SHACKNEWS

HIGHVELD AMATEUR RADIO CLUB

APRIL 2008

COMMUNICATION IS THE NAME OF THE GAME

Meeting There was no meeting held this month. Many of our members attended the do at the Transvaal Aviation Club put on by the Antique Wireless Association. This event was most enjoyable and it was nice to meet all our fellow amateurs. A few pics below of various types of old refurbished equipment. *Bulletin readers please check regularly to see if there are any changes made to the Sunday roster.*

SSC Meeting This months meeting was held at the home of Errol and Betty. Thanks for all the eats to Errol and Betty. Next meeting will be held on Saturday 7th June 2008 at the home of Berridge and Sandra.

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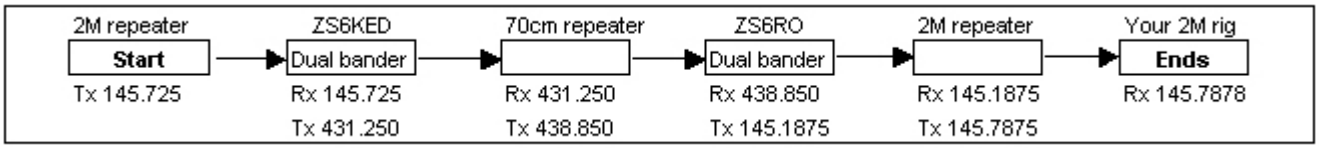
Testing IRs

1. Obtain a remote control with a visible LED on it. Make sure it has batteries in it and that they are not out of power.
2. Grab a digital camera, video camera, camera phone, web cam or any other piece of camera equipment with an LCD screen.
3. Turn the camera on, making sure it is in capture mode, and look through the LCD screen.
4. Point the LED on the remote directly at the camera lens.
5. Hit any button on the remote, except for mode-change buttons such as TV, as those do not send an infra-red signal.
6. You should now see a bluish-white light emitting from the dark panel of the remote. This is infra-red light!

Sunday morning SARL HQ bulletin relay

There seems to be some misunderstanding about how the bulletin is received at your 2M rig on a Sunday morning. I hope the flow diagram below makes sense.



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Design hints to prolong battery life Part 2 Submitted by Frank ZS6TMV

Avoid voltage drops in power supply lines

Speaking of polarity reversal protection; this is another source of power loss. The standard method is to insert an "idiot diode" in series with the battery, which blocks the reverse current that would occur if the battery should be connected in reverse. However this creates a 0.6-0.7 V voltage drop. How bad is this? Well, for a 3V battery a voltage drop of 0.65V amounts to a loss of 22%, for a 6V battery the loss is 11% and for a 9V battery we're still looking at 5.5% loss, which is more than trivial.

For applications where battery discharge current is very low, a fuse with a reverse polarity diode may be considered. Since a fuse has a certain internal resistance and thereby creates additional losses in the power line, this solution is not suitable for high current applications. The diode should be put across the power lines "behind" the fuse and in reverse direction, so that an incorrectly connected battery will blow the fuse via the diode.

Apart from being lossy itself, a fuse also has another drawback: once its blown, the appliance is out of service until the fuse has been replaced. Both these drawbacks can be overcome by using a (power) FET or MOSFET instead of an idiot diode in series with the battery. The voltage drop across FETs in the forward direction is much lower than that across a diode (typically in the range of tens of millivolts) while the FET will still block current in the reverse direction. The maximum voltages and currents that a FET can handle in this application (or should we say mis-application?) are limited, but for battery operated equipment this poses no problem.

On a similar note, the use of dissipative voltage stabilizers (such as the well known 78nn series) should be avoided. Again this is where modern components come to the rescue: switched low-voltage regulators have become the norm. Many hobby electronicists still use 78xx stabilizers everywhere without thinking about it. However a modern DC-DC "buck" converter (e.g. to step down a 9V supply to 5V TTL levels) can have an efficiency of well over 90% (95% is not unheard of). If properly designed, the amount of QRM and other spurious oscillations generated by these low-power switching regulators is practically zero.

Avoiding peak currents

As stated above, the internal resistance of small and compact batteries is a major source of battery inefficiency. Since the power dissipation across these internal resistances is a direct factor of the discharge current, it is obvious that the best way to minimize these losses is to keep the discharge current of the battery as low as possible.

For applications that draw a pulsed or irregular current (such as digital appliances or audio amplifiers) the solution is to connect a fair-sized electrolytic capacitor in parallel with the battery. The capacity required depends on the amount of current drawn; for low currents 470uF will usually be sufficient; for somewhat higher currents and current peaks 1000uF should be considered. The on/off switch for the appliance should be put between the battery terminal(s) and the electrolytic, so that when the power is switched off the leakage current through the electrolytic won't discharge the battery. It is vital that the electrolytic be of good quality and not an old fossil from the bottom of the junk box, as it must have a very low leakage current. Old electrolytics often have a significant leakage current which creates an energy loss that is worse than what we were trying to counteract in the first place! It's also important not to use a tantalum capacitor here. Tantalum capacitors cannot handle large inrush currents (the initial charge current when the power is

switched on) and should NEVER be put across power supply lines.

Design your circuits for low power consumption

Most hobby projects are fairly straightforward: ICs are TTL ICs from the 74xx range, and pull-up resistors are typically 10k. AF amplifier stages are conventional class-A(ish) circuits with a rest current of several milli-amps, and LEDs are being driven via a current limiting resistor.
While simple to design and build, this is not the best way to preserve battery power.

Consider the use of CMOS ICs (e.g. the 4xxx series or 74HC(T)xx series) as an alternative for TTL logic. Not only will these ICs consume far less power, they also do away with the need for low pull-up resistances. A 74HC00, for example, is quite happy with pull-up resistors of 100k.

Instead of using transistor stages for AF amplification, consider the use of an AF amplifier IC with a low rest current. This will also simplify the design and construction of your project!

Instead of driving a LED via a series resistor, consider driving it with a low duty-cycle square wave instead. For example, to run a power indicator LED (typically 2.1V/20mA) from a 9V battery, a 330 ohm series resistor could be omitted if the LED were driven by a square wave at a 20% duty cycle.

These are just a few examples. The possibilities are literally endless.

Use the right battery

In closing, it is important to keep in mind that not all batteries are created equal. Some brands and types are more efficient at higher discharge currents, others last longer in appliances that only draw a trickle. Your mileage will vary... so don't be afraid to experiment. Unless you design your hobby projects around exotic chips, chances are that the battery will be the most expensive component by far that you will use in your design, and one with a limited lifespan at that. So a bit of effort to minimize the cost of batteries is generally worth it.

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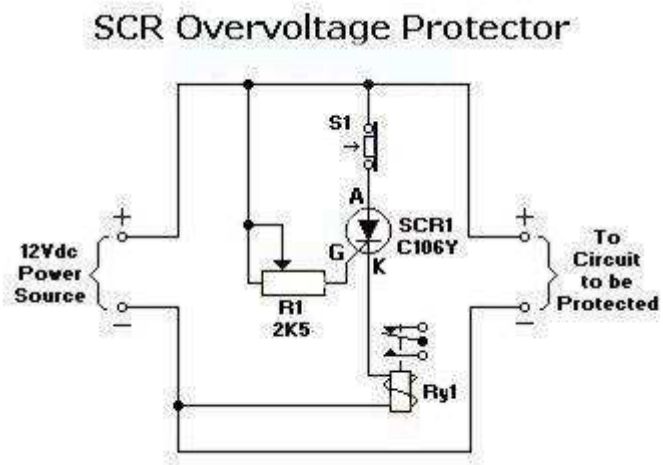

Fig 1

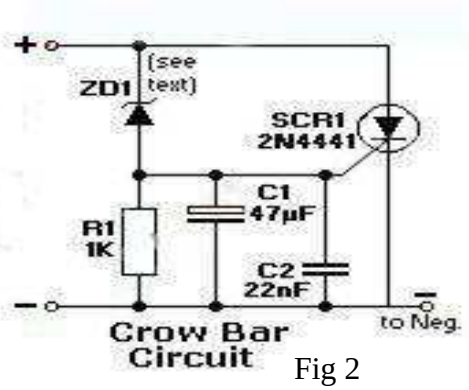

Fig 2

Fig1 - Depending on the setting or R1, when the voltage exceeds a certain amount, SCR1 triggers, which activates relay RY1 and opens the circuit. S1 resets the SCR by interrupting power to it.
This is a simple crow-bar circuit for low amperage protection, up to 4 amps at 30V max.
Adjust the SCR for a model that suits your needs.

Fig 2 - This circuit can be added to any power supply design that does not have additional circuit protection. When the voltage exceeds either 10V or 30V, depending on the voltage switch setting via the front panel, the zener diode ZD1 conducts and fires the gate of the SCR. This provides a short-circuit over the output

Example a zener for 1 to 6V is 7.2V and a 30V zener for 28V The 2N4441 can be substituted with an ECG5442, NTE5442, or other equivalent.

It is very important therefore to use the correct value for the AC fuse.
To calculate this value, as a rule of thumb, take the maximum output current and divide by four.

This crow-bar circuit is good for up to 50V and 8.0 amp using the 2N4441 SCR.
The C106Y will do the same for up to 30V and 4.0 amps.
Adjust the SCR as necessary for your project.

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A passenger in a taxi tapped the driver on the shoulder to hand him the money. The driver screamed, lost control of the cab, nearly hit a bus, drove up over the curb and stopped just inches from a large plate glass window. For a few moments everything was silent in the cab, then the driver said, "Please, don't ever do that again. You scared the daylights out of me." The passenger, who was also frightened, apologized and said he didn't realize that a tap on the shoulder could frighten him so much, to which the driver replied, "I'm sorry, it's really not your fault at all. Today is my first day driving a cab. I have been driving a hearse for the last 25 years."

CLUB INFORMATION

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Website http://www.qsl.net/zs6hvb/
http://www.qsl.net/zs6ssc/

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Bulletins Sunday morning - 145.7875 MHz & 7062 KHz @ 08h45.
Relay - 80M - 3662KHz

Monthly meeting venue

Witwatersrand Rifles HQ
Cnr Barlow and Cavaleros Str
Industries West
Germiston

First Saturday of the month at 14:30

Committee

Chairman	Doug Wetton	ZS6BXU	011-680-4906
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Repeater

145.1875 MHz input
145.7875 MHZ output
Linked on a Sunday morning during bulletin time to 70 cm - 438.850 MHz