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HAMS Waywite News

MIDLANDS AMATEUR RADIO CLUB
P.O.Box 1076, HILTON, 3245

February 2008



AFFILIATED TO
THE SARL & IN
ASSOCIATION
WITH THE NATAL
CARBINEERS

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The Chairman's Fax

Month number three has arrived and time to make a concerted effort to start doing something constructive for the Walter Reid competition and I do mean make something, not just bring along an item that was produced when you were ten years younger. The efforts over the past few years were really not anything to write home about. Your committee did try to instill a bit of effort two years ago to make a specific electronic project that even the most junior members could partake in, but low-behold that incentive together with a substantial cash prize could not tempt our members. What does this mean to our club, are practical construction projects not wanted or have really become a black box community at this stage, is there so much money available that ham radio has bitten the bullet.

ZR operators appear to be quite happy not to further their ham experience because the SARL has made it so easy for any palooker to get a licence, that even a Boswell circus baboon could pass it with a bit of training. Something that in the past years took time, going to bed each night with the good old ARRL handbook (not the modern one which needs a lectern to rest on because of its weight). Writing the RAE with all the heartache and panic and then the wonderful elation when your new callsign arrived from the Post Office if one managed to pass the examination and then the next barrier, twelve words a minute in the difficult morse test.

Those were the days you became a HAM and the world your oyster, qsl cards were your reward! Now the word HAM is frowned upon by those so called clever people who would have it that this wonderful HOBBY be called the "Amateur Service" PHOOEY! to you and your kind.

This will be the topic at our next meeting and we will discuss the Walter Reid competition. All our ZR and ZS licence holders will be most wellcome as we don't see or hear from you too often.

We will also have a "SHOW & TELL" and you are invited to bring along any item you would like to share with your fellow hams this does not have to be related to radio, any hobby can be shown and displayed.

Why don't you join in on the Thursday MARC net at 19:00 Hrs on 3,620 MHz. Some of our members never seem to turn up, those that do carry the torch for the rest!

NEXT MEETING ON 15/03/2008

CU THERE

PS! Don't forget to send your apologies if you can't make it!

73 DE ZS5MQ

The club meets on the third Saturday of every month, except December at 13:00 at the Natal Carbineers Conference Center, Geere Street, PMB.

Sunday Morning Bulletins (MARC and SARL) as well as the Club Net from 07:45 on 3620 kHz and the 145.750 MHz repeater.

From the Editor

The lower early morning temperatures are probably trying to tell me something. Apart from a hint to go and check if the moths have left me some of my winter-woollies, I think that we are going to have some serious power outages as many electric heaters are turned on in the coming months. I know that all of us require power at about the same time of day, but most of the businesses and small factories are closed down by then. Can somebody please explain this to me?

With the above information in mind, I have made up some primary cells using lemons. Insert a piece of copper water pipe and a slice of galvanized iron into a lemon - it produces about 0,9 V! Three of these in series produced a usable glow from a white LED. A bit of a messy business, so I would like to suggest that you put your product in a canned fruit bottle and use it during the darkness to navigate down the passage to the smallest room in the house!

As many of us now have large lead acid storage batteries in our homes, I visited the Internet to get some information on the do's and don't's regarding the care and keeping of these things. There is a wealth of information out there, but I will try to condense the data into two short articles.

Wessel, ZS5BLY.

CLUB BANKING DETAILS

Bank: First National Bank

Branch: Bank Street

Branch code: 220-825

Account holder: Midlands Amateur Radio Club

Account Number: 625057756507

Type of account: Current

Reference to use is your call sign

News and Views

- ① The Underberg repeater is still out of action.
- ① The Swartberg repeater has been on and off during the past few weeks. Philip, ZR5PDL is trying out some new antennas. Hopefully some good news soon!
- ① In an article published in the February issue of QST, Gerald Martes, KD6JDJ, describes a very interesting antenna for the reception of circularly polarised signals from weather- and amateur satellites. Due to circumstances beyond my control this article has to stand over for the next issue.
- ① PostNet race to take place on Sunday, 16th March. If you wish to assist with the communication, contact OM Bert.
- ☺ = ? (Nobody has sent any good news!)

Hints and Kinks

A very useful hint from Hal Whiting, KI2U appeared in the February, 2008 issue of QST. He solved the problem that we all have when attaching thin wires to more substantial plugs or sockets. He covers the wires with heat shrink tubing and then squirts hot glue (using a hot glue gun) into the back end of the tubing. The tubing then shrinks pushing the glue towards the connector end and making for a much more resilient connector. I have tried it, and it works!

Lead Acid Batteries

Lead acid batteries were invented in 1859 by Gaston Planté and first demonstrated to the French *Academy of Science* in 1860. They remain the technology of choice for automotive SLI (Starting, Lighting and Ignition) applications because they are robust, tolerant to abuse, tried and tested and because of their low cost. For higher power applications with intermittent loads, however, lead acid batteries are too big and heavy and they suffer from a shorter cycle life and typical usable power down to only 50% depth of discharge. Despite these shortcomings lead acid batteries are still being specified for applications up to PowerNet limits of 36 V, 2kWh.

Lead acid batteries are composed lead-dioxide cathode, a sponge metallic lead anode and a sulphuric acid electrolyte. This heavy metal element makes them toxic and improper disposal can be hazardous to the environment. The cell voltage is 2 volts.

DISCHARGING: During discharge the lead-dioxide (positive plate) reacts with the electrolyte of sulphuric acid to create lead sulphate, water and energy. This reaction causes the specific gravity of the electrolyte to drop.

CHARGING: During charging, the cycle is reversed: the lead sulphate and water are electro-chemically converted to lead-oxide and sulphuric acid by the external charging source.

ADVANTAGES:

Low cost	Reliable, over 140 years of developments
Robust, tolerant to abuse	Tolerant to overcharging
Low internal impedance	Can deliver very high currents
Indefinite shelf life if stored without electrolyte	Trickle charge for indefinite periods
Wide range of sizes and capacities available	Many suppliers worldwide.

SHORTCOMINGS:

Very heavy and bulky and has a typical coulombic charge efficiency of only 70%. This can, however, rise to 85% or 90% for very special designs. The battery is not suitable for very fast charging and when overcharged, gassing occurs. This is the production of oxygen and hydrogen by the electrolysis of water after the electro-chemical change is complete. This gas mixture can cause an explosive atmosphere in badly ventilated rooms. Gassing also causes a loss of water in the cell.

Sulphation may occur if the battery is stored for prolonged periods in a completely discharged state or very low state of charge. It also happens if the battery is never fully charged, or if the electrolyte has become abnormally low due to excessive water loss from overcharging and/or evaporation. Sulphation is the increase in internal resistance of the battery due to the formation of large lead sulphate crystals which are not readily converted to lead, lead-dioxide and sulphuric acid during recharging. In extreme cases the large crystals may cause distortion and shorting of the plates. In some cases sulphation can be corrected by charging very slowly (a low current) at a higher than normal voltage.

Shedding or loss of material from the plate may occur due to excessive charge rates or excessive cycling. The result is chunks of lead on the bottom of the cell, or actual holes in the plate for which there is no cure. This is more likely to occur in batteries which have a spongy plate which increases the plate area and hence the power handling of the unit.

CHARGING:

The charger has three functions:

- i) Getting the charge into the battery (charging)
- ii) Optimising the charging rate (stabilising)
- iii) Knowing when to stop (terminating)

There is quite a lot to be said about this topic, so it will have to stand over for the next issue.

ADVERT



SOLAR Power for your Shack

Be prepared for extended power outages. Convert your shack to use 12 volt Solar Energy. I have acquired affordable 10 watt Solar Panels. Each panel is capable of sending $\pm 720\text{mA}$ at 13.8Vdc into your lead-acid battery. You can add more panels in parallel to increase your charge rate.

Solar Panels, 10w @ **R298.00** each,
 120W switch-mode inverters @ **R290.00** each,
 12v energy saving lamps @ **R49.00** each,

Contact: - Shaun Rudling (ZR5S) on 082-676 1488 or
shaun@pmbnet.co.za



Standard Resonators
 Power Rating 400 Watts

Part Number	Description	Approximate Bandwidth
RM-10	10 Meter	2:1 SWR or better
RM-12	12 Meter	150-250 kHz
RM-15	15 Meter	90-120 kHz
RM-17	17 Meter	100-150 kHz
RM-20	20 Meter	80-100 kHz
RM-30	30 Meter	50-60 kHz
RM-40	40 Meter	40-50 kHz
RM-75	75 Meter	25-30 kHz
RM-80	80 Meter	25-30 kHz



Ameritron's SDA-100 is without a doubt the best built, best looking, best performing HF Mobile Screwdriver Antenna in the world! When properly installed on your vehicle this antenna will provide continuous coverage from 10 Meters through 80 Meters with a 6 foot whip. Remove the whip to get 6 Meters through 40 Meters coverage.

X200
 144/430MHz(2m /70cmz)
 Gain:6.0dB (144MHz) ,8.0dB(430MHz)
 Max. power rating:200W
 Impedance:50ohm's
 VSWR:Less than 1.5:1
 Length:2.5m
 Radial length:approx.52cm
 Weight:1.2kg
 Rated wind velocity: 50m/sec.
 Mast diameter accepted:30mm to 62mm
 Type:2 x 5/8wave(144MHz),4 x 5/8wave(430MHz),FRP outershell



Stop tuning, start talking.

The SG-230 Smartuner was the first product in the HF market to offer fast, flexible tuning without any user interface. This unit works with ANY radio and ANY antenna without any special interface, making it the most versatile tuning product available. The SG-230 can be used in base station, mobile, marine and aviation and has been the "Gold Standard" of automatic antenna tuning for nearly twenty years. The SG-230 is built in a rugged ABS plastic enclosure which is sealed to protect it, and allows ultimate versatility in installation.



Radio Accessories & Data Modems

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Tech Support

During my ZS6 days we used to have a Technical Net once a week on the local repeater. Here anybody could ask any technical question and somebody, or bodies, on the net would provide an answer. During the first couple of years in ZS5 we had the Muddlers Net where many technical problems were solved by discussion. Maybe we should give our Thursday Net a more technical flavour and, hopefully, get a larger audience and more participants. Think about it and air your opinion at the next club meeting.

Operational Amplifiers (Part 2)

Consider the figure shown here. From our previous rules we may say:

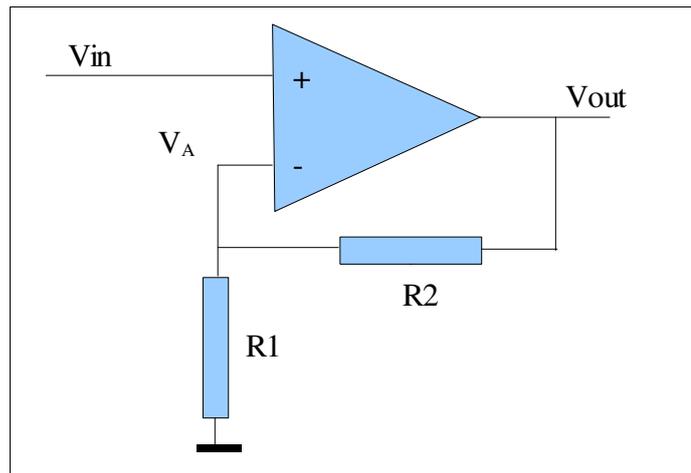
$$V_A = V_{IN} \quad (\text{rule 1})$$

But V_A comes from a voltage divider so that:

$$V_A = V_{OUT} \frac{R1}{(R1+R2)}$$

Setting $V_A = V_{IN}$ we get that

$$\text{Gain} = \frac{V_{OUT}}{V_{IN}} = 1 + \frac{R2}{R1}$$

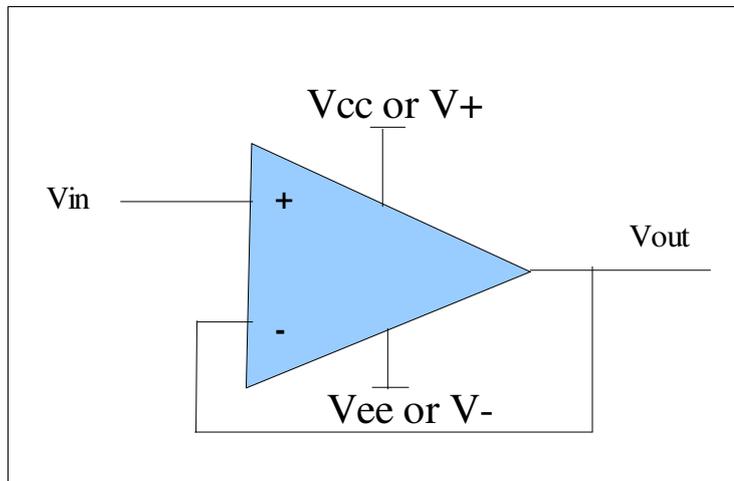


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This is a non-inverting amplifier - the output has the same polarity as the input. As with our inverting amplifier, we may assume that the input impedance is very high and that the output impedance is very low. Similar to the inverting amplifier, this is a DC amplifier. Therefore if the signal source is AC-coupled, you must provide a return to ground for the very low input current at V_{IN} by connecting a resistor from the + input to ground (a value of about 100 k will do in most cases).

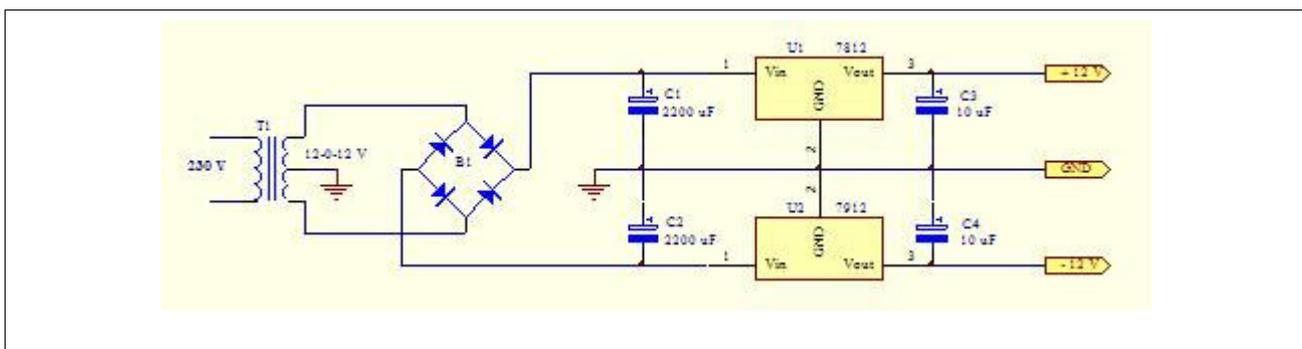
There are many occasions where we have a signal source with a very high output impedance (e.g. a parallel tuned circuit or a crystal pickup) of which the performance will be degraded when it is directly connected to a low impedance load. In transistor applications we would use an emitter follower or buffer. The op-amp equivalent is shown in the figure below:

It is simply a non-inverting amplifier with $R1 = \text{infinite}$ and $R2 = \text{zero}$. Hence the gain will be 1 and $V_{IN} = V_{OUT}$. As with the previous cases, we have a device with a very high input impedance and a very low output impedance to which we may now connect load. Some manufacturers produce ready made buffers in which the negative input-to-output connection is made during the manufacturing stage e.g. the LM 310.



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In most circuit diagrams using op-amps the power supply to the unit is not shown as rails as is customary for transistor circuits. Instead only the connections are shown and labeled as indicated in the diagram of the buffer above. Most applications use dual power supplies but operation from a single supply is also very popular. A circuit diagram for a suitable dual supply for + and - 12 Volt is shown below. No switches, fuses or indicators are shown but remember to add them!

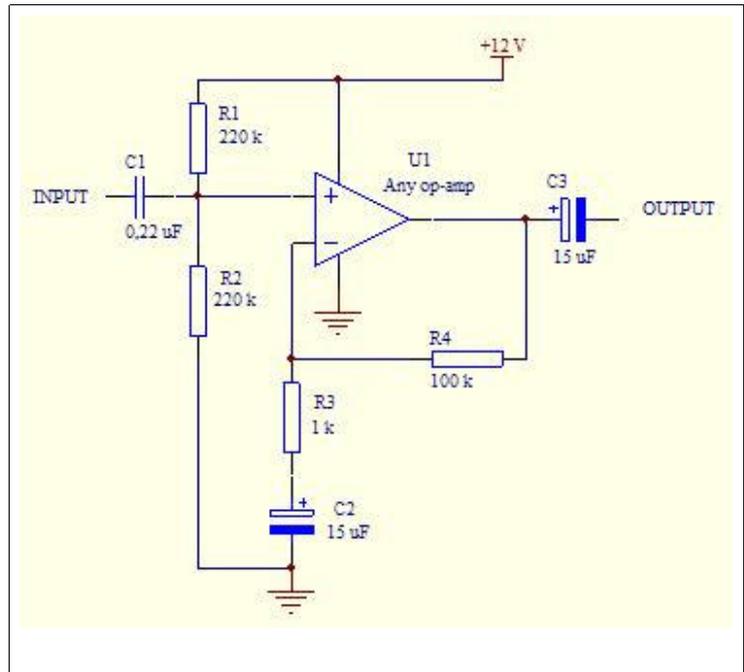


Op-amps can typically swing the outputs to within about 1,5 V from the supply rails. When using a single supply (that is with V- connected to ground) you can not have the inputs at ground. In such cases you have to bias the input to, say, half of the supply voltage by using an equal value resistor divider as shown in the application below.

This is an audio amplifier with a 40 dB gain and should give an output swing of about 10 V before it starts clipping. Compare this with the non-inverting configuration above and note that our old R2 has been replaced with the series combination of R3 and C2. This makes the gain frequency dependent and will give a low frequency 3 dB point at the frequency where the reactance of the capacitor (15 µF) is equal to the value of R3 (1 k). (About 10 Hz).

Now go and build one and then play around with the value of R3 and C2. Have fun!

(Next month we will take a look at some other interesting applications of operational amplifiers)



More Tech Support

An unfailingly polite lady called to ask for help with a Windows installation that had gone terribly wrong:

Customer: "I brought my Windows disks from work to install them on my home computer."

Training stresses that we are "not the Software Police", so I let the little act of piracy slide.

Tech Support: " Umm-hmm. What happened next?"

Customer: " As I put the disks in it turns out that they weren't initialised."

Tech Support: "Do you remember the message exactly ma'am?"

Customer: (proudly) " I wrote it down. ' This is not a Macintosh disk. Would you like to initialise it?"

Tech Support: "Er, what happened next?"

Customer: " After they were initialised, all the disks appeared to be blank. And now I brought them back to work, and I can't read them in the A: drive; the PC wants to format them. And this is our only set of Windows disks for the whole office. Did I do something wrong?"

Bulletin Readers

16th March	Mickey	ZS5QB
23rd March	Mike	ZS5BGV
30th March	Robin	ZS5MRS
6th April	Bert	ZS5MQ
13th April	Wessel	ZS5BLY
20th April	Mickey	ZS5QB
27th April	Mike	ZS5BGV

