

September 2010

Volume 11, Issue 3

# ANODE

## Inside this issue:

Editor's Comments	1
Clip-on R.F. Current Meter	1
The Back Page	8

## Editor's Comments

### Volume 11, Issue 3

#### How to eMail the club

Just to let the members know, we have a few 'rules' on the email processor.

eMail addressed to :-  
zs6wr.club@gmail.com, will be sent to the 'entire' committee. Any attachments greater than 800 k bytes will NOT be sent on to the committee. Also certain junk senders, such as ABSA scammers will be deleted.

I am 'trying out' a new rule this month, which should send email to 'all the current members'.

#### Amateur Radio and Linux...

#### Rolling Your Own with Digital Amateur Radio

<http://www.linuxjournal.com/article/10620>

FLdigi to FLDigiROL: an Amateur Radio operator's digital journey to open source.

Amateur Radio operators are generally free-thinking individualists who don't mind getting their hands dirty to get something done right. Many of us do not think twice about buying a brand-new radio for hundreds or even thousands of dollars and popping the lid on it to see if we can modify it to make it better. You do not have to look hard to find myriad articles on how to modify

*(continued on page 2)*

## Clip-on RF Current Meter

GOSNO's original article was in Rad-Com (RSGB) April 1993, page 74.

The original Maplin ferrite core is no longer available, but this version contains additional information from GOSNO on alternative sources.

### Introduction

A clip-on RF ammeter is not only useful for antenna experimenters but also as an aid to achieving good EMC in an amateur station. If some of the RF current from a transmitter flows into mains wiring, this can increase the chance of breakthrough problems in nearby TV, video or audio equipment etc. A clip-on RF ammeter allows this current to be

measured, so that steps can be taken to minimize it.

For RFI investigations, you can also clip this meter on to coaxial cables, rotator cables and other wiring in your shack, to find out where the RF currents are flowing, and how big they are. You can also use this tool for measuring currents in wires and radials.

Instead of splitting a ferrite ring in half, RSGB EMC Committee member David Lauder, GOSNO, has been experimenting with various types of ferrite core which are already split, as shown in Fig 1 (below).

### Special points of interest:

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

# Editor's Comments

*(continued from page 1)*

different pieces of Amateur Radio equipment. So, it is not surprising that we might feel the same way about the software we use.

Open-source software and Amateur Radio are a natural fit. Few operators ever would buy a piece of radio gear if it came with a license that said they could not modify it, and it's natural to see why a lot of us navigate toward open source in general and Linux in particular. My personal computing journey started with DOS in 1990, OS/2 in 1993, Windows in 1998 and Linux since 2000. In the true Amateur Radio tradition, I taught myself how to write batch files in DOS, then started tinkering with Pascal. From there, it went to C and eventually, C++. Then, after learning how to use those languages, I took college-level classes to relearn them the right way. It's almost an Amateur Radio tradition to do things backward sometimes and without the manual first.

**Linux Journal Contents #189, January 2010**  
<http://www.linuxjournal.com/issue/189>

**Fldigi:**  
<http://www.w1hkj.com/FldigiHelp/Modes/index.htm>

**Live Map:** [psk.gladstonefamily.net/pskmap.html](http://psk.gladstonefamily.net/pskmap.html)

**HAMSOF T: Linux Software for the Hamradio Community:** [radio.linux.org.au](http://radio.linux.org.au)

**GNU Radio:** [gnuradio.org](http://gnuradio.org)

**D-RATS:** [d-rats.com](http://d-rats.com)

**Ubuntu Amateur Radio**  
**[Find them here:-**  
<https://launchpad.net/~ubuntu-hams>]

This team exists to bring together radio amateurs who use Ubuntu in order to:

☐ Provide a meeting place for amateur radio operators using Ubuntu Linux

- ☐ Help each other use amateur radio applications on Ubuntu Linux
- ☐ Promote the use of applications running on Ubuntu
- ☐ Help organize packaging and maintenance where needed for amateur radio applications
- ☐ Help provide documentation for Linux APIs, i.e. for sound interfaces
- ☐ Allow experienced Ubuntu users and the bug handling community to help process bugs reported against amateur radio apps running on Ubuntu
- ☐ Connect application users with upstream teams in order to facilitate testing
- ☐ And more!

We hang out on IRC in #ubuntu-hams on irc.freenode.com

Team members are encouraged to use our wiki page:

<https://wiki.ubuntu.com/UbuntuHams>

and to update their call sign and information by following the link on that page. Please help populate the page with information about the various amateur radio packages.

If you are a bug triager, packager, or developer who wants to work with amateur radio packages, consider joining the Ubuntu Ham Developers team:

<https://launchpad.net/~ubuntu-hams-devel>

The current list of Amateur Radio software packages in Ubuntu, and those that require packaging are listed at:  
<https://wiki.ubuntu.com/UbuntuHamsPackages>  
and the associated bug status is at:  
<https://bugs.launchpad.net/~ubuntu-hams-devel/+packagebugs>

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**[New User] Using Minicom and a USB/**

## Editor's Comments

*(Continued from page 2)*

**Serial cable to talk to your KPC 3+  
Mar 23, 2010 By David Lane in Ham Radio**

Over the weekend, I was showing Linux and Packet radio and for some reason I could not talk to my TNC, a KPC 3+. It was at this point that I realized I had forgotten more about Linux (and minicom) than I had about the commands needed to control the TNC. So, in the interest of helping save you some time, here is a quick write up on using minicom with a USB/Serial adapter to talk to your TNC, specifically, a KPC.

Minicom is an old school program that is available for most of the distributions but may not be installed by default. The good news: it is in all the repositories, so you can pull it down and install it quickly.

It is a serial terminal program that runs from the command line, but can sometimes be a little fussy to get working, and I will admit that I have not used minicom with a USB/Serial converter.

First, you have to know what tty port your USB/Serial converter is on. So, plug it in, give it a minute and then type at a console port:

```
dmesg | grep tty
```

You should get something like this back:

```
kg4giy@kauai:/$ dmesg | grep tty
[ 0.001982] console [tty0] enabled
[ 686.529224] usb 2-2: pl2303 converter
now attached to ttyUSB0
```

In this case, the converter is attached to ttyUSB0, you when you configure minicom, you want to use /dev/ttyUSB0 as the serial port setting.

To start minicom then (assuming you have not configured it, but you know the modem speed of the TNC) type:

```
$ sudo minicom -s
```

Note that minicom requires root privileges. You will be prompted for your password.

Select "Serial port set up" from the list with the cursor keys and set the serial device and the Bps/par/bits (8/N/1 and whatever the speed of your TNC is). Press , Save setup as dfl to save your settings and then select Exit to enter minicom.

Turn on the TNC. Press once or twice if you do not get the TNC cmd: prompt and you should now have control of the TNC.

When you are done, A then Z will bring up the help menu and you can exit by pressing Q or A Q to exit.

One thing to note. Minicom has a much smaller set of connection speeds. For overall interoperability, it is best to set the baud rate of your TNC to 9600, with 8-n-1 for parity. This will facilitate connectivity with a multitude of devices, including a simple VT220.

I hope this saves you all a few minutes!

### **Tech Support Request - Serial baud rate changes**

Feb 18, 2010 By David Lane  
In Ham Radio

One of my goals for the forum was to provide a source of information sharing and tech support, so, with that, we have our first tech support style question!

From Jim, W6JVE:

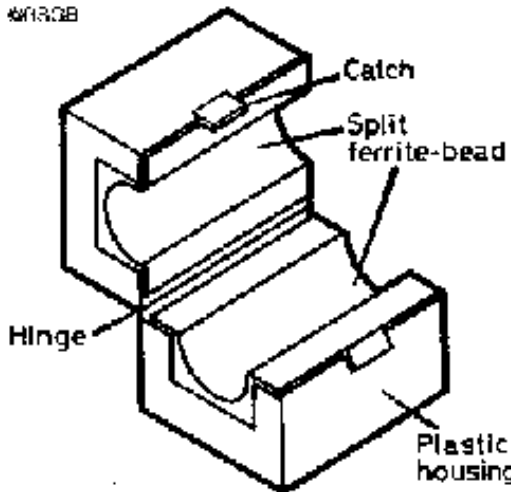
Some of us in the amateur radio game would like to be able to use the serial port on the computer at 45.45 baud, 5 bits per character so we can send and receive 60 wpm RTTY signals through the port. That is not one of the

*(Continued on page 7)*



# Clip-on RF Current Meter

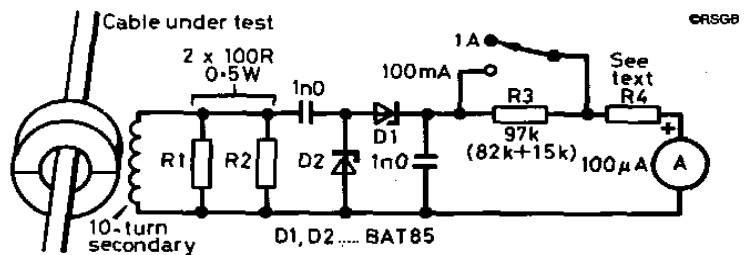
(Continued from page 1)



**Clip-on ferrite core**

Farnell Components (UK)  
 Stock No. 535-904 Radio Shack (USA)  
 #273-105  
 RS Components  
 Stock No 257-4266 TDK  
 Type ZCAT3035-1330

## Circuit Description



## Circuit

This is a large split ferrite bead with a 13 mm diameter hole and a hinged plastic carrier which can be clipped around a cable. Although intended to be clipped on and left, with care it can be opened and closed repeatedly. It is intended for suppression of computer interference but can also be used as a wide-band current transformer. This type of split bead offers better coupling than a ring core and is usable from below 500 kHz to over 50 MHz.

What's needed for reasonable coupling is a split bead where the length of the hole is about 2.5 times the inside diameter. Make sure that the length of the hole is at least 30 mm/1.25 inch for best results. Because most types of clip-on ferrite core are designed for EMI suppression, the grade of ferrite is generally OK for use as an RF transformer on the HF bands.

There are many sources for these cores. Almost any generic 'flea market' split ferrite bead should be OK, if the centre aperture is large enough to take both the secondary winding and the cable you want to test.

Maplin Electronics (UK)  
 Suitable cores no longer available (new range are all too small) Fair-Rite Products Corp (USA)  
 Part No. 0443164151

In the circuit in Fig 2 (above), a 10-turn secondary is wound on one half of the core and terminated by a 50-ohm load formed by R1 and R2 in parallel. When the core is clipped onto a cable, the cable under test forms the single turn primary winding of a transformer and in theory, 10% of the RF primary current flows in the secondary and through the 50-ohm load. (Note that more turns on the secondary would give less secondary current.) For primary currents up to 1A the power rating of the 50-ohm secondary load should be 1W. In practice, with the core in the prototype, the current ratio was less than 10%, being fairly constant at 8% up to 30 MHz and falling to 7.5% at 50 MHz. At 14 MHz for example, 1A RMS in the cable under test causes 80 mA RMS to flow through the 50-ohm load which drops 4V RMS across 50 ohms.

Clipping the current transformer onto a cable adds a small series impedance which in theory is 0.5 ohms (secondary load divided by turns ratio squared) but in practice is about 2 ohms at 14 MHz and 4 ohms at 28 MHz. The voltage across R1/R2 is rectified by a voltage doubler rectifier using two BAT85 Schottky diodes. This gives a DC output about 2.8 times the RMS AC input

(continued on page 5)

## Clip-on RF Current Meter

(Continued from page 4)

voltage less the forward drop of the diodes. With a 100 microampere moving coil meter, the total resistance of (R3 + R4 + meter) should be 104 k ohms on the 1A range. On the 100 mA range, R3 is short-circuited and the resistance of (R4 + meter) should equal 6.8 k ohms. On the 100 mA range, the forward voltage drop of the diodes is significant, so that the minimum current which can be measured is 30 mA and an extra scale should be marked on the meter as in Fig 3 (below). The response of the detector circuit on its own should be fairly flat up to 30 MHz but it may be less accurate at 50 MHz depending on lead inductance, layout etc. [For RFI work, tracing unwanted stray currents, you can see useful indications all the way up to 432 MHz - G3SEK.]

### Meter scale

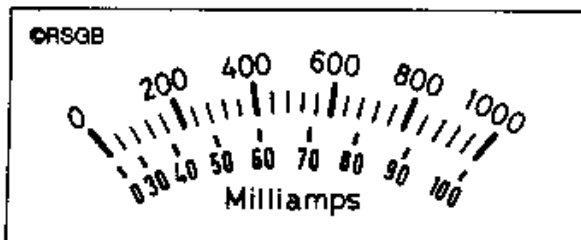


Fig 3: RF Ammeter calibration markings.

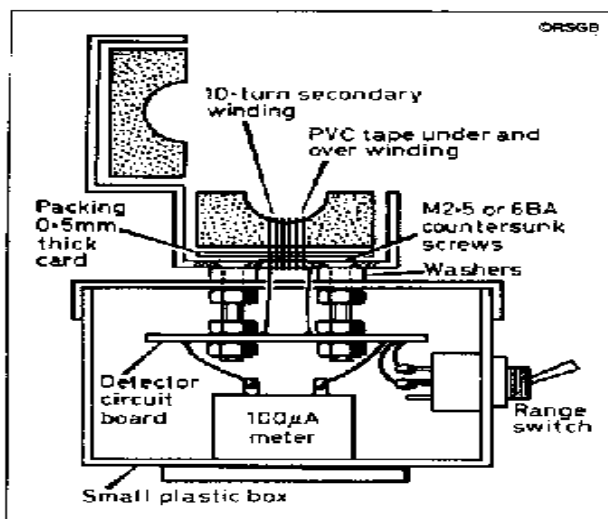


Fig 4: Suitable layout using a plastic box.

### Construction

See below for photographs of alternative construction methods.

### Original construction

The meter can be mounted in a small plastic box with the current transformer mounted on the lid as shown in Fig 4.

The clip-on ferrite choke has two fixing holes in its plastic carrier. Carefully push out the half of the ferrite core then put two M2.5 or 6BA [1/8-inch] countersunk screws through the holes from the inside. Put a 0.5 mm thickness of card (2 thicknesses of QSL card!) under the ferrite core before clipping it back into the carrier.

Now put a piece of PVC insulating tape onto the ferrite to protect the enamel insulation on the wire and wind 10 turns of enamelled wire, about 26-28SWG (24-26AWG or 0.4 mm) tightly round the ferrite core half. This will pull it down into the carrier which is why the card is needed. Check that when the core is clipped shut, there is no gap between the halves, and that the plastic spring lugs on the top half are being pushed outwards by the core.

Cover the winding with epoxy or a piece of PVC tape to give it some protection in use.

### Calibration and Use

If required, the accuracy of the clip-on ammeter can be checked against a power meter on various bands, using the test set-up shown in Fig 5 (below).

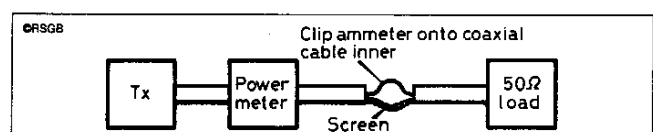


Fig 5: Test set-up for calibration of the RF ammeter.

(Continued on page 6)

## Clip-on RF Current Meter

(Continued from page 5)

### Calibration setup

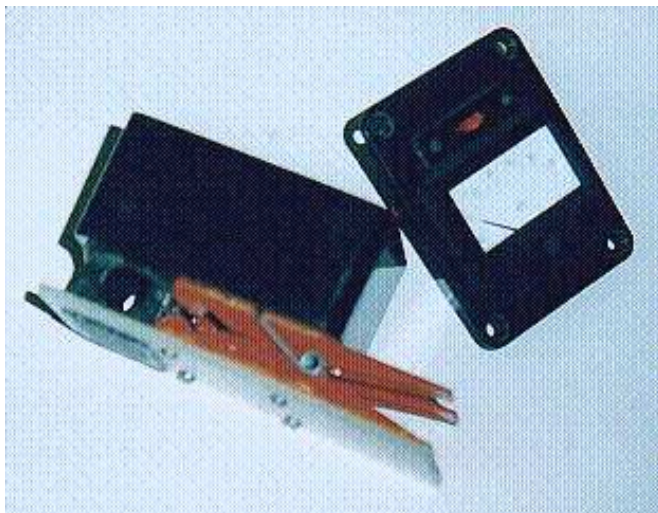
Clip the ferrite core around the coax inner only, with 50W into the load. The ammeter should show 1.0A. With 0.5W into the load, the ammeter should indicate 100 mA. The split coax arrangement is only used for testing the meter in normal use, the meter should of course be clipped around the outside of the braid of unbroken coaxial cable. In this way, it does not respond to the current on the inner but only shows any current on the outside of the braid, which should ideally be zero. In practice, any current on the outside of the coax braid will form standing waves, causing the reading to vary as the ammeter is moved along the cable. It can also be clipped around a mains cable, particularly a transmitter mains cable to detect any RF current being injected into the mains wiring.

### Alternative Construction Methods

The clip-on cores as supplied (Fig 1) are too fragile for repeated use - the plastic hinge breaks after being used a few times.

#### G3SEK:

As an alternative, I tried a "heavy duty" version of the earlier designs using a spring clothes-peg. The photos below show one version using



two clothes-pegs in parallel.

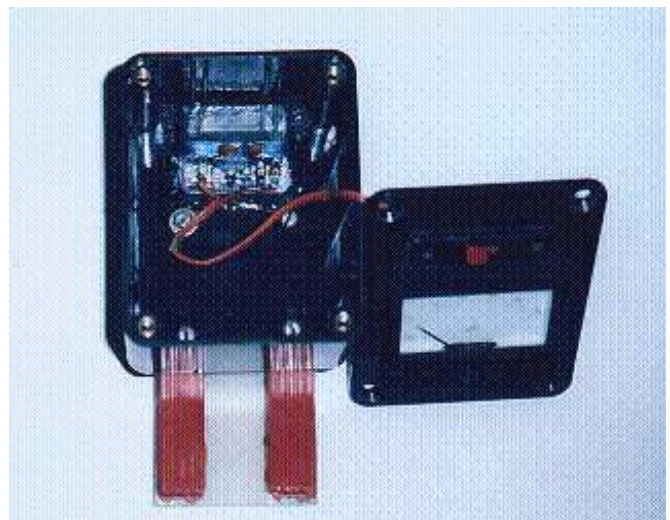
The moving part of the ferrite core is glued into a hole in a piece of 1/8 in (3 mm) fibreglass sheet, which is itself glued and screwed onto the two clothes-pegs. The fixed part of the core (the part with the winding) is glued into a hole in the base of a plastic box.

Alternative construction, side view Alternative construction, top view

The two halves of the core must clip together without gaps. Here's how:

1. Epoxy-glu the fixed part of the core (with the winding already in place) into the hole in the box, making sure the core is square and level.
2. Insert a spacer between the jaws of both clothes-pegs to open them up, so that the fibreglass sheet is parallel to the base of the box (see photo above).
3. Locate the other half of the core exactly on top of the part with the winding, and epoxy it to the fibreglass sheet.

Make absolutely sure that the two parts of the core will close together with no gaps. Do not allow full spring pressure until the epoxy has completely set.



#### G10XAC:

A similar construction using a giant paper-clip,  
(continued on page 7)

## Clip-on RF Current Meter

(Continued from page 6)  
with a small plastic meter glued to the side.

Visit G3SEK's tech web page at :-  
<http://www.ifwtech.co.uk/g3sek/index.htm>



## Editor's Comments

(Continued from page 3)  
supported baud rates. I don't know where to go to ask that this be changed.

So, is this something that can be done easily? Programmatically? Can you help Jim out? If so, post a response! And thanks!

### How to Replace an Invalid Windows XP Installation with Ubuntu

[Find this article at :-  
<http://www.devshed.com/c/a/BrainDump/How-to-Replace-an-Invalid-Windows-XP-Installation-with-Linux-Ubuntu/>]

### Low-Cost 2.4-GHz Spectrum Analyzer

[Find this article at:-  
<http://www.circuitcellar.com/library/print/0406/Armitage-189/8.htm>]

### It's Dry, but you can read it...

1. Two antennas meet on a roof, fall in love and get married. The ceremony wasn't much, but the reception was excellent.

2. Two hydrogen atoms walk into a bar. One says, "I've lost my electron." The other says, "Are you sure?" The first replies, "Yes, I'm

positive...

3. A jumper cable walks into a bar. The bartender says, "I'll serve you, but just don't start anything."

4. A sandwich walks into a bar. The bartender says, "Sorry we don't serve food in here."

5. A dyslexic man walks into a bra.

6. A man walks into a bar with a slab of asphalt under his arm and says: "A beer please, . . . and one for the road."

7. Two cannibals are eating a clown. One says to the other: "Does this taste funny to you?"

8. A man complains, "Doc, I can't stop singing 'The Green, Green Grass of Home.'" "That's the Tom Jones Syndrome," explains the doc. "Is it common?" asks the man. "It's not unusual," says the doc.

9. Two cows are standing in a field. Daisy says to Dolly, "I was artificially inseminated this morning." "I don't believe you," said Dolly. "It's true, no bull!" exclaimed Daisy.

10. An invisible man marries an invisible woman. The kids were nothing to look at, either.

**The West Rand Amateur Radio Club**

Established in 1938

KG33XU 26.14122 South - 27.91870 East

P.O. Box 5344  
Weltevreden Park  
1715

**Phone:** 083 267 3835 (Chairman)

**Email:** [zs6wr.club@gmail.com](mailto:zs6wr.club@gmail.com)

**Web page:** [www.zs6wr.co.za](http://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!**

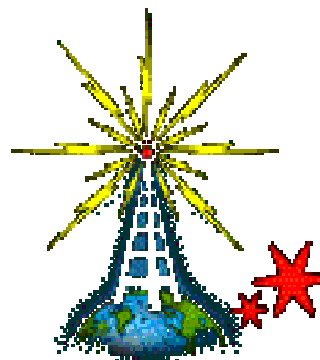
Chairman (technical)	Phillip van Tonder	ZS6PVT	083 267 3835	<a href="mailto:zs6wr.club@gmail.com">zs6wr.club@gmail.com</a> <b>OR</b> <a href="mailto:zs6pvt@gmail.com">zs6pvt@gmail.com</a>
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Treasurer	Craig Woods	ZS6CRW	083 449-4886	<a href="mailto:zs6crw@gmail.com">zs6crw@gmail.com</a>
Member	Romeo Nardini	ZS6ARQ	082 552 4440	<a href="mailto:roshelec@global.co.za">roshelec@global.co.za</a>
Member (Anode)	John Brock	'PieRat'	011 768 1626	<a href="mailto:brockjk@gmail.com">brockjk@gmail.com</a>
Member (technical)	Ron Eva	ZR6RON	082 902 8343	<a href="mailto:zr6ron@webmail.co.za">zr6ron@webmail.co.za</a>
SARL Liaison	Willem Weideman	ZS6WWJ	082 890 6775	<a href="mailto:willem@zs6wwj.co.za">willem@zs6wwj.co.za</a>

**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.

See Club website at [www.zs6wr.co.za](http://www.zs6wr.co.za) for all ANODE back issues.



**We need your input! Email us articles, comments and suggestions please.**  
[zs6wr.club@gmail.com](mailto:zs6wr.club@gmail.com)