ZS6HVB
Affiliated to the
SARL

SHACKNEWS

HIGHVELD AMATEUR RADIO CLUB

Jan - March 2015
Published every 3 months

We're on

COMMUNICATION IS THE NAME OF THE GAME

The January meeting was cancelled due to there being a number of members unavailable.

The February meeting has been held and a number of decisions discussed and agreed upon.

The March event is the social do to be held at the home of Berridge and Sandra.

Seeing that the house in now in a secured area I will attach a map.

Why I Like Retirement !

Question: How many days in a week?
Answer: 6 Saturdays, 1 Sunday

Question: When is a retiree's bedtime?
Answer: Two hours after he falls asleep on the couch.

Question: How many retirees to change a light bulb?
Answer: Only one, but it might take all day.

Question: What's the biggest gripe of retirees?
Answer: There is not enough time to get everything done.

Question: Why don't retirees mind being called Seniors?
Answer: The term comes with a 10% discount.

Question: Why do retirees count pennies?
Answer: They are the only ones who have the time.

Question: What is the best way to describe retirement?
Answer: The never ending Coffee Break.

Question: What do you do all week?
Answer: Monday through Friday, NOTHING..... Saturday & Sunday, I rest.

Question: What's the biggest advantage of going back to school as a retiree?
Answer: If you cut classes, no one calls your parents.

The most popular, simple and effective antenna is the horizontal dipole. It is a balanced antenna, that is, the wires on both sides of the center insulator are of equal length. In the early days of radio it was fed with ladder-line, two wires in parallel spaced by insulators. It, too, is balanced. Feeding a balanced antenna with a balanced feeder works well. Many amateurs still use this method because of the very low loss of ladder-line.
But back around the time of World War 2, coaxial cable was introduced. It has certain advantages over ladder-line. It is self-shielded and does not radiate. It can be routed next to metal objects or even buried in the ground with no effect on its operation. But it has a major defect in that it is unbalanced. The coaxial cable has a center conductor and a surrounding metal shield. The center conductor connects to one side of the dipole and the shield to the other. There are equal currents in the center conductor and in the shield, so we expect equal currents in the two sides of the dipole. This looks simple and straightforward,
but there is a problem. The problem is caused by something called “skin effect.” This tells us that, at radio frequencies, the current in a conductor flows just in the “skin” of the conductor and does not penetrate further into the conductor. This means that the current in the shield of the coaxial cable is confined to the inside of the shield. No current reaches the outside of the shield. Therefore, the outside of the shield is just like a third conductor. But this third conductor is connected to one side of the antenna, the same side the inner surface of the shield is connected to. Now it is possible that not all of the current from the inside of the shield goes into one side of the dipole. Some may go down the outside of the shield. This can cause problems. With less current in the antenna, its radiated signal will be less. The radiation from the outside of the shield brings radiation closer to the house and may cause TVI. When the antenna is used
for reception, there will be pickup from the dipole and from the coax shield. Most man-made noise is vertically polarized, so the horizontal dipole discriminates against it. The vertical shield, on the other hand, readily picks up the noise, so your antenna becomes noisier and reception is poorer.

Balun To The Rescue

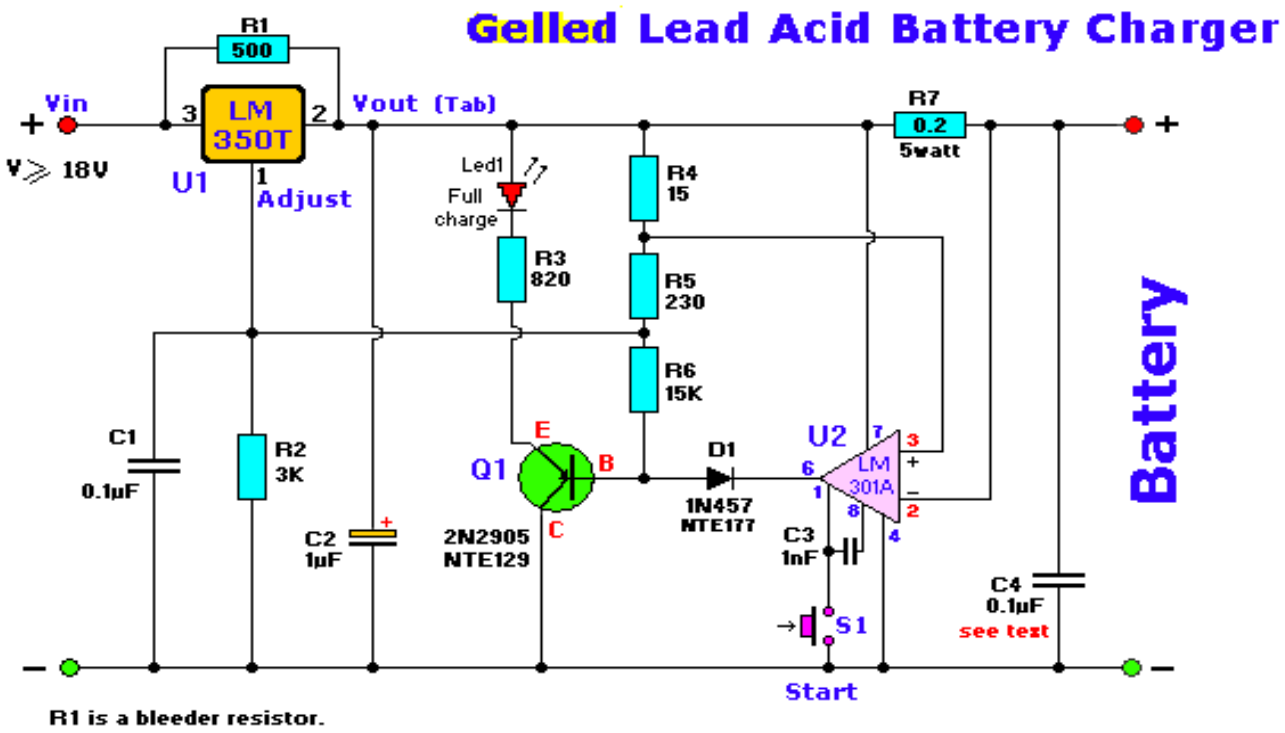
The current flow down the outside of the shield can be eliminated by use of a balun, a balanced to unbalanced device. There are several ways to make a balun, but all of them place high impedance between the antenna and the outer shield. This prevents any current flow down the shield. To make a very simple balun, you wind the top portion of the cable into a coil. This does not affect the currents flowing inside the cable but now the outside of the shield is a coil and just like any coil it has inductive reactance that presents an impedance to any flow of RF. At low frequencies it is difficult to get enough inductance to be effective and the coil tends to whip in the wind and is physically unwieldy. But it works.
The “transmission-line” balun is much better. This is a short section of two-conductor transmission line wrapped around a ferrite toroid and connected between the coax and the antenna. The ferrite gives the coil high impedance so no current will flow through it to the coax shield and the antenna sees a balanced line. Then there is the ferrite bead balun. Enough ferrite beads are placed over the coax to provide a high impedance to RF. This prevents any current flowing down the shield. This is a simple and effective balun and is in widespread use today.

Matching Transformers

The baluns described above are 1:1 baluns, that is, their input and output impedances are the same. They are useful for connecting 50-ohm coaxial cable to dipoles or other antennas that have impedances close to 50 ohms. But some antennas have higher or lower impedances where an impedance change in the balun can provide a better match. The transmission line balun adapts itself easily to 4:1, 9:1, 16:1 ratio step-up and step-down transformers. Other ratios are also available. Thus the impedance matching function can be built right into the balun.

At The Transmitter

We have been talking about the use of baluns at the antenna feedpoint. Another common use of baluns is at or near the transmitter. Quite often, ladder-line is used to feed the antenna. But it is difficult to run the ladder-line into the radio shack. So, a short length of coaxial cable is run from the transmitter or antenna
tuner out to the ladder-line. At this connection, we have the same problem as before – connecting unbalanced coax to a balanced feedline. Again, a balun is required. The ladder-line usually has 450-ohm impedance. Since we are connecting a 50-ohm coax to 450-ohm line, it would seem that we need a balun with a 9:1 step-up to get a good match. No, no, no! Remember that the 450-ohm line is connected to a 75- ohm antenna. If the line is a half-wave long we'll see 75 ohms at the bottom, not 450. At other cable lengths we'll see impedances from less than 75 ohms, up to much higher than 450 ohms. So we are not at all likely to get a match. It is helpful, however, to have a step-up transformer and a 4:1 step-up is a good compromise value to use.



All resistors are carbon, 1/4 watt, 5% tolerance, unless otherwise indicated.

R1 = 500 ohm
R2 = 3K
R3 = 820 ohm

R4 = 15 ohm
R5 = 230 ohm
R6 = 15K
R7 = 0.2 ohm, 5W, WW

C1 = 0.1uF (100nF), ceramic
C2 = 1uF/40 volt
C3 = 1000pF (1nF), ceramic

C4 = 0.1uF, ceramic (see text)
D1 = 1N457 (or equiv.)
Led1 = Red, 5mm, ultra-bright
Q1 = 2N2905, PNP, TO-39 case

U1 = LM350T
U2 = LM301A
S1 = Pushbutton switch (normally-open)

This high-performance circuit first quickly starts (and holds) the charge at 2 amp, but as the voltage rises the current will consequently decrease.
When the current falls below 150mA, the charger automatically switches to a lower 'Float' voltage to prevent overcharging.

At the point that a full charge is reached, Q1 will bias and the LED will light.
The LM301A is a 8-pin OpAmp. Transistor Q1 is a PNP, Silicon, AF-Out type with a TO-39 metal case and can be substituted for a NTE or ECG129. Diode D1, a Si, GP Det. type, can be substituted with a NTE177 or ECG177. The LM350 (U1) needs to be cooled.
The input voltage should equal or about 18volts.
R1's function is to bleed some of the input voltage to the output and vice-versa. A 1N4002 or similar diode can be used also.
R2 and R5 are actually metal-film type resistors. To get the 3K for R2 use two 1K5 (1500 ohm) resistors in series. For R5 use two 470 ohm resistors in parallel. Or whatever combination to get to these values. For R1, 500 ohm, you can use two 1K in parallel or 470 + 33 ohms in series.
R7, the 0.2 ohm resistor, is a 5 watt wire-wound type. Do **not** use the standard carbon type.
C4: This (optional) 0.1uF (100nF) Ceramic capacitor needs to be mounted over the power lines and as close to the LM301 (U2) as possible. It will filter off any possible residue hf ripple, which otherwise may prevent this op-amp from working properly. Use only if you have problems with the LM301 not switching off.
S1 is a subminiature pushbutton switch, normally open. It shows an 'open' switch with the arrow indicating a 'momentary' connection when pushed.
Nothing out of the ordinary here folks and a standard symbol for electronics...
When the start switch is pushed, the output of the charger goes to 14.5 V. As the batttery approaches full charge, the charging current decreases and the output voltage is reduced form 14.5V to about 12.5V, terminating the charging process. Transistor Q1 then lights the led as a visual indication of a full charge.
Note: This circuit will both work for Gel cell and regular L.A. Batteries.

Currently in use in my shack

Club Information

Monthly meeting venue

Germiston Methodist Church
Room at back of the offices
Lady Duncan Rd
Germiston

3rd Saturday of the month at 14:30

Postal address PO Box 19937 Sunward Park 1470

Website http://www.zs6hvb.za.net

Back Issues of Shacknews available on the club website

e-mail zs6hvb@zs6hvb.za.net

Repeater 145.1875 MHz input - 145.7875 MHZ output

Bulletins Sunday morning - 145.7875 MHz & 7062 KHz @ 08h45.

Committee

Chairman	Vacant		
Secretary/Treasurer	Berridge Emmett	ZS6BFL	011-893-1291
Shacknews Editor	Berridge Emmett	ZS6BFL	011-893-1291
Shacknews Printing	Harry Lautenbach	ZS6LT	011-888-5362