THE WEST RAND AMATEUR RADIO CLUB

June 2010
Volume 10, Issue 12

ANODE

Inside this issue:

Editor's Comments

Volume 10, Issue 12
June 2010

The Annual General Meeting of the West Rand Amateur Radio Club

This will take place at the club house on the 19th of June at 14:00. There is going to be a Bring and Braai after the elections. Make sure you arrive early to ensure voting can take place on time.

New members please retain your receipt and ask the secretary or treasurer for your card.

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RS232 checker

The RS232 tester (below) was put together for the benefit of OM Janos and any other HAM's who are struggling to get the interface to the radio working. I hope it helps you establish the correct working voltages on the RS232 pins.

{—}

The Anode is 10!

The Anode is just completing its tenth year in publication. The majority of the published Anodes have been laid out in Microsoft Publisher 2000. The PDF's have been generated by GhostScript and Ghostview. At various points in the ten years, I have tried some different methods of generation but always came back to Publisher.

Recently I took another look at Scribus,

(continued on page 2)

A Simple RS232 Tester

Special points of interest:

- Contact details on back page (corrected & updated Jan 2010)
- Ham-Comp Latest on web site.

This was born out of a need to help Janos sort out his PC to rig interface. He had built a 'standard' PSK31 interface circuit using opto-couplers but could not get the transceiver to transmit. This was compounded by the unfamiliar software and the use of a USB to RS232 adapter.

To be able to check the voltage on each pin requires a "third hand". That is what this small project provides. A means of checking the voltage on the RS232 pins.

It consists of two nine pin plugs and sockets. One of each so that you can connect it in series with the RS232 plug at the PC end and the interface end. When you use the switch in the circuit shown over the page, you can check each pin in turn or leave the meter connected to the pin of interest. Thus leaving your hands free to check other things or click the mouse on the software PTT button.

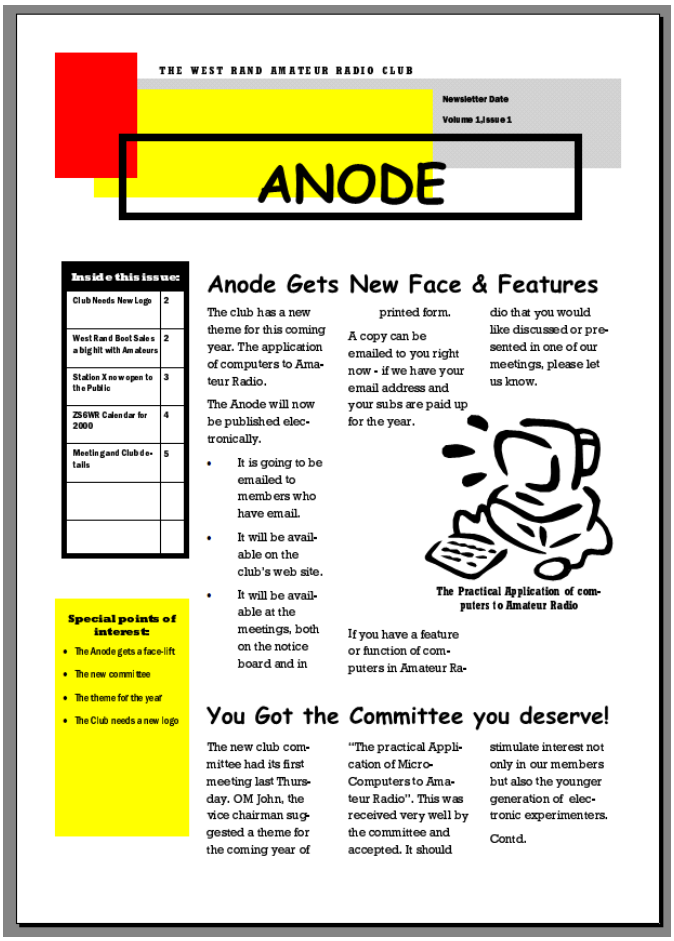
The plugs were "scrounged" from some old connecting cables and PC hardware. I then mounted them onto back plates left over from another "scavenging" operation. I then wired them up as a "straight through" con-

(continued on page 5)

Editor's Comments

(continued from page 1)

a German designed desktop publishing program. This 'second look', was enlightening. The Open Source (free) package has improved immensely. I shall be 'learning' and using Scribus in future months. Watch for the new look Anode soon.



THE WEST RAND AMATEUR RADIO CLUB

Newsletter Date
Volume 1,Issue 1

ANODE

Inside this issue:

Club Needs New Logo	2
West Rand Boot Sales a big hit with Amateurs	2
Station X now open to the Public	3
ZS6WR Calendar for 2000	4
Meeting and Club details	5

Special points of interest:

- The Anode gets a face-lift
- The new committee
- The theme for the year
- The Club needs a new logo

Anode Gets New Face & Features

The club has a new theme for this coming year. The application of computers to Amateur Radio.

The Anode will now be published electronically.

- It is going to be emailed to members who have email.
- It will be available on the club's web site.
- It will be available at the meetings, both on the notice board and in printed form.

A copy can be emailed to you right now - if we have your email address and your subs are paid up for the year.

dio that you would like discussed or presented in one of our meetings, please let us know.

The Practical Application of computers to Amateur Radio

If you have a feature or function of computers in Amateur Ra-

You Got the Committee you deserve!

The new club committee had its first meeting last Thursday. OM John, the vice chairman suggested a theme for the coming year of "The practical Application of Micro-Computers to Amateur Radio". This was received very well by the committee and accepted. It should stimulate interest not only in our members but also the younger generation of electronic experimenters.

Contd.

Talking from his radio shack during a ten minute pay out on the amateur radio community, he stereotypes hams in a series of over generalisations that could have many of his ill-informed viewers believe we are mostly all fat, engaging in meaningless activity, intellectual deficient, elitist and gutless when not behind a microphone.

Bert K1OIK obviously does not like contests and contesters. He claims they go nuts, abandon their families and even withdraw from important social occasions.

He likens packet clusters that list all active DX stations during a contest, to a hunter going into a zoo and killing a whole lot of caged animals.

The video ends with an industrial-style sign that states: Danger, Beware of Ham Radio.

Bert Fisher K1OIK, is obviously a great character. He has other videos including 'Ham Radio, a critical evaluation', and 'The Real World of Ham Radio', that make interesting viewing.

He obviously has enjoyed amateur radio most of his life, and shares the hobby with his daughter Erin KB1LOQ.

Jim Linton VK3PC
Now.. watch the video on youtube...

{—}

Danger, Beware of Ham Radio

The YouTube is a fabulous video sharing facility. There are plenty of good and informative videos about many aspects of amateur radio.

But there's one – the Truth about Ham Radio by Bert Fisher K1OIK – that interestingly gives one man's opinion about what's wrong with our hobby and some within it.

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Farmer sold RAF radios dumped in mine shafts

A report in The Sentinel newspaper describes how in the late 1940's, a farmer retrieved between 10 and 36 thousand former RAF radios that had been dumped in mine shafts.

Saturday, May 15, 2010, 09:20

Editor's Comments

(Continued from page 2)

MADAM, – I came across some stories about Sherman tanks on the internet (published on June 13, 2009), and was very interested to read about them.

It seems that stories like this have some lasting fascination for people, even years after the events.

My hobby is military history, particularly radio communications.

During some recent research I came across 1940s reports of radio gear being tipped down disused mine shafts near Cheadle in Staffordshire.

This method of disposal of stores wasn't uncommon after the Second World War.

But what made this more interesting was that it seems that a local farmer re-entered at least one shaft.

He removed large quantities of RAF radios – 10,000 units or up to 36,000 depending on the source of the information – which an associate from Buxton then sold on the open market.

It appears that the Coal Commission (forerunner to the National Coal Board) took legal action against the farmer on the grounds of trespass and he was forced to cease operations.

But in the following year, 1947, he bought two shafts from the now-NCB for as little as £10 and started mining again.

This time the Ministry of Supply (who had dumped the stores in the first place) tried to stop the mining but failed to do so.

The farmer's MP, Hugh Fraser, raised questions in the House about why these radios had been dumped rather than being sold off to recoup some revenue for the Government.

It seems that the NCB failed to put a clause in the sale agreement that the shaft contents were not to be touched.

Anyway, the whole issue appears to have embarrassed the Labour government considerably at a time of national austerity.

The Minister of Supply demanded a list of other dumping sites be drawn up, in case other caches of equipment were waiting to be dug up by land owners and sold, adding fuel to the argument.

The Cheadle area was a favourite dumping site due to the number of worked-out mines there and the two in this case were the "Wonder" and "Surprise" pits.

The name of the farmer concerned was Thomas Weston, of Commonside, Boundary, and his associate was George Eyre.

I wrote a short article last year on post-war radio disposals for the Vintage Military & Amateur Radio Society magazine, Signal.

I have since then managed to get copies of the extensive file on the Wonder Pit from the National Archives, so I have been able to find out a lot more about this story.

It looks, from the attached file found in the archives, as if an ancestor of your paper took some interest in a similar case where magnesium bomb casings were dug up and sold by another landowner, just as the MOS feared!

If you are able at some time to have a look in your archives I would be very interested to hear of any discussion of the Wonder Pit mining.

It seems that this David vs. Goliath story made it to the national press with both the News of

(Continued on page 4)

Editor's Comments

(Continued from page 3)

the World and Daily Herald being mentioned in the MOS file.

Finally, I have no intention of digging this stuff up, can you imagine the Health and Safety hoops one would have to jump through first!
Maybe Time Team might give it a look?
ROGER BASFORD Norfolk

{—}

Fox hunting minus the fox
By Danielle Cook

Over one hundred amateur radio enthusiasts will travel to Mount Gambier this weekend for the 47th Radio Convention.

Every year on the June long weekend hand radio enthusiasts get together for the Australian Fox Hunting Championships.

Competitors travel from all over Australia to claim to coveted champions trophy.

Wayne Kilpatrick is the South East Radio Group Convention Coordinator and said this has nothing to do with 'eliminating foxes from the countryside'.
The game involves using direction finding radio equipment to look for people and collect points.

Contestants usually compete in teams and all squeeze into the one vehicle.

"Most operate from four wheel drives and they might have a team of four people in a four wheel drive, but the equipment in that car is absolutely mind boggling," he said.

The antenna formations are an art.

"You couldn't believe that you could put this much equipment on a vehicle."

Wayne sets up the course and tries to trick the contestants with dead ends and long windy detours.

At each stage the teams put their ping pong balls in a tube, collect the next set of frequencies and head to the next check point.

Wayne said this game can go for hours and expects a late night on Saturday.

Like any game there are rules which have to be followed and only one team has been disqualified in the 46 years.

"The most obvious one is they have to abide by all the road rules.

"If any of the foxes, which are us, observe any of them not doing the right thing we just disqualify them straight away."

Although locals can't take part in the games, they can always go down and see the contestants in action.

"If the public want to get a laugh and watch 25 or so people with funny antennas running around on foot trying to find these little tiny transmitters that we hide they can come down and watch."

It's not just all about the games though; this gives radio lovers a chance to look at new products on the market.

"The other part of it is where we have a buy swap and sell where new traders come across from Melbourne in particularly and display their wares and other people sell second hand equipment or pre-loved wares."

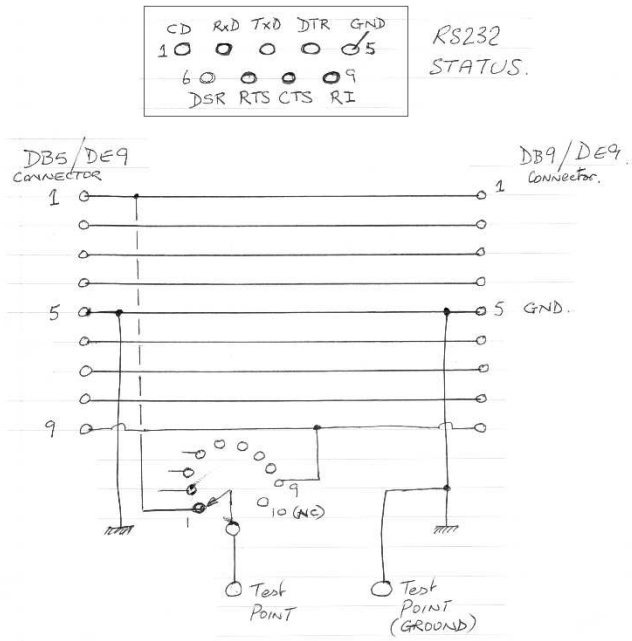
The games start at midday on Saturday and will finish in the early hours of the morning, then continue on Sunday finishing at five in the afternoon.

If you would like any more information visit their website : http://serg.mountgambier.org/convention.html

A Simple RS232 Tester

(Continued from page 1)

nection with suitable coloured coded wire.



Circuit above with pin designations and numbers.

I then "looked up" RS232 on Wikipedia and found out to my surprise that the plugs/ sockets are DE9 not really DB9. Also the voltages specified for RS232 (Recommended Standard 232), are much higher than those necessary to switch the interface. But that the line may very well not go low or negative enough to ensure correct operation.

The interface that Janos is using is similar to the one shown above. But his hasn't got the reverse connected L.E.D.s there to show the "off" condition.

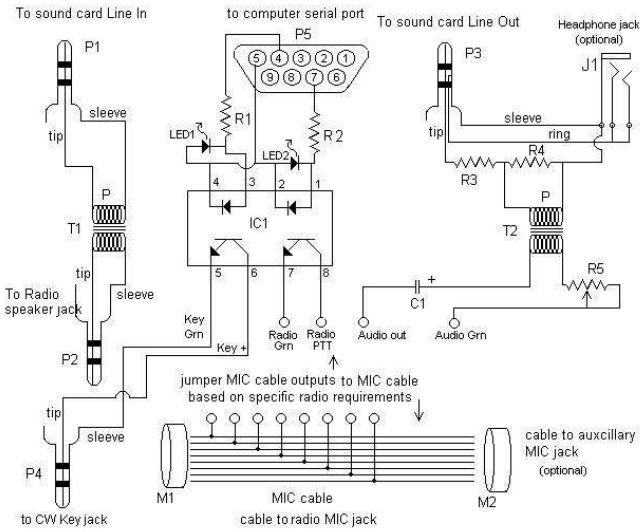
Using the tester

I measured -6.44 Volts on the CTS pin 8 and 0 Volts on the RTS pin 7. This was on a USB to RS232 device that had not been initialised by a program.

I also found the voltage to go to +6 Volts on transmit. This lead me to check the opto-coupler specification. A 4N25-28 type can only withstand a reverse voltage of 5 Volts. So those reverse connected L.E.D.s are vital to keep the Opto-coupler from blowing.

From reading the measured voltages, it seems that the USB to RS232 interface is compliant with the RS232 specification. But only just! A couple of volts above the minimum requirement.

JB 2010

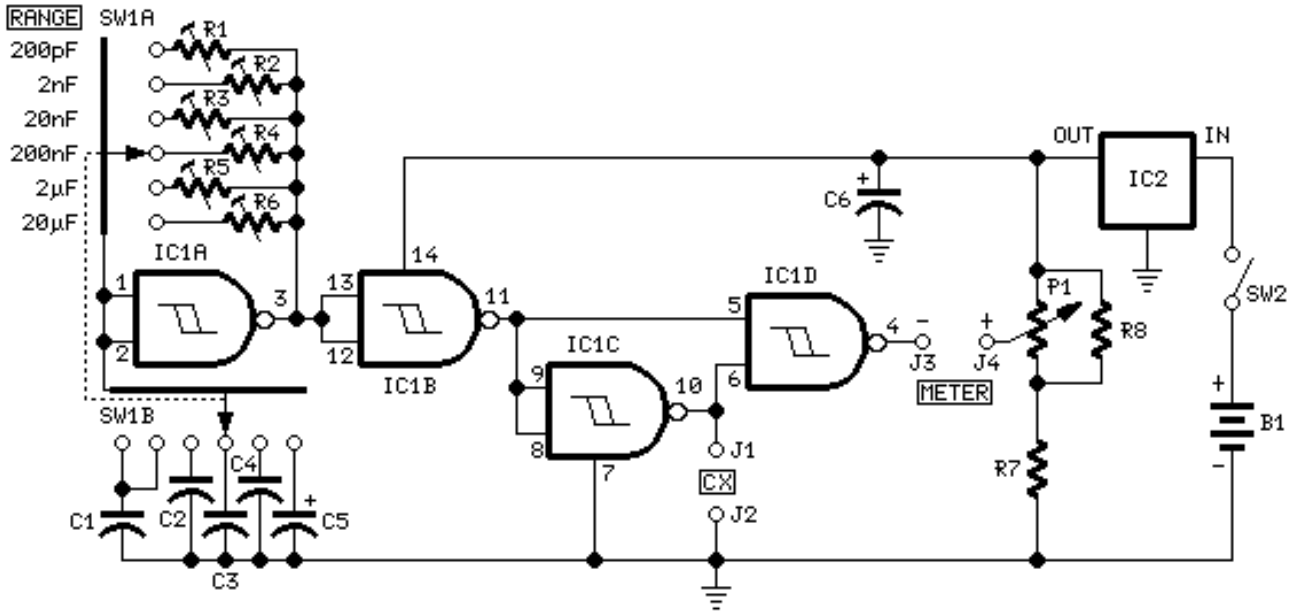


A fairly typical interface

A Simple Capacitance Meter

When I started my search for this, I found nearly 73,000 circuits! Here are just a few.

Simple Capacitance Meter 1
Operates in conjunction with a voltmeter
1pF to 22µF in six Ranges - 9V Battery supply



Parts:

P1_____470R Linear Potentiometer

R1 to R6_____47K 1/2W Cermet or Carbon Trimmers
R7_____10K 1/4W Resistor
R8_____100R 1/4W Resistor

C1_____1nF 63V Polyester or Polystyrene Capacitor 5% Tolerance or better
C2_____10nF 63V Polyester or Polystyrene Capacitor 5% Tolerance or better
C3_____100nF 63V Polyester Capacitor 5% Tolerance or better
C4_____1µF 63V Polyester Capacitor 5% Tolerance or better
C5_____10µF 25V Electrolytic Capacitor (See Notes)
C6_____47µF 25V Electrolytic Capacitor

IC1_____4093 Quad 2 input Schmitt NAND Gate IC
IC2_____78L05 5V 100mA Regulator IC

SW1_____2 poles 6 ways Rotary Switch
SW2_____SPST Toggle or Slide Switch

J1,J2_____1 or 2mm. chassis sockets (See Notes)
J3,J4_____4mm Output sockets

B1_____9V PP3 Battery

Clip for PP3 Battery

Comments:

A Capacitance Meter can be an useful tool for the electronics amateur, mainly to measure the value of capacitors obtained after dismantling old radios, PC cards and other electronics appliances.

Good quality capacitors can be found frequently, but often their capacitance value is unknown because the lettering on the case is hardly readable: in some cases being partially

(continued on page 7)

A Simple Capacitance Meter

(Continued from page 6)
or completely erased.

This device can measure capacitors in the 1 pF to 22µF range with good accuracy if low tolerance capacitors are used for C1 - C5, and is even more appealing as it requires a common digital or analogue Multimeter set to 2V dc voltage range to clearly and cheaply display the unknown capacitor value.

This test tool can be useful also when a more tight value is required for a capacitor: selecting it from a batch will become much easier.

Circuit Operation:

In conjunction with a voltmeter, this circuit gives a direct reading of capacitance. IC1A and IC1B form an oscillator and buffer, the frequency being set by R1 to R6 trimmers and C1 to C5 capacitors switched by SW1A and B in six different ranges. Output goes to IC1D, one of whose inputs is inverted and delayed by the unknown component by time proportional to its value. At the output of IC1D, normally high, a negative-going pulse with a width proportional to the capacitance appears, the duty cycle of the output and, therefore, the average voltage indicating the value of capacitance.

Supply voltage stability is required for accuracy: therefore, a small 5V voltage regulator IC was added.

Circuit Calibration:

To calibrate, set the D.V.M. (Digital Volt Meter) to its 2V range and remove CX, adjusting P1 for a zero reading (a very narrow pulse is present in this condition due to the inherent delay of IC1C). For ranges 2 to 6 (2 nF to 20µF) connect a capacitor of the same value and tolerance of C2 to C5 in the CX position, set the frequency switch and adjust R2 to R6 trimmers for reading the correct value on the Multimeter display.

Obviously, this operation must be repeated five times, connecting the correct capacitor in the CX position and adjusting the corresponding Trimmer for each range.

To calibrate the first range (200 pF) set the frequency switch in the first position and connect a 100 pF low tolerance polystyrene capacitor in the CX position. Then adjust R1 for a reading of 100 on the display.

Notes:

P1 must be adjusted for a zero reading (Cx removed) whenever the range is changed.

A +100% - 20% tolerance value is very common for electrolytic capacitors. Therefore, C5 should be a low tolerance type or a 1µF or 2.2µF polyester capacitor, 5% tolerance or better, can be used in the CX position to calibrate the last range.

Wiring from the circuit board to J1 and J2 must be kept as short as possible to avoid stray capacitance.

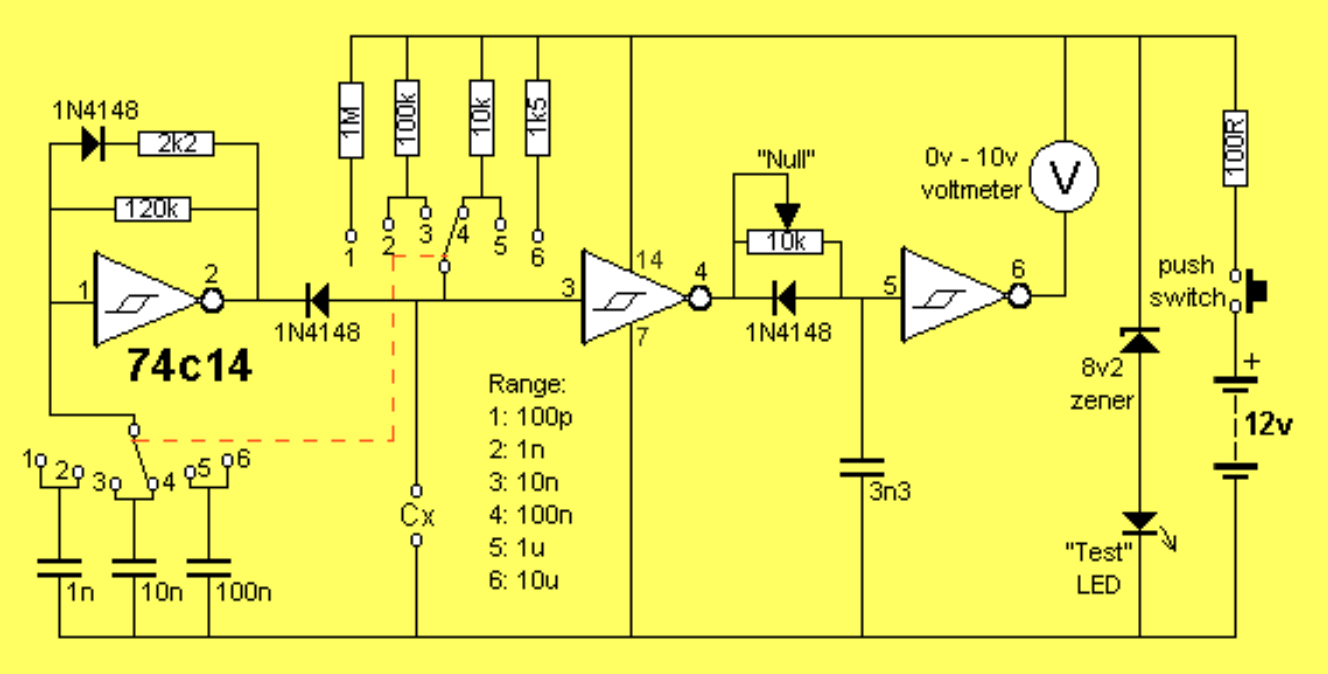
As described in the Parts List, J1 and J2 can be chassis sockets of 1 or 2 mm diameter, or even two short leads ended with crocodile clips, but perhaps the best solution is to use a 2 way spring loaded, lever action, quick connection loudspeaker terminal.

Originally developed for terminating loudspeaker leads, these terminals have found numerous uses in applications requiring quick interconnection between equipment. The spring loaded lever allows wires to be easily inserted into the terminal where they are firmly trapped once the lever is released, giving a reliable con-

(Continued on page 8)

A Simple Capacitance Meter

(Continued from page 7)



nection.

Total current consumption is 3.5 mA.

This is a modified version of an original circuit by Rae Perälä, Helsinki, Finland

Obtained from:
http://www.redcircuits.com/index.html

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Build this . . . **Add-on**
CAPACITANCE METER 2

Tests capacitors from 1p to 10u, in 6 ranges
Connect it to your multimeter (0v - 10v scale)

This simple add-on capacitance meter has been specially designed to help you identify capacitors from 1p to 10u.

There has always been a problem identifying capacitors, due to the enormous variety in size, shape and coding. Most of the time it is impossible to identify them by size due to the different forms of construction. So you have to be able to read and interpret the codes on the body. But if the numbers are missing or microscopic in size, you have a problem. The only solution is to have a piece of test equipment to identify them for you.

Add on CAPACITANCE METER CIRCUIT

This project is exactly what you need. It is simple to construct and can be connected to almost any analogue multimeter.

The scales are accurate over each range - certainly good enough to provide you with the value of any capacitor between 1p and 10u.

The actual accuracy depends on the tolerance of the components used in the design and since we have used 10% components, you can assume this accuracy for any of the readings you take. It is interesting to note that the actual value of a capacitor is not important for most applications.

Coupling capacitors can be +/-50% without affecting performance, as can bypass capacitors. About the only types that have to be accurate

(continued on page 9)

A Simple Capacitance Meter

(Continued from page 8)
are tuning capacitors and those in oscillators, and then there is usually a trimmer cap or slug tuned coil that can be adjusted to set the frequency.

The reason we designed this project was a result of our need to determine the value of a couple of capacitors we were using in the front end of an RF motion detector (yet to be released). It had to be 1.8p and the capacitors I found in our parts store looked like 18p - it was difficult to read the value printed on the body. I had to borrow one of the staff's capacitor testers to prove it was 1p8.

When you are working with high frequencies such as 400 MHz, capacitors have to be the correct value or the circuit will not work. Certainly an 18p will not work in place of a 1p8 in an oscillator stage at this frequency.

The tester proved so handy I thought it would be a good idea to present something similar as a project.

It's very handy when you are not sure of a value. This is especially important with surface-mount components as their value is not marked on the body and the size is no indication of capacitance. Many capacitors are made in layers to reduce their size and this is certainly the case with surface-mount. We have instances where 10p is physically larger than 22n! - this is because the 22n is made up of many layers.

Ceramic capacitors can sometimes be a problem too. Their size is also dependent on the layer principle and a 22n can be the same size as a 10p or even smaller! There is also a problem with the markings. Sometimes 100p is marked as "100" and sometimes "101." You have to think every time you pick up a component and remember the coding being used - if you don't want to make a mistake.

At the end of this article we have included a section on the coding of capacitors and this will help you identify some of the more difficult values.

If you make a mistake and put 102 or 103 in a circuit in place of 100p, you may be creating a fault that you will never locate as 102 is 1n and 103 is 10n. We have also had the case of a 1n capacitor being marked 1n0. The numbers were so small that the constructor thought it was 100, and used it as a 100p!

It's even more difficult to decipher 5.6p from 56p on tiny ceramic capacitors as the decimal point is so small that a magnifying glass can hardly pick it up.

Another trap is the marking of capacitors such as 47000 instead of 47n or .0022 instead of 2n2.

When we are making up the kits, we know a component is 5p6 because it comes from a box labelled 5p6 or marked on the bag as 5p6, but when you pick up some oddments from a junk box, you can't be quite so certain.
When you are experimenting with high frequency circuits such as RF stages in transmitters, you will very soon realise the importance of "p" values. The difference of only a few "p" will change the frequency many MHz, depending on where it is situated in the circuit. The wrong value will even prevent a stage from oscillating.

So there we have it, some capacitors are critical and some can be almost any value.

Going back to the old radio days and the introduction of transistor radios, some of the ceramic capacitors had a tolerance of 50% to 80%. This wasn't a problem as they were used in bypass situations and for coupling where a value could be increased by as much as 100% without any affect in performance.

Tolerance has improved with modern components and the normal tolerance is now about

A Simple Capacitance Meter

(Continued from page 9)

10% to 20% but we need not be concerned with the accuracy of a capacitor, or the tester, but rather the need to determine if the value marked on the body is the same as it appears to a circuit.

By double-checking with a tester, you will prevent silly mistakes such as using a 10n capacitor in place of a 1n or 5p6 in place of 56p.

Now to the technical part . . .

Measuring from 1p to 10u is a factor of 10 million. To cover this we need 6 ranges. Each range is divided into 100 parts, making it easy to read values on a 0-10v scale.

For each range we need to switch some of the components into circuit to create the necessary test frequencies and charging values. This is the function of the rotary switch.

All you have to do is fit the unknown capacitor to the test socket and press the button.

If you don't know the value of the capacitor at all, you can start on any range. When on an incorrect range, the needle will swing full scale or not move at all. Only when it's on the correct range will deflect the appropriate value.

HOW THE CIRCUIT WORKS

This circuit reads the value of a capacitor and displays it on an analogue meter.

Designing a circuit to do this is considerably more difficult than you think as the only way to read a capacitor is to charge it and measure how long it takes to charge.

As you may be aware, the charging of a capacitor is a non linear function and so we must create a circuit that by-passes the non linear problems and works on a linear arrangement.

We have done this by charging the capacitor to a specified voltage level and this level is detected by a gate.

We wanted to use our favourite chip, the 74c14 hex Schmitt Trigger in this project. It operates by detecting 2/3 of the rail voltage to change the state of the output. At first it seemed that this could not be used to create a linear output. But where there's a will, there's a way.

Not only does the circuit produce very good linearity, but it is simpler and better than anything else we have seen.

The circuit works on a timing principle. The first oscillator, between pins 1 and 2 has a high time of 100 units and a low of 1 unit.

The HIGH is created by the 120k resistor and the capacitor selected by the rotary switch and the low is created by the 2k2 and diode.

This gives us our starting point where we can divide a scale into 100 parts.

The next section of the circuit charges the test capacitor via a resistor selected by the rotary switch.

The requirement of this section is to charge the largest capacitor (in the range) in exactly 100 units of time.

This means a 100p capacitor will take 100 units of time to charge and it will not quite get to the point where the gate detects a HIGH before the output of the timing oscillator goes tow and discharges it, ready for the next cycle.

Obtained from:
http://www.talkingelectronics.com/

The West Rand Amateur Radio Club
Established in 1938
KG33XU 26.14122 South - 27.91870 East

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Email: zs6wr.club@gmail.com
Web page: www.zs6wr.co.za

Bulletins (Sundays at …)
11h15 Start of call in of stations
11h30 Main bulletin start

Frequencies
439.000MHz 7.6MHz split
Input: 431.4MHz (West Rand Repeater)
145,625 MHz (West Rand Repeater)
10,135 MHz (HF Relay)

Radio Amateurs do it with more frequency!

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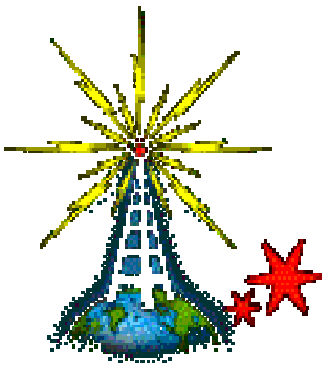
West Rand members - we need your input!

To make this the best ham radio magazine in South Africa we need your input. Please submit articles, comments, suggestions etc.

Please send plain text with no formatting to the email address below.

In July 2003, we re-published an Anode Compendium on CD. It has the issues from July 2000 until June 2005. This will be re-issued for the 10th year anniversary. Check with the chairman for details.



We need your input! Email us articles, comments and suggestions please.
zs6wr.club@gmail.com