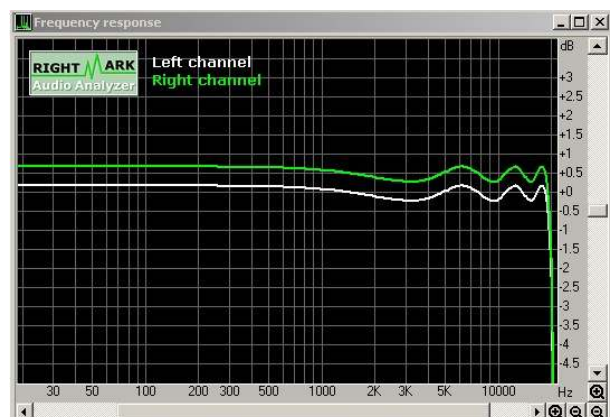
This is it in a nutshell. Below is my version of the unit that I hook to a dual power supply and sound card. I have added an extra switchable R_m of 1k and reduced R2 to 1k8 so that a maximum voltage sweep of just on $\pm 10V$ is available when using a $\pm 12V$ DC supply. Variable sweep is also possible using the Windows Play Control slider.



A further note on sound card performance is in order. A good wide, flat frequency response is desirable. An extremely useful software utility RMAA5.5 is available free from <http://audio.rightmark.org/download.shtml>. All you need to do is to connect line-out to line-in and the software will test some 7 audio parameters:



My laptop soundcard response (not very suitable)



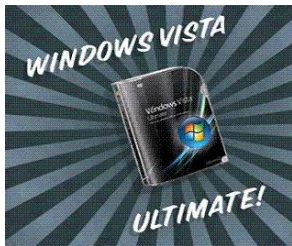
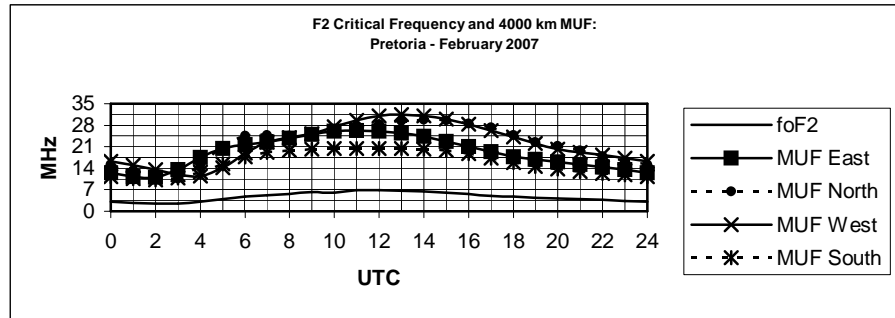
Sound Blaster 24 (balance deliberately offset)

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.



Will Windows XP survive the release of Windows Vista? The answer is affirmative but it is also a question of nuances. According to Microsoft, Windows XP will survive the general availability of Windows Vista scheduled for consumer launch on Jan 29, 2007.

Windows 95, Windows NT Workstation 4.xx, Windows 98, Windows 98 SE, Windows Millennium Edition (Windows Me), Windows 2000 Professional and Windows XP SP1 are not as lucky, but Windows XP Professional, Windows XP Tablet PC Edition, Windows XP Professional x64 Edition, Windows XP Home Edition and Windows XP Media Center Edition3 will be available up to 24 months following the general availability of Windows Vista. Namely, the end of January 2009.

However, the Jan 2009 end date is only available via System Builder License Availability. In the context of this licensing policy, system builders will be able to offer the Windows XP 12 months after the operating system will stop being available for retail.

Microsoft additionally informs that via Direct OEM and Retail Licenses, Windows XP will be available for a total of 12 months after Vista's official launch, or until January 29, 2008. "Under the Support Lifecycle policy Windows desktop licenses are available for four years after general availability in all standard product distribution channels (e.g. direct OEM, System Builders, retail, and Volume Licensing programs via licenses or via downgrade rights). Licenses will continue to be available through downgrade rights available in Volume Licensing programs after end of general availability," revealed the Redmond Company.

As the existence of Windows XP is strictly dependent on the policies of the OEMs and of the system builders and the sales channels, the fact of the matter is that Microsoft will not permit the Vista and XP cohabitation. Although Microsoft will continue to support the license availability of XP due to the contractual terms of the Support Lifecycle policy, the Company will also shift the spotlight on Vista while pushing XP in the background and pulling it from the shelves.

LET'S GO COMPLEX (part X)

Hans ZS6KH

 We now know about $\lambda/2$ wavelength load impedance repetitions looking back from the load to the source. If there is a mismatch, then all the way back to the source we have

Voltage maxima and minima spaced $\lambda/4$ waves apart
 Current minima and maxima coinciding
 Impedance maxima and minima coinciding

In fact, all three vary continuously in between any two points one $\lambda/4$ wave apart. Equations [35] and [41] allow you to fully calculate the impedance at any point.

IMPEDANCE CHARTS

Rather than calculate, and to get a much faster oversight of any matching situation, several charts have been devised in the past. The fourth and last was originally published in 1939 by P.H. Smith of the Bell Telephone Labs as a "Transmission line calculator" with some improvements published later in 1944.

It has since become indispensable to the antenna engineer and it has often been said that he who understands Smith Charts, understands transmission lines.

THE SMITH CHART

The basis of the Smith Chart is of course the equations for complex reflection coefficient, and line impedances. It is a special type of graph with curved, rather than rectangular coordinates. Three families of circles make up the Smith Chart. The only straight line is through the centre and known as the resistance axis.

All values indicated are normalized values referenced to any Z_0 ohms. For eg 0,2 is 10 ohms on a 50 Ohm line.

The first set of circles are constant resistance circles:

The chart is not complete without locator scales as shown

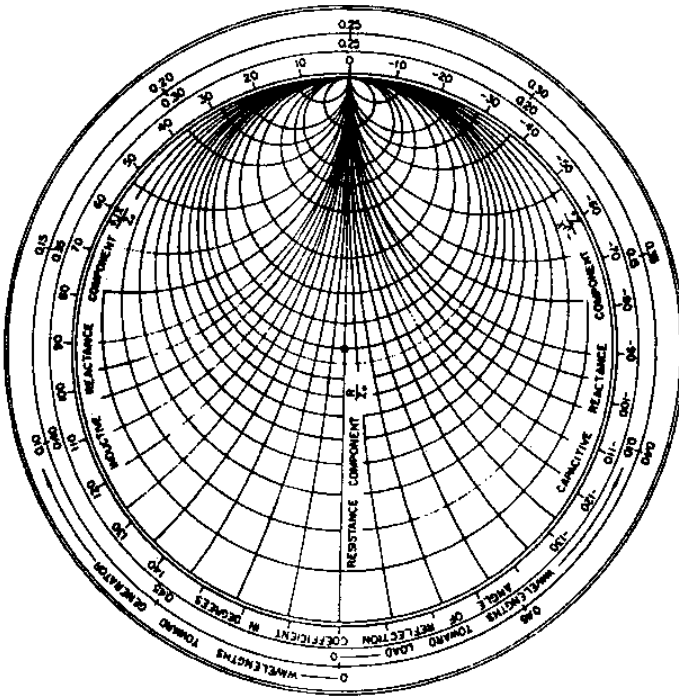
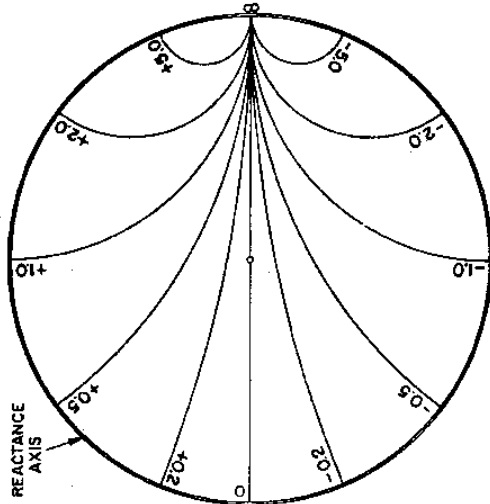


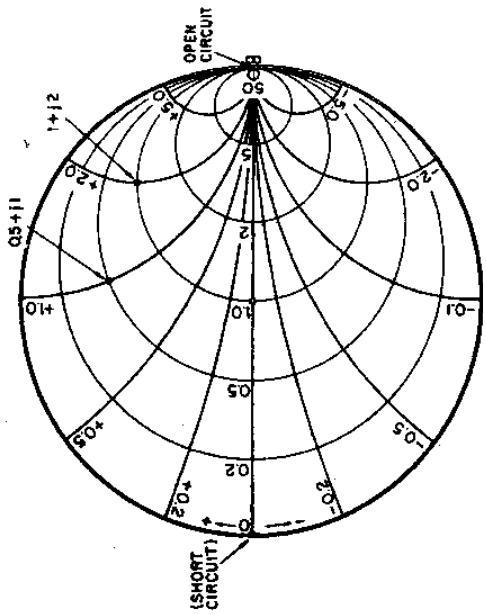
Fig. 25 Complete Smith Chart

The outer scales refer to quantities which change with position along a transmission line. Moving in a clockwise direction is "wavelengths toward generator" (source) and anticlockwise is "wavelengths toward load". The entire length of the circumference represents a half wavelength. Also the angle of the reflection coefficient is shown.

Last but not least the normalized values shown on the F of the real axis also represents the true VSWR. A circle drawn on the chart centre is thus a constant VSWR circle. Moving along a mismatched line thus means that we follow the circumference of an SWR circle in a desired direction. When we cross the real axis at the left, we pass through voltage minimum and on the right through a voltage maximum. For instance, draw a SWR=2.5 circle on the chart enclosed with this issue.... (use copies, keep the original) Assuming $Z_0=50$ and the load is 20 ohms resistive, the SWR thus sits at a minimum at 0.4. Now move say, 0.1 wavelengths toward the source. Draw a straight line between the outer scale point and the chart centre. The crossing point of the SWR circle and the line then represents the impedance at that point: $0.57 + j0.57$ or the equivalent of $28.5 + j28.5$ ohms.



For clarity only skeleton values are shown. The other set of circles are centred off the edge and represent constant impedances $+jX/Z_0$ in the upper half (inductive) and $-jX/Z_0$ in the lower half (capacitive). The full outer rim is the reactance axis. In the complete chart all arcs intersect each other at right angles. The centre represents Z_0 . Zero reactance ($X=0$) coincides with the centre line.



A very good Smith Chart can be downloaded from : www.pdfpad.com/smithchart/



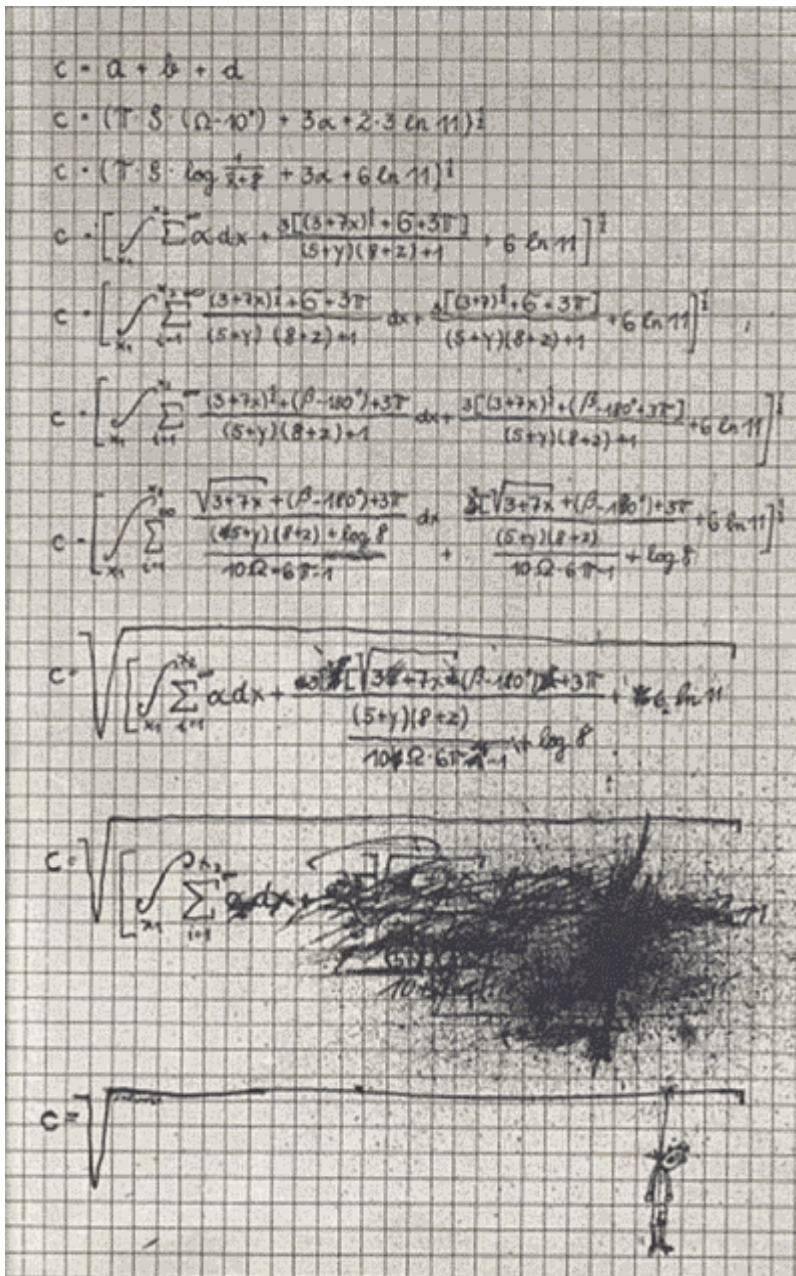
Want *Faster* Data Transfer?

WiFi Speed Spray™ to the rescue!

This revolutionary product is guaranteed to enhance the transfer of computer data through the air. You'll be amazed!

Do you live in a polluted environment? If so, you've probably experienced the heartbreak of data transfer slow-down. **WiFi Speed Spray™** can overcome the effects of pollution, increase fidelity, and provide you with the fastest wireless data transfer possible. Approved by the FCC, and 802.11b compliant! Compatible with Windows and most versions of Linux.

WiFi Speed Spray™ is designed to eliminate these harsh conditions selectively. Only the radio wave path is affected. There are no side-effects.



What adverts really mean..

EXCLUSIVE - Imported product.

UNMATCHED - Almost as good as the competition.

FOOLPROOF OPERATION - No provision for adjustments.

ADVANCED DESIGN - The advertising agency doesn't understand it.

IT'S HERE AT LAST - Rush job. Nobody knew it was coming.

FIELD TESTED - Manufacturer lacks test equipment.

HIGH ACCURACY - Unit on which all parts fit.

FUTURISTIC - No other reason why it looks the way it does.

REDESIGNED - Previous flaws fixed - we hope.

DIRECT SALES ONLY - Factory had a big argument with distributor.

YEARS OF DEVELOPMENT - We finally got one to work.

BREAKTHROUGH - We finally figured out a use for it.

MAINTENANCE FREE - Impossible to fix.

MEETS ALL STANDARDS - Ours, not yours.

SOLID-STATE - Heavy as hell.

HIGH RELIABILITY - We made it work long enough to ship it.