NAMIBIAN AMATEUR RADIO LEAGUE

NEWSLETTER

January 2011

BULLETINS

The monthly bulletin will be broadcasted on the first Sunday of each month on 7.069 MHz LSB at **09H00**

WEB PAGE

www qsl.net/narl

QSL BUREAU

The QSL bureau will handle cards to paid up members of the League only. QSL cards may be sent to:NARL P.O.Box 1100, WINDHOEK

REPEATER/BEACON

Windhoek Input 145.175MHz **+** CTCSS tone 88.5 Hz Output 145.775MHz
Omaruru Input 145.000 MHz + CTCSS tone 67.0 Hz Output 145.600 MHz
Echo Link V51RS-R, Node No 359091

FROM THE PRESIDENT'S PEN:

Wow what a start to a new year! A lot of positive things are happening and I must say I am pleasantly surprised to see that more and more hams are finding their way (back) to the league. This is one of the positive happenings that this year has kicked off with. Another very positive note is the cooperation that is currently developing between the NARL and NAM-ARC. A few months ago this seemed totally impossible but step by step we are working together to make ham radio better for everyone in Namibia. The first joint venture was and is finding a solution to the mutual interference that exists between Robert's and Wolfgang's station. Then after many years of neglect and due to many hours of input from Michael, V51MB, the QSL bureau is finally up to date and even cards from non league members have been delivered or are ready for collection. A few other points are being addressed and the outcome will be communicated a.s.a.p.

Wishing everyone a great 2011

73

Werner

V51JP

NEWS FROM COUNCIL'S ACTIVITIES:

6th February 2011 NARL Bulletin

Good Morning: - Herewith the Bulletin for Sunday, 4th February 2011. This is **Victor five one November Alpha Mike**, the official Amateur Radio Station of the Namibian Amateur Radio League, operated this morning from Windhoek by Werner, V51JP, to transmit Amateur Radio News to Radio Amateurs and all listeners on this frequency. This is a service by the Namibian Amateur Radio League, in the interest of all Radio Amateurs in Namibia. This Bulletin is broadcast on 7069 Kilo Hertz, Lower Side Band, at 08:00 local time, on the first Sunday of every Month. It will also be transmitted on 2Meters as well as 3720 Kilo Hertz, Lower Side Band and on Echo Link via V51RS-R. This bulletin is also printed in the monthly newsletter. Enquiries and comments relating to the Bulletin, or the NARL, may be made on the air after the Bulletin, or by writing to**: Namibian Amateur Radio League**, **P O Box 1100, Windhoek, Namibia.**

The items in today's bulletin are:

1. Council News
2. Repeater News
3. Monthly meetings
4. Members Input
5. Local news

6. International News

1.Council News

Good news for al magic band fans and experimenters. During the festive holidays Robert V51RS was able to get the old 6m beacon working again. The plans for the beacon are a test run here in Windhoek and then possible deployment to Otjiwarongo for propagation tests.

The NARL license disk stickers have arrived and are available free of charge to all NARL members. Please contact me or Angela V51SA to get yours.

2. Repeater News

The holidays where a busy time for the NARL repeater crew!
Our 145.700 repeater was struck by lightning and Robert V51RS immediately made a plan to get the repeater running again. The new repeater was running fine but there was still some unexplained interference and a decision was taken to move the repeater frequency back to the trusted 145.775. Disaster struck again! Another lightning strike took care of the repeater again and again Robert made the arrangements to have the damaged repeater fixed. It is now undergoing tests and will be moved to the high site as soon as the weather turns favourable.

3. Monthly meetings

A council meeting will be held forthcoming to discuss some very important developments that will shape ham radio in Namibia for the better. Date and time will be confirmed with all involved parties.

4. Members Input

We urgently need Motorola GM300 radios, no matter in what condition they are! If you have anything at all in your shack or junk box that you don't need, please talk to me.

5. Local news

Silvia, daughter of Robert V51RS and Angela V51SA and granddaughter of Juergen V51JF took part in the last RAE for 2010 and passed the exam! We are very proud to announce that she is the youngest candidate to pass the RAE.
Dawie V51DZ was the other successful candidate and we congratulate both of them on their achievement and wish them all the best with the new hobby.

Arnold V51BI, our editor, had his birthday earlier this week and the council and the members of the NARL wish him all the best for the future and many happy returns. Happy birthday Arnold!

6. International News

South Orkney Islands DXpedition

Members of the Microlight Penguins hit the airwaves as planned on January 27th, from Signy Island (AN-008) around
1730z on 20 meters SSB. Activity by VP8ORK should last until February 8th.
They expect to be on the air with 7 stations on all HF bands 160-10 meters using SSB, CW and RTTY.
As this was being written, the VP8ORK log shows (at 1456z,
January 30th) that they have made 21198 QSOs with 7863 unique call signs (13321/CW, 7364/SSB and 513/RTTY).
For more details and updates, visit the VP8O Web page at: http://www.vp8o.com

The guys taking part in the DXpedition to the South Orkney Islands, which are south of Argentina near the South Pole, are looking for contacts with South Africa.

They asked for more contacts with SA when they worked three SA Hams on February 1, 2011.

They are on 20m every night at around 8:00 local SA time. Please look for them. They had 5:9 signals into SA.

They will be on air till February 8 2011.

Conclusion

This concludes the Bulletin for Sunday the 6th February 2011**.** The next Bulletin will be presented Sunday the 6th March 2011. The NARL depends on club newsletters, Radio Magazines and individuals for news of interest to radio amateurs. The only way to ensure that your contribution reaches the NARL is to send it via email to the secretary of the NARL. Should you wish to comment on any of the items in the Bulletin, please feel free to do so after this service. This bulletin was compiled and read by Werner V51JP, as a service to all Radio Amateurs, Short Wave Listeners and Electronic Enthusiasts. Thank you for listening.
This is Victor 51 November Alpha Mike, operated by V51JP, Continuing with the call in list.

40M
8H00: V51BP V51JF V51RS

80M
8H00:

2M
8H00: V51MB V51DB

ECHO-LINK
8H00: DL6OBS V51TX

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

The Council and members of the NARL wish Arnold V51BI all the best with the operation on Thursday and a speedy recovery afterwards.

Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Chapter 8, Harris
CRYSTAL SETS TO SIDEBAND
© Frank W. Harris 2006, REV 10

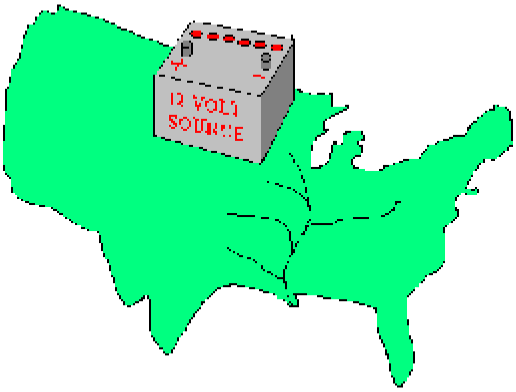
Chapter 8
POWER SUPPLIES

Once you progress past crystal sets, electronic projects almost always need a power supply. Low power projects, like a small receiver, can be powered with flashlight batteries or even a little 9 volt "transistor" battery. Other convenient sources of low power DC are ***adapter plugs***. These are the black cubes a few inches square that plug into the wall and have a long, skinny cord that plugs into your recorder or small appliance. They deliver 6, 12, or other DC voltage at a few watts. Adapter plugs have the safety of a battery with the convenience of wall power.
Unfortunately, if you plan to power your QRP with household power, you'll need more than a few watts. When you decide to plug a homebuilt circuit into the wall, you must confront some significant safety issues. Line-powered power supplies convert 120 volts AC into DC

voltage at the required levels of voltage and current. Actually, a transmitter can also be thought of as an energy conversion device. It converts direct current into radio frequency current. In this chapter I'll describe some power supplies you could use for your QRP transmitter. A 5-watt transmitter needs at least 10 watts of power with good voltage regulation.

Line-powered power supplies

The ideal power supply is called a ***voltage source.*** A voltage source is a power supply that can supply infinite amounts of current without the slightest waver in the voltage. For example: As every northern resident knows, starting a car can be difficult when it's below zero. A cold battery does not supply as much current as a warm battery. So, when you turn the ignition key on a frigid morning, the battery voltage crashes.



On the other hand, if you had a battery the size of North Dakota, the voltage would not drop a microvolt when you started the engine. Moreover, you could start all the other cars in Minnesota simultaneously without voltage drop. Of course, there are also other practical issues here. For example, your battery would need zero resistance battery cables, zero resistance connectors, etc. Well, you get the idea: The ideal voltage source should not lose any voltage, no matter how much power it supplies. Using ham radio vernacular, a good power supply is a "stiff" supply.

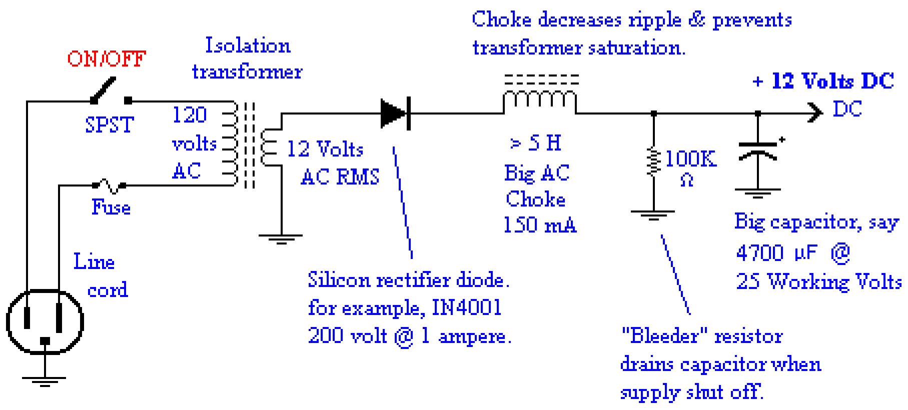
Lab power supplies

A reliable, line-powered laboratory power supply is useful for checking circuit boards. No lab should be without one. A big advantage of commercial lab supplies is that the voltage is adjustable from zero to some high level like 20 volts. Meters show you the current and voltage at every moment, so you know what is happening. Variable voltage allows you to power up a new circuit *CAREFULLY*. You can start with a few tenths of a volt and see what happens. If the circuit is shorted, you can find out with one volt applied to the circuit board, rather than blasting it with 12 volts right away. This helps you to avoid burning up expensive transistors. Many lab supplies put out two or even three separate supply voltages at once. Another feature of some lab power supplies is that they automatically limit the available current to some maximum that you select.

Bench power supplies are quite generic and there are many modern ones that will serve you well. Remember, to power your QRP you need about 1.0 ampere at 12 volts DC. A typical modern, transistor QRP transmitter runs on a 12 volt power supply but its efficiency is only about

50%. Therefore,
10 watts = 12 volts x 800 milliamperes
Homebuilt power supplies for use with rechargeable batteries or line power are described below. If you aren't familiar with power supply design, a discussion of the basic principles follows.

Simple wall-powered supplies for 120 Volts AC



SIMPLE LINE-POWERED 12 VOLT POWER SUPPLY.
(NOT SUFFICIENT FOR QRP)

The diagram above illustrates the simplest, safe, generic, line-powered power supply you can build. Unfortunately, this supply is too poorly regulated to power a transmitter. However, it illustrates the minimum safety features and it's easy to explain.

The following discussion assumes that the reader lives in North America where the standard household line voltage is 120 volts AC RMS @ 60 Hz. The safety issues explained here are applicable to other regions of the world. However, voltages, connector types, wire color codes, and ground configurations are often different. For example, in Europe the standard is 220 volts AC RMS @ 50 Hz.

Power supply safety

Metal enclosures. The supply should be enclosed in a box to insure that children (and you) won't get fingers across the 120 volts AC. Ideally the box should be made of metal so that, in case of a short circuit, a fire is highly unlikely.

Another safety design philosophy is called ***double insulation.*** In this scheme the electronics are housed in a plastic box and extra effort is made to insure that the internal wires are properly protected so that shorts and loose wires are highly unlikely. A double insulated plastic box does not necessarily need a ground wire in the line cord. However, in ham work, metal boxes shield circuitry from stray radio waves and are usually the best choice.

Line cord. The line cord should be the modern, three-wire type with the (green) ground wire securely connected to the metal box. In case a loose wire in the box causes the hot side of the AC line to touch the metal box, the ground wire will safely shunt the AC current to ground.

The line cord should pass into the metal box through a ***rubber grommet*** so that the metal edge can't cut through the insulation on the wire and cause a short circuit. Once inside the box, the cord should be held captive by a clamp, properly known as a ***strain relief.*** The strain relief insures that if the power supply is ever yanked by its cord, the live wires will not be ripped loose and short out.

The wires in a line cord are usually color-coded. The "hot" wire usually has ***black*** insulation while the "neutral" or return wire is ***white***. The third ***green*** safety wire is connected to power line ground. It should be connected directly to the metal chassis. The neutral wire is also supposed to be connected to the house ground buss out in the circuit breaker box. Looking at a North American household three-prong socket, the round pin is the “ground” and is connected to the green wire. The wider, flat pin is the hot side and the narrower flat pin is neutral. Unfortunately, sometimes wall sockets are wired wrong, so it’s better not to bet your life on the orientation of the flat pins.

Fuse. The first destination of one of the two power wires should be a ***fuse***. As you probably know, fuses are little pieces of solder-like lead mounted in a glass case. When the current exceeds some calibrated level, like one ampere, the lead melts and the circuit opens. Fuses, of course, can only be blown once and can’t be reused. A fuse is represented on the diagram by the squiggle in the diagram labeled “1A,” meaning “one ampere.” The electrical standards allow a fuse to be considerably larger than necessary, like 5 amperes and still give adequate protection against shorts.

Switch. The power switch can switch just one side of the line. Or, it is even safer to switch both sides of the power line at once. The switch should be rated for at least 125 volts AC and 3 amperes.

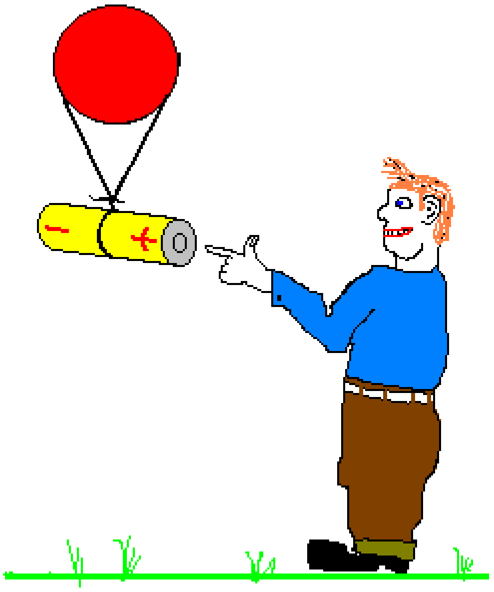
The transformer

After the power switch, the line current usually goes to the primary winding of a transformer. The transformer has two functions: first, it isolates your power supply from the household supply and from ground. This makes electrocuting yourself much less likely. As explained earlier, the AC lines supply 120 volts AC referenced to ground. The transformer secondary delivers AC power that has no relation to ground at all.

For example, I don’t recommend actually trying this, but suppose you were to plug a well-designed transformer into a wall socket. And suppose that this transformer has high voltage secondary wires left dangling open circuit: Because of the isolation, you could touch either secondary wire without being shocked, even if your other hand were hanging onto a grounded water pipe. Of course if you touch both high voltage wires simultaneously, they will blast you.

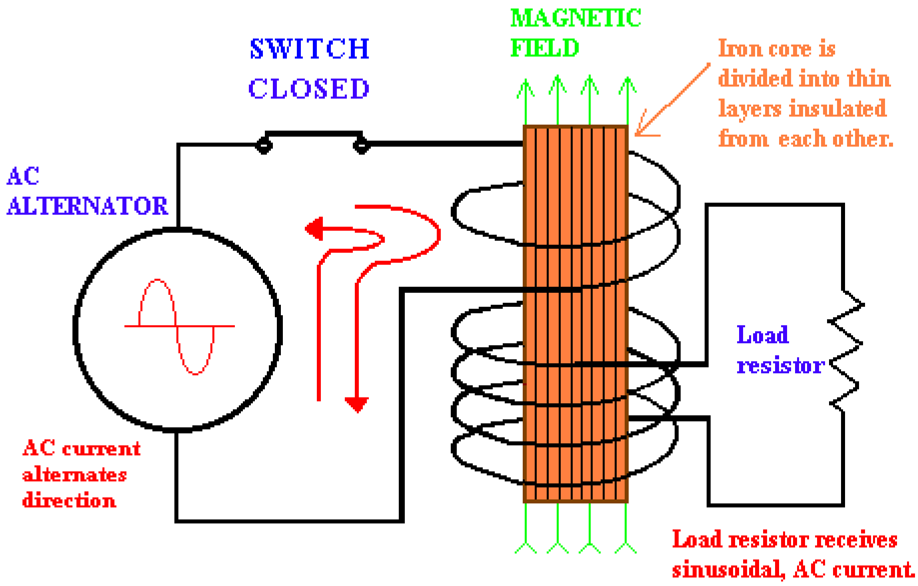
A secondary winding is isolated from ground - like a battery floating in mid-air

Think of isolation as a battery hanging from a balloon. Electric circuits require a closed loop in order for current to flow. For the dangling battery, the current can only flow from one end of the battery to the other. There is no relationship to ground. If a person standing on the ground reaches up and touches the battery, no circuit loops are completed, so no current flows.

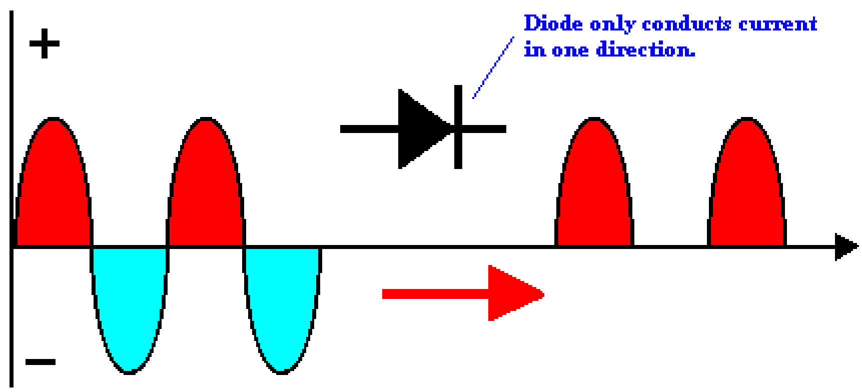


As explained in Chapter 2, transformers can change the ratio of current to voltage in proportion to the number of turns of wire around the core. To convert 120 volts AC to 12 volts

AC, the turns ratio between primary and secondary coils would be 10:1. Or, if you needed to generate 1200 volts AC for an oscilloscope cathode ray tube (**CRT)**, the turns ratio would be 1:10.



Transformers are not 100 % efficient. They are made from copper wire that has a significant resistance and iron that dissipates a small amount of energy as heat every time a magnetic field is generated or its polarity is reversed. In general, the larger the transformer, the larger the diameter wire used on the windings, the higher the efficiency will be.
Iron has a definite and abrupt limit on how much magnetic field it can support. Once all the iron has been magnetized, the iron will contribute no more magnetic field, no matter how much more current flows through the primary. Obviously, the larger the iron core, the more energy the iron can pass on to the secondary before the iron saturates. As a general rule, the larger the transformer, the more power it can pass through its windings.



HALF-WAVE RECTIFICATION

(Only one half of wave is exploited.)

Rectification

Most electronic devices require DC voltage to work properly. AC is converted to DC by means of rectifier diodes. Rectifiers are high-power, high-current, high-voltage versions of the diodes used in crystal sets. Referring to the simple power supply shown earlier, the transformer is followed by a rectifier diode. ***The diode only passes positive current flow in the direction of the arrow.*** This means that current leaving the diode is in the form of “humps,” or half sine

waves. Only half of the sinewave is passed through, so a single diode rectifier is called a ***halfwave rectifier.*** By definition these humps are “DC” since they have only one polarity.
Unfortunately, for most electronics applications bumpy, intermittent sine-wave halves are grossly inadequate. For example, if you use them to power a CW transmitter, your signal will sound like an unpleasant buzz and it will take up 120 Hertz of bandwidth. In the 1920s this was often done deliberately to modulate Morse code and make it audible in a receiver without a BFO. If you tried to run a computer microprocessor on these humps without filtering, the processor would reset 60 times per second.

Peak Volts, RMS volts, and DC volts

Obviously sinewaves don’t stand still at any one voltage, so how are they measured? If the sinewave reaches peaks of plus 12 volts and minus 12 volts, then most of the time the output from the rectifier will be much less than 12 volts. Also, the positive voltage seems to cancel the negative voltage so that the arithmetic average of any sinewave voltage is zero. Obviously that measurement isn’t useful either.

Rules are needed to name sinewave voltage and current. As you might expect, ***peak voltage*** is the voltage difference between zero and the most positive extreme of the waveform. ***Peak-to-peak*** or ***PP*** voltage means the voltage difference between the most negative peak and the highest positive peak.

As you may know, the voltage that comes out of North American wall sockets is officially ***120 volts AC RMS***. During my lifetime American line voltage has also been nominally called “110 volts AC,” “115 volts AC,” “117 volts AC,” and now it is called "120 volts AC." Confusing, no? Anyway, the two power wires coming into your house from the power pole out in the alley nominally have 240 volts AC across them. Of course it was formerly called two times 110 volts AC or 220 volts AC. Some people still call it 220 volts. Line voltage is designed so that each of the two wires from the power pole is at 120 volts AC with respect to ground.

As explained in chapter 2, inside your circuit breaker box these two wires are connected to two big metal “buss” bars. There is a third, grounded metal bar that runs down between the two active buss bars. The individual circuit breakers snap onto these bars like cars on a railroad track. Heavy power circuits for your electric stove and clothes drier clip clear across the tracks to engage both lines for a total of 240 volts. Small circuit breakers just clip from one side to the ground bar to give you 120 volts for ordinary low-power circuits.

The ***RMS*** or ***Root Mean Square*** of a sinewave voltage is the peak voltage divided by the square root of two. RMS voltage can be thought of as "the effective average voltage." It can be used to calculate AC RMS current, power, and AC resistance and impedance. For example, 120 volts RMS is a sinewave with a peak voltage of 1.414 times the RMS voltage. In other words, 120 V RMS x $\sqrt{2}$ = 120 x 1.414 = 169.7 Volts Peak. Therefore, ordinary household line voltage could be expressed as ***120 Volts RMS, 170 Volts Peak*** or ***340 Volts Peak-to-Peak***.

Filter capacitors - filtering out the ripple

The half sinewave bumps, which are properly known as “ripple,” must be smoothed out into a continuous DC voltage. This is accomplished by means of a ***low pass filter.*** In this case low pass means that the filter only passes frequencies well below 60 Hz. DC is of course zero Hertz, which is the lowest frequency possible. The half-wave rectified supply illustrated earlier is equipped with an L-C “L” filter. L- filters are simply two-element filters that represent the two legs of the letter “L.”

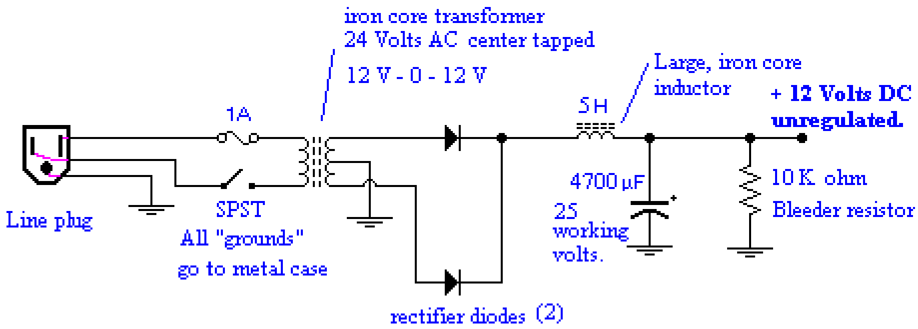
Capacitors conduct AC and prevent the flow of DC. Inductors conduct DC but resist the flow of AC current. In an effective DC filter, the component values will be huge, like 10 henries and 5,000 microfarads. This is because the frequency we want to filter out, 60 Hz, is extremely low and big components are needed to have an effect on such a slowly changing sinewave.

Bleeder resistor across the capacitor

The purpose of the bleeder resistor across the filter capacitor is to discharge it when the supply is not in use. Remember that high quality capacitors will hold their charge for many hours, sometimes days. Bleeders usually aren't important with a low voltage supply like 12 volts. But if this were a 500 volt supply, a person could get a nasty jolt or burn if they were to touch the capacitor. This could happen even though the supply is no longer turned on or plugged in.

If you were to build the half-wave supply shown earlier and put a 10 watt load on it, with an excellent transformer and a really huge capacitor, perhaps the DC voltage will at least be continuous. However, there will still be a 60 Hz sinewave ripple or waves impressed on top of it. If you used it to power a transmitter, the tone of the Morse code would have a distinct rough sound as the DC level varies at 60 times per second. When hams gave you a signal report they would say that your signal tone was a number much less than 9. For example, they might send "UR RST 595." (RST means Readability, Strength and Tone. Hams use a scale of 1 to 5 for readabilitity, and 1 to 9 for both strength and tone.) Because of the harsh note of your tone, you might only rate a "5." For this reason, transmitter power supplies always use dual rectifiers to produce ***full-wave rectification***.

Full-wave rectifiers

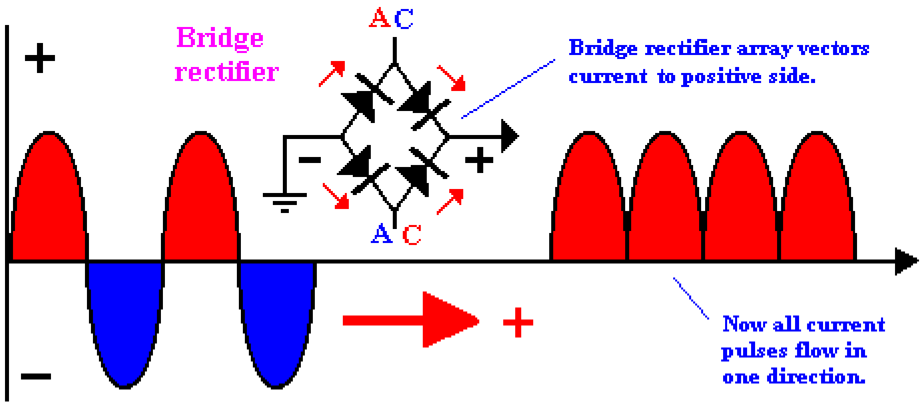


FULL - WAVE RETIFICATION USING A TAPPED POWER TRANSFORMER

Full-wave rectifiers convert both halves of the sinewave into useful DC current. The DC voltage is now a succession of "humps" with no "off" intervals. With twice as many "humps" per second, the voltage is much easier to filter. Full-wave rectification is a big step toward producing a DC source that resembles the smooth continuous voltage available from a battery. There are two ways to achieve full wave rectification. The circuit above uses two diodes.

What you probably didn't notice at first is that the secondary of the transformer has *TWO* 12 volt RMS AC windings. By having two separate windings, and wiring them in series, one of the windings can be positive at all times. This allows positive current to flow through one of the two diodes at all times and greatly decreases the ripple. Notice that, if we wanted, we could reverse the polarity of the diodes and produce the same waveform with the opposite polarity. That is, if we wanted a ***NEGATIVE voltage source*** referenced to ground, reversing the diodes would do that.

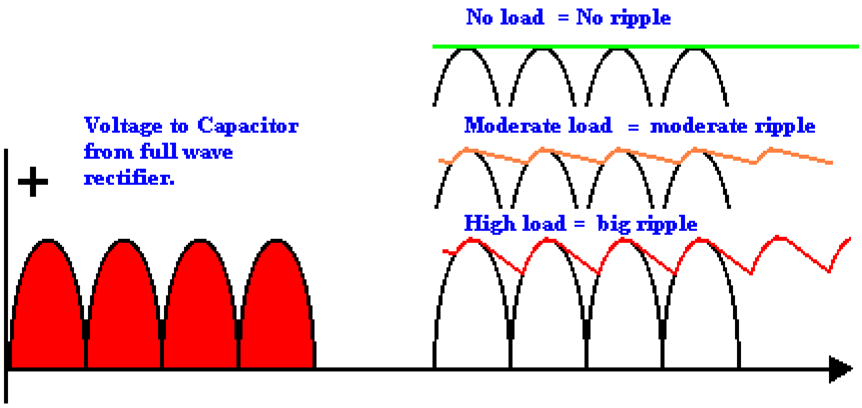
Bridge rectifiers



FULL WAVE RECTIFICATION

(Both polarities of sinewave are exploited.)

The second way to achieve full wave rectification is to use a bridge rectifier made from four individual diodes. This configuration allows us to get full wave rectification from a single secondary winding. The four diodes are soldered in a diamond pattern as shown above. The AC voltage source is applied across the top and bottom of the diamond. The two diodes on the right are pointed so that the positive current will always flow to the positive side. The left side is wired to ground and the diodes point in such a way the negative current is always vectored toward ground. To say it another way, the positive current always flows "UP" from ground.



Effect of Load Current on Power Supply Ripple.

Ripple

Because the rectifier is supplying current in the form of "humps," the voltage output across the capacitor will also vary up and down. If the capacitance is large the voltage doesn't drop to zero during the "valleys," but it can drop fairly low if the current drain from the supply is large. The more current that is sucked out of the capacitor, the lower the voltage "valleys." This is illustrated in the drawing above. If the choke is large enough, it will work with the capacitor to smooth out the height of the voltage peaks and raise the level of the valleys dramatically.

With no load current, output voltage charges to the peak voltage

Notice that, if the power supply is not connected to an external load, the output voltage will rise up to the maximum voltage that comes through the rectifiers. For a 12 volt RMS transformer output winding, this is approximately the square root of two (1.414) multiplied times 12 volt RMS volts, or about 18 volts. Referring to the diagram, with no external load the only load on the capacitor is the tiny one milliampere current passing through the bleeder resistor. This means that the variation in voltage between the humps will be extremely small. In summary, if there is no load on the power supply, to a voltmeter it looks like a "regulated" 18 volt power supply with essentially no ripple. If your 12 volt circuit might be damaged by 18 volts, you must not connect a supply like this to your circuit.

When you first turn it on, the voltage will be 18 volts for a moment before the load current flow is established and the choke and capacitor pull the peak voltage down. RMS (Root Mean Square) refers to the *AVERAGE* voltage of the rectified sine wave "humps." If the output from the big capacitor were fed directly into your QRP without a regulator, the capacitor would charge toward the peak voltage of the "humps." Depending on how much current your QRP was drawing, 18 volts might destroy some of the components in your QRP. As the load on the power supply is increased, the output voltage would drop down toward the rated RMS voltage, 12 volts. As the rated transformer load, say 3 amps, is exceeded, the DC voltage will probably drop below 12 volts.

Power transformer saturation

A second purpose of the choke (series inductor) is to prevent the peak current from the transformer from exceeding the current rating of the transformer. If the choke were not located between the rectifier and the capacitor, the current from the "humps" would only flow into capacitor when the voltage from the rectifiers is higher than the voltage already stored in the capacitor. It is like a tidal pool alongside the ocean. The pool can only fill with water when the tide rises higher than the level of the pool. The result of these pulses of charging current is that the power transformer must provide much more peak current than it may be rated for. If a transformer is rated for, say 10 amperes RMS, and these surges of current are drawn in bursts just a few microseconds long, then the peak current might be 100 amperes. Since the transformer doesn't have enough iron for that, the iron saturates and the transformer inductance momentarily collapses. Suddenly, the transformer will act like a few turns of copper wire shorting out the AC source. Saturation causes the windings and the transformer to heat rapidly and perform poorly.

Substituting big chokes with small, cheap resistors

In the real world, most low voltage power supplies like this solve the problem with a cheap resistor instead of a large, expensive iron core inductor. Resistors waste energy, but what the heck! You can use the resistor with an extra-large filter capacitor that costs less and weighs less than a choke with equivalent filter value. Or, as we'll see shortly, a linear voltage regulator can put a load on the capacitor all the time so that the current flow is not just in short bursts.

Regulators

To provide pure DC at a constant voltage over a wide range of load current, you need a regulated power supply. The regulator's first task is to "trim off" unwanted peak voltage and provide a DC voltage equal to (or similar to) the transformer rated RMS voltage. Regulators solve the 18 volt over-voltage problem described above. Its second purpose is to maintain constant voltage even when the load resistance is changing continuously or during a line voltage brown out. A regulator circuit is usually added to a power supply like the one above. There are two basic designs for regulators, ***linear regulators*** and ***switching regulators***.

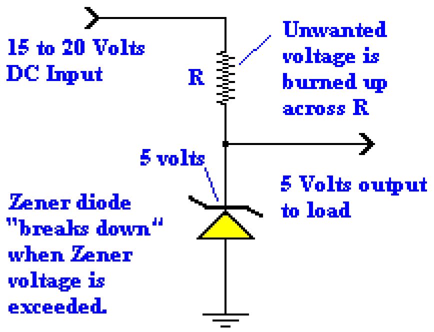
Linear regulators are a sort of automatic variable resistor placed in series with the output of a simple supply like the ones we have been discussing. The regulator uses feedback from the load voltage to change the size of the "automatic resistor" and hold the load voltage constant. For example, in the above power supply the regulator input voltage might vary from say 15 to 18 volts, but the regulator would change its resistance to hold the output constant at 12 volts DC. ***A linear regulator not only insures that the load voltage is always the same, it also "trims" off the ripple.***

Switching regulators are more complex circuits that usually involve inductors (or transformers) and switching transistors. They start with unregulated DC and turn it back into AC power. This AC power is then passed through a transformer to generate whatever voltage is needed above or below the original DC voltage. In an equivalent method, the unregulated DC is pulsed through an inductor to generate higher or lower voltages. Some switching regulators work directly off the household line. In other words, the 120 volts AC is rectified without a transformer and results in roughly 120 volts DC that is then converted into AC to drive a small, high frequency transformer or a step-down inductor. For amateur radio work, switchers usually make radio noise that you will hear in your receiver. Yes, commercial radio equipment often use switchers in their designs, but in my experience, getting rid of the switching noise is extremely difficult.

In contrast to switching regulators, some switchers just boost the voltage, but don't regulate the output voltage. These are often called ***charge pumps***. The noise from these unregulated charge pumps can be insignificant because they only switch at one frequency and they don't "dither" back and forth trying to hold the output voltage constant. In summary, ***regulated switchers are noisy*** and I have pretty well given up trying to use them inside ham equipment.

Zener diode regulators

The simplest regulator is made from a ***Zener diode***. It is a "***linear regulator***" because there are no abrupt pulsed signals involved and it works entirely with DC. It dissipates the unwanted voltage as heat. A Zener diode is a modified silicon diode subtly different from the rectifiers used in the power supplies above. Zener diodes are made from silicon that has been doped (contaminated) with extra ions. The extra ions cause the diode to break down at a specific lower reverse voltage when a high reverse voltage is applied. Zener diodes are inferior rectifiers, but when used as regulators, they are quite useful.



Why ordinary rectifiers don't behave like Zeners

Diodes rectify because the reverse voltage is insufficient to force electrons through the P side of the P-N junction that has no free electrons. However, when enough voltage or "electrical force" is applied, the P-N barrier breaks down in an ***avalanche breakdown***. When this breakdown happens at high voltage and high current, the sudden heat generated may ruin the diode (or bipolar transistor). You may remember the homemade crystal diode discussed in chapter 4. When this crude diode was reversed biased, it broke down abruptly at about one volt. At any voltage above 1 volt, it acted like a short circuit and regulated the load voltage to one volt. At low voltage levels, such a breakdown doesn't necessarily destroy the diode if the diode doesn't overheat. This ***Zener voltage*** level can also be used as voltage reference.

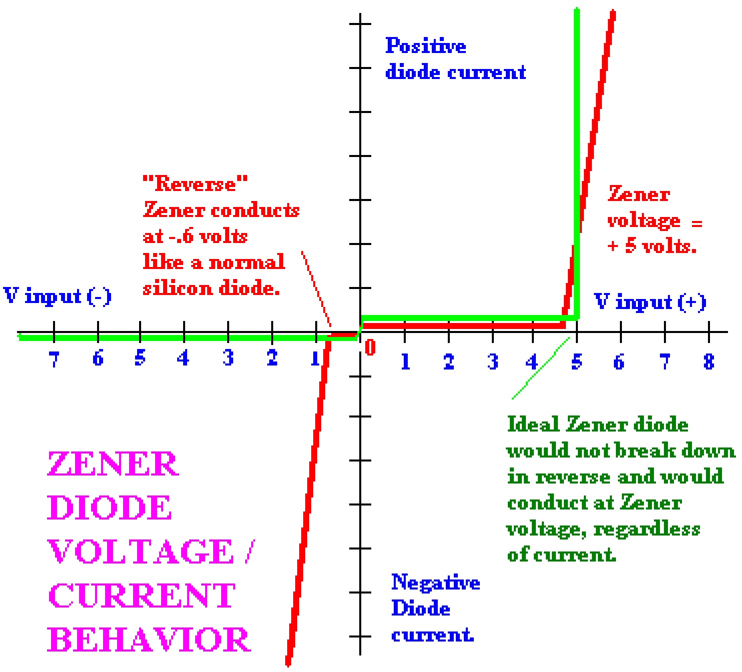
Doping silicon diodes makes Zeners

When big, tough, modern 400 volt silicon diodes are "doped" with extra ions mixed into the semiconductor, the avalanche can happen at lower voltages anywhere below 400 down to as little as 3 volts. Because the load voltage is low, and the load resistance presumably limits the current to a safe level, the heating in the silicon is mild enough that the diode survives the breakdown. In practice, Zener diodes are available from about 3 to 50 volts. 100 volt Zeners would have to be capable of dissipating a great deal of heat or they would be easily destroyed.

In the circuit above the Zener diode breaks down at 5 volts. If one of these diodes is placed across a load, the Zener diode will clamp the voltage to 5 volts so the voltage across the load never rises above 5 volts. Of course the input voltage must always be higher than 5 volts and the unwanted voltage will be dissipated across the resistor in series with the power supply. Ohm's law tells us that half of the resistor current must pass through the Zener on its way to ground. So the Zener diode itself is dissipating as much energy as the intended load. As you can see, Zener diode regulators have poor energy inefficiency.

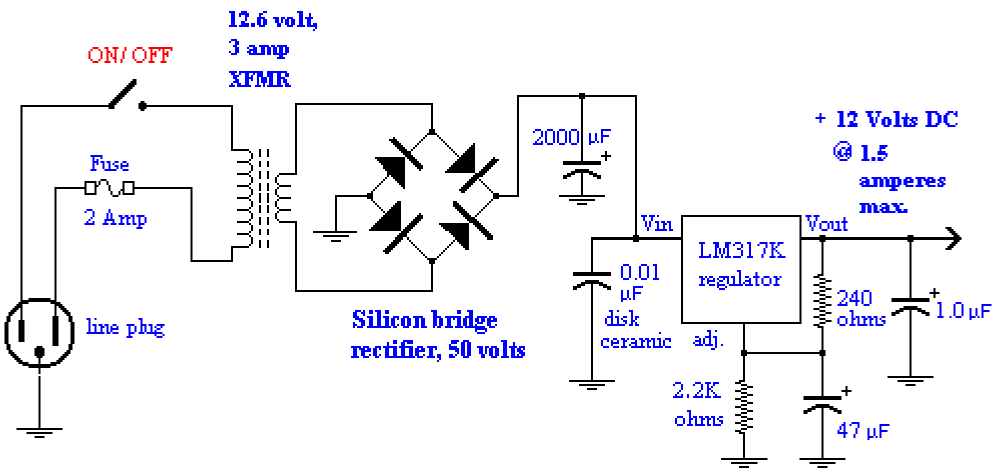
Real versus ideal Zeners

If a Zener diode behaved "perfectly," the voltage across it would be the Zener voltage, no matter how many amperes flowed through the diode. This is illustrated by the green curve in the graph below. Unfortunately, the Zener voltage rises with large currents as shown below on the red curve. Notice that when the Zener diode is wired backwards, it acts like a normal, forwardbiased silicon diode. Conduction starts at about 0.6 volts. Real Zeners look like ordinary forward biased silicon diodes. What is called "forward" conduction for a normal diode is called reverse conduction for a Zener. Zener diodes are impractical for heavy current regulation. They not only dissipate energy in the series resistor R, they also burn up energy in the diode. Moreover, as the diode current rises, the Zener voltage can be significantly different from its nominal value. In practice Zener regulation is used for light loads over a narrow range of input voltage. As you will see later, Zeners can be used as ***VOLTAGE REFERENCES*** to run a transistor regulator. In this way, the regulation can be fairly good and energy isn't wasted.



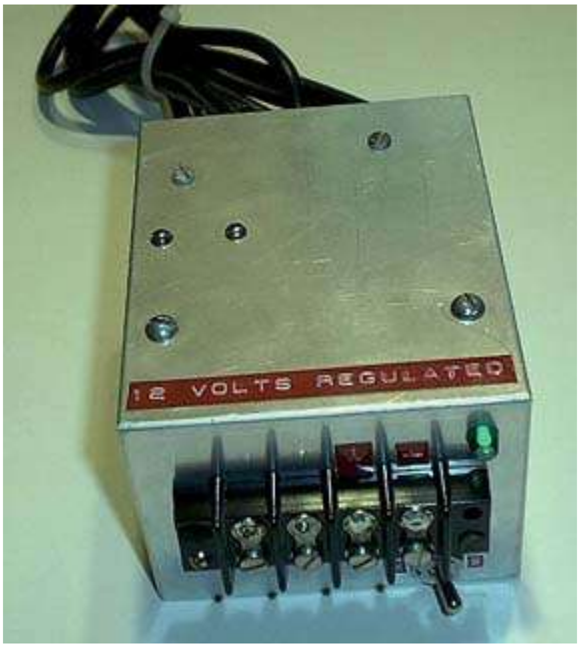
This will be illustrated in an application later in this chapter.

A homebuilt, line-powered power supply for a QRP



Now let's be practical: The 12 volt supply below worked well for me and can be assembled entirely from parts at your local Radio Shack.

This 18 watt regulated line-powered supply should be built in a metal chassis. The round ground pin from the line cord should be connected to the chassis. In that way, if the "hot" black wire should break and touch the chassis, the metal would not become dangerous to touch. A 2 to 5 ampere fuse in series with the line input protects the supply. The ON/OFF switch should be rated for 250 volts DC and at least 1 ampere. The line cord should pass through a rubber grommet on the way into the chassis. Once inside, the line cord should be clamped to the chassis so that, if someone picks up the power supply by the cord, the force will be on the clamp and not on the solder joint where the line cord is fastened to the fuse and switch. The transformer is rated at 12.6 volts RMS at 3 amperes. I used Radio Shack part # 273-1511. The rectifier is a generic silicon bridge rectifier rated for at least 50 volts @ 3 amperes. Alternatively you could use 4 individual rectifiers arranged as shown above. The filter capacitor following the rectifier just needs to be large and greater than about 25 working volts. The other three capacitors serve to stabilize the output and prevent oscillations and ripple. Adding a 12 volt dial light so you will know when it is on is a nice touch.



The LM317K programmable voltage regulator

The LM317K regulator chip is packaged in a TO-3 metal case and can deliver 1.5 amperes. To dissipate the heat, the TO-3 case should be bolted to the metal chassis and insulated by means of a mica washer and silicon grease. Mounting kits for this purpose are also available at Radio Shack. This regulator chip works by regulating the voltage between the Vout terminal and the ”adjustment” lead on the regulator. The regulator regulates this voltage difference to 1.2 volts. This low voltage allows the designer to regulate voltages equal to or higher than 1.2 volts. In this 12 volt application, the regulator passes current through a 240 ohm resistor and regulates the voltage across the 240 ohm resistor to 1.2 volts. This results in a “current source” that drives a regulated current through the 2.2K resistor to ground. This increases the total regulated output voltage from 1.2 up to 12 volts. In other words, 240 ohms is about 10% of the sum of 240 ohms plus 2200 ohms. Because you can “program” the total regulated voltage, this same regulator can be used to regulate voltages from 1.2 volts up to about 20 volts.

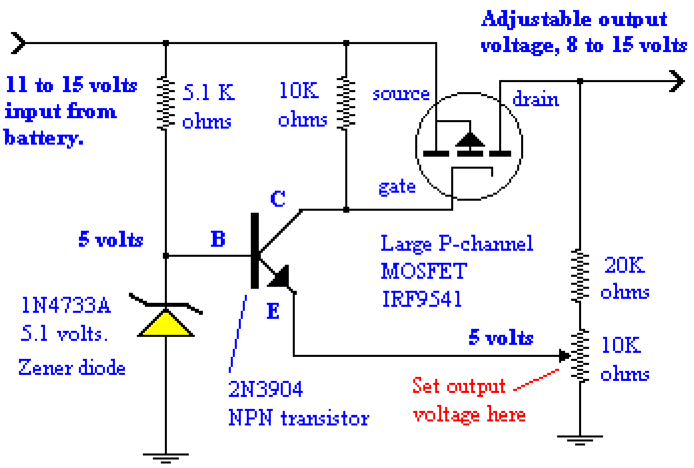
Another reason you need good voltage regulation is that the tuned stages in your QRP don't take kindly to changing the supply voltage. If you tune up the antenna using 12 volts, and the voltage later goes up or down, the tuning of some stages may change slightly and your signal might crash in the middle of a QSO (conversation).

The LM317K “clips off” any voltage above 12 volts so your QRP will never see a higher voltage. Notice that the LM317K is a ***linear regulator***. This means that it turns any input voltage that is above the regulation voltage into heat. This seems wasteful, but linear regulation makes no radio noise and produces a flat output voltage with practically no ripple. Notice that the choke (or a resistor) is not necessary here because the regulator is drawing current from the capacitor nearly all the time. This means that the current is flowing from the transformer nearly all of the time and will not be saturated by high current pulses.

This power supply violates my goal to never use integrated circuits. If there are purists who share my aversion to integrated circuits, the “low dropout” regulator shown below can be substituted for the LM317K regulator. A larger power supply than this would be more versatile and could power a bigger transmitter. Obviously, the higher the power level, the more cumbersome the regulation becomes. Running a 100 watt transmitter requires a 300 watt regulated power supply. I sidestepped this project by running my entire ham station on a solarcharged
12 volt battery which is described later in this chapter.

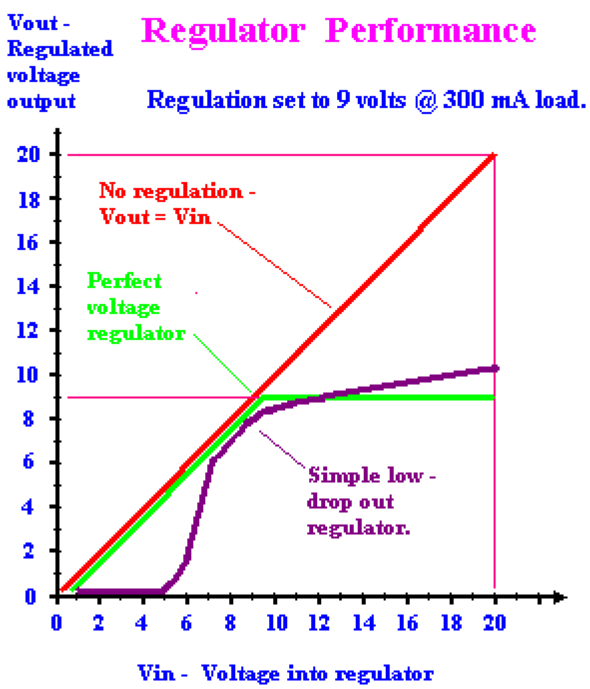
A low dropout voltage regulator for use with a battery

As you will read shortly, a lead-acid golf-cart battery makes a fine, high-current 12 volt power supply. Unfortunately, running your transmitter on batteries means that, when the battery is ready to be recharged, its voltage will drop down to 11 or even 10.5 volts. This means that (ideally) your QRP must be tuned up to run on 10.5 or 11 volts and then regulated to that level. Remember that ***a linear regulator can only deliver LESS than its input voltage***. So if you're running on a 12 volt battery, you need a regulator that wastes as little voltage as possible. This waste voltage is called ***dropout.*** The regulator shown below receives nominal 12 volts from a battery. The active regulation element is a big P-channel MOSFET transistor. This transistor can be arbitrarily large. The bigger it is, the less voltage it will waste and the lower the “drop out.” The P-channel MOSFET transistor turns on (conducts current) when its gate voltage is pulled downward toward ground. So when the battery voltage drops, the gate voltage must be pulled down (toward zero volts) to turn the MOSFET more on. When the battery input voltage rises, the gate voltage must be raised to turn the transistor more off and restore the output to the set voltage.

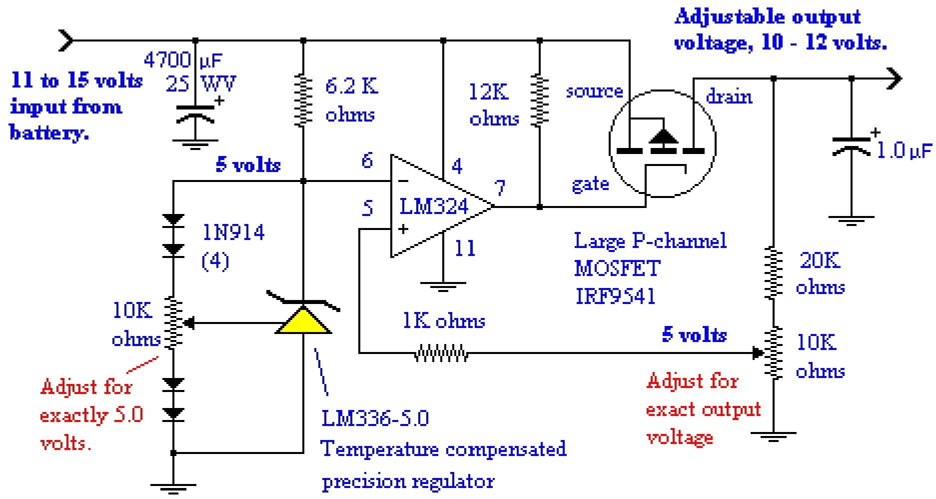


Low Dropout 12 Volt Power Supply

The gate voltage control is done with an NPN bipolar transistor. The transistor compares the reference voltage across a 5 volt Zener with a fraction of the output voltage across the sense resistor pot on the lower right. The slider on the sense resistor contacts the resistance at a level that produces about 0.6 volts less than 5 volts. As the output voltage rises, the voltage on the sense resistor rises. This in turn increases the transistor emitter voltage. The difference in voltage between the base and emitter drops, causing the drive to the NPN transistor to drop. As the NPN transistor turns more off, the gate voltage on the MOSFET rises toward the battery voltage and turns off the MOSFET and lowers the regulated output voltage. The purple plot on the left shows the performance of this simple power supply when it has been set to 9 volts with a 300 milliampere load. The red line shows the voltage the load would receive if there were no regulation. That is, Vin = Vout. The green line illustrates the performance of an ideal or perfect linear regulator. If the transistors had infinite gain and the Zener diode always produced precisely the same reference output voltage, then the green curve is what you would get. As soon as the regulator is given 9 volts input, it would deliver exactly nine volts, no matter what the load was. As you can see, the simple regulator isn't radically different from ideal, but it is much less then perfect.



A precision, temperature-compensated, low-dropout regulator
More nearly perfect regulation can be achieved by replacing the NPN transistor with an operational amplifier. Operation amplifiers, op-amps, are integrated circuits composed of many or even dozens of transistors. Op-amps perform as though they were nearly perfect transistors. Similarly the LM336 voltage reference is an integrated circuit made from bunches of transistors that perform as though they were a nearly "perfect" Zener diode. As the voltage across the regulator is varied, the voltage across the Zener remains constant within a couple thousandths of a volt.



Low Dropout 12 Volt Power Supply with Precision Regulator

The op-amp is the triangle in the center. This op-amp has 14 pins and the numbers shown are the pin numbers. This particular chip contains four op-amps. Only one is used in this circuit. Pins 6 and 5 are the inputs. The input pins function in such a way that the op-amp changes the output voltage (pin 7) to "try" to keep the two input pins at the same voltage. That is, so long as the voltage on pin 6 is identical to the voltage on pin 5, the output remains constant. When the **positive** pin 5 has a higher voltage than the **negative** pin 6, the output pin will shoot positive as high as it can go. When the negative pin 6 is higher than pin 5, the output pin will zoom negative as low as it can go.
Unlike simple transistors, the op-amp has nearly infinite voltage and current gain. Gains like 100,000 or a million are common. Also, the inputs draw essentially no current. They have nearly infinitely high input resistance. This means that op-amps are ideal to "monitor" some condition, such as the output voltage from the power supply, and then change the OP-AMP output pin voltage in order to restore the supply to equilibrium. Looking at the diagram, pin 6, the negative input, always rests at 5.00 volts, so long as the battery voltage input is at least 5 volts. The output voltage pot at the lower right is adjusted to produce the desired output voltage. The big MOSFET transistor will remain turned on to the exact degree to deliver the voltage you set. This set point is the place where 5 volts appears on the pot. As soon as the op-amp "sees" that pins 5 and 6 have the same voltage, the output voltage on pin 7 holds still and stops changing.
A precision Zener diode
The LM336 precision Zener diode is not only extremely accurate, it will maintain its accuracy over a wide temperature range. Speaking of temperature change, don't forget to bolt your MOSFET to a big heat sink. At high input voltages and big load currents, you may expect the MOSFET to get boiling hot without a heat sink. Keeping it cool keeps its internal resistance

low and improves the regulation. The metal flange on the transistor should be insulated from the heat sink and metal chassis with a mica insulator and silicon grease.

As we shall see in chapter 10, building a variable frequency oscillator that reaches modern standards of frequency drift requires the use of a super-regulated power supply. This in turn will require you to use regulators made from integrated circuits. Sigh. Of course you could prove me wrong by building one with discrete parts.

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BATTERIES AS A POWER SUPPLY

The beauty of batteries

As I mentioned earlier, I run my whole station on solar power stored in a 12 volt battery. You're probably thinking, "Yeah. And I'll bet he voted for Ralph Nader." Now I know this sounds like pinko, tree-hugging, liberal silliness, but my solar powered station came about quite logically and has many advantages for a homebuilt station. There are lots of hams that do this - and no wonder! A lead acid storage battery is a wonderful power supply. It puts out huge currents whenever you need them and the voltage regulation is excellent. The best advantages are that batteries make no switching power supply RF noise and there's no waste heat from a big linear regulator.

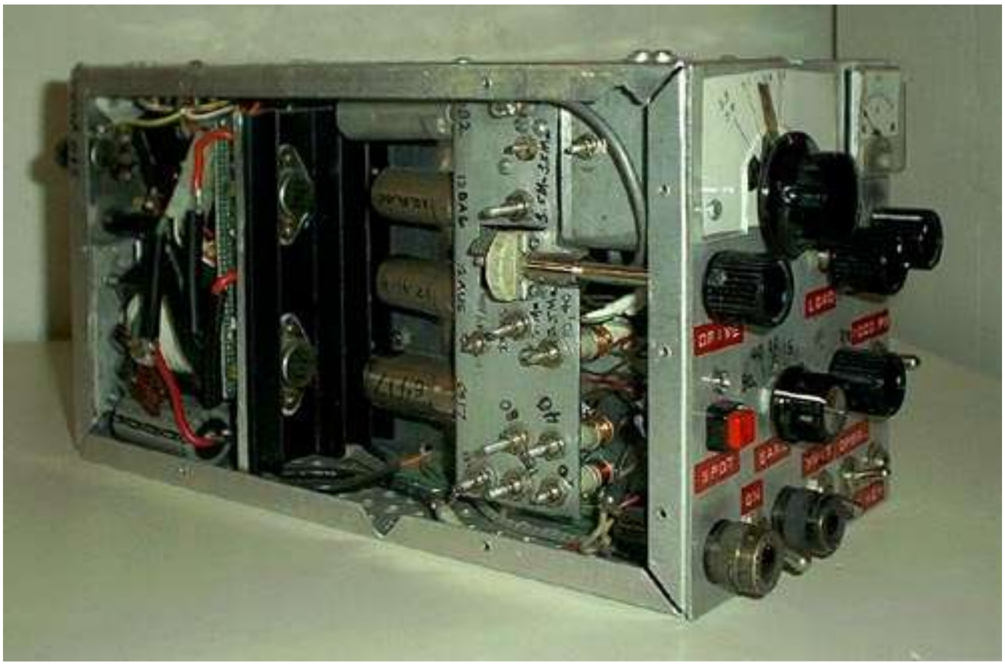
My return to ham radio began in 1997 when I hauled my 1967 homebuilt mobile ham rig down from the attic and blew off the dust. Since my old mobile rig runs on 12 volts, I couldn't even try out the receiver without a heavy-duty 12 volt power supply. I considered building or buying a supply but after 10 seconds I decided that was ridiculous. I happened to have some 6 volt golf cart batteries in the garage. I hauled two of them down to the basement and put on an automotive 12 volt trickle charger. After a day, the batteries recovered and I could fire up the rig. AM phone was extinct, but there was nothing to stop me from getting on CW, which I did with good success. Well, that's not quite true. My adventures included a drifting VFO and a blown 200 watt charge-pump switcher, but those problems had nothing to do with the power source.

My old vacuum tube rig was a power hog. The receiver drew 3.5 amperes at 12 volts. That's 42 watts just to listen! The transmitter was much worse, of course, but it isn't dramatically worse than a transistorized rig. After all, a transmitter can't radiate big power if it doesn't draw big power. Moreover, a modern, linear, class A transistor rig can be even more inefficient than an old Class C vacuum tube transmitter. Either way, my transmitters draw 6 to 18 amperes.

Compared to a golf cart or an automobile starter motor, a ham rig is a low power device. 20 amperes should be plenty of current. A deep discharge storage battery is best, but there's no reason you can't use an old car battery. We all routinely discard car batteries when they can no longer supply 400 amperes on a January morning. But even an old car battery will usually supply 20 amperes for five minutes without appreciable voltage drop. All you need to do is keep a small, one-ampere charger on it continuously. For anyone on a budget, a free used battery is a darn cheap high current regulated supply.

Requirements of a line-powered 20 ampere, 12 volt supply

I don't plan to build an equivalent line-powered power supply. But if I did, I wouldn't build a switching power supply. I've had zero luck running ham equipment on switchers. If the switcher is more than just an asynchronous charge pump and actually regulates the output voltage, then it will make RF noise which you'll hear in your receiver.


A 1967 homebrew all-band transmitter with a switching power supply running on 12 volts DC

The 150 watt switching supply is at the left rear. Originally the supply was a simple charge pump that used germanium power transistors. It consisted of a free-running multivibrator circuit that drove a step-up transformer with no feedback. The supply worked well and didn't produce audible hash in my receiver. Then one day a germanium transistor blew and I was unable to find a suitable replacement. I rebuilt the supply using a modern pulse width modulator regulation system and MOSFET power transistors. A neat feature of the new switcher was that the output voltage was adjustable. Just by turning a knob I could vary the transmitter output power from 20 to 80 watts.

Unfortunately, the switcher and the RF amplifier stages “talked to each other.” That is, when the load increased, the supply increased the pulse width modulation to compensate, but not without a slight delay. This subtle ripple or “jitter” was hard to see on a scope, but no matter how much I filtered it, the jitter appeared as a slightly rough note on the CW signal. In practical terms, I kept getting 598 RST reports.

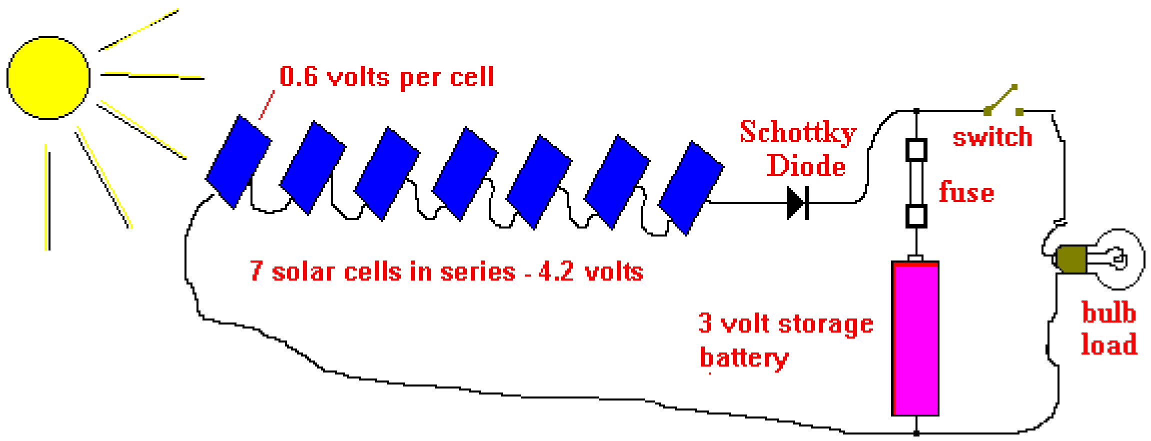
There was an elaborate 12 volt switcher in QEX magazine a few years ago that solved the jitter noise problem. I was delighted to see that I wasn’t the only one who noticed “jitter noise.” The problem is real, but after seeing the complicated Rube Goldberg solutions, my desire to build one vanished.

If I had to build such a supply again, one method would be to build a charge pump or other unregulated switched system that boosted (or lowered) the input voltage to just above the desired voltage. Then I could use a linear voltage regulator to accomplish the regulation function with a minimum of waste heat generated. This is the low noise approach I used to power my super-regulated miniature VFO power supplies described in chapter 10.

One feature of a high power charge pump I would test would be to use a manually adjusted pulse width for the AC generation. This way the output voltage could be manually set so that the linear regulator would waste as little energy as possible. This regulation margin would depend on how consistent my line voltage was and how stiff the charge pump conversion system was. For example, starting with 120 volts AC, the charge pump might lower the voltage to say, 20 volts DC. Then the linear could reduce the 20 volts DC down to 12 volts.

Going solar

Because my trickle charger was feeble, I was charging non-stop. Even then, I was having trouble keeping the battery charged for a couple hours of daily operating. However, I already owned a 12 watt, 12 volt solar panel which I installed on the roof.



A simple solar charger circuit

Solar cells are a kind of silicon diode. They are arranged in series so that the forward voltage drop of each diode adds up to some voltage greater than the voltage of the storage battery. For example, at 0.6 volts per solar cell, we need at least 20 cells in series to raise the panel voltage higher than the 12 volt battery. Typically, an open circuited panel puts out 20 volts in bright sunshine. This extra capability insures that it will continue to charge a 12 volt battery all day and implies that there are roughly thirty 0.6 volt cells in series. Solar cells are interesting to play with. I was surprised to discover that if you put your hand over just one of the series cells, it turns off the whole string, something like Christmas tree lights wired in series. This means that just one wet leaf stuck on your panel can turn off the whole array.

The panel output current is proportional to the sine of the angle the sunlight makes with the panel. If your object is to produce the maximum kilowatt-hours averaged over the entire year, then the angle should equal the latitude. I mounted my panel at 45o, which at 40o latitude, gives me better performance during the winter. Optimizing for winter is smart because the days are short and the panel is often covered with snow. Actually 50o may be better here in Boulder. Snow slides off a steep incline and higher angles are more resistant to hail damage. On the other hand, mounting them on a steep frame may make them subject to wind damage. There is no way to win. Many people just mount the panels flat on whatever roof they happen to have. If you wish to sacrifice some percentage of the output for beauty or mounting convenience, that's your decision.

The "lunar discharger"

It's bad form to connect a solar panel directly to a storage battery. The solar cells are forward biased diodes with respect to the battery. Therefore, whenever the sunlight quits, the panel voltage may drop below the battery voltage and a small battery current will reverse and flow through the solar panel. In other words, at night, the solar charger becomes a "lunar discharger." (Never mind.) If there are enough extra solar cells, then the night-time voltage drop may still exceed the battery voltage. Anyway, the discharge problem is typically prevented by a silicon diode in series with the panel to insure that current is never allowed to flow from the battery back into the panel. Since this check valve diode has a forward voltage drop that wastes energy, you may as well use a big Schottky diode that will only penalize you with 0.2 volts instead of 0.6 volts loss.

Another small issue is lightning protection. My panel is on the roof where, in theory, it might attract a lightning bolt. I'm not really worried, but I have a connector on the lead from the panel so I can disconnect it from my shack when I go away on trips or whenever a storm is particularly frightening.


Solar panel on the roof
I built my panel frame out of varnished wood. The wooden boards screwed down to the roof retained water against the shingles and rapidly rotted. I replaced the boards with 2 inch aluminum angle stock which should be a permanent fix.

Conservation helps

My solar panel charges about as much as the line-powered trickle charger, about 1 ampere. Consequently I still had to use line power to charge occasionally whenever I stayed on the air too long. A breakthrough came when I built my new transistorized receiver. The new receiver draws 120 mA. That sure beats 3,500 mA. Since then, I haven't needed my line powered charger.

12 Volt power distribution

A storage battery can deliver hundreds of amperes, so it's wise to isolate the battery from your rig and solar panel with an appropriate fuse. A 30 ampere fuse should be about right. I have a master switch to isolate the battery from the ham rig when I'm not using it. A little LED pilot light tells me when it's connected and a voltmeter warns me if the battery is not fit for use. I also have charging and discharging ammeters (ampere meters) so I know the status of my supply at all times. I find the discharge meter helpful for monitoring my transmitters. You can even tune the antenna while watching the battery current. For fun I also have a small 12 volt lamp for emergency lighting.

Maintaining clean battery contacts is critical to keeping the supply voltage constant under load. Every few months, I clean the contacts and top off the batteries with distilled water. I can tell that the battery contacts need cleaning whenever the pilot light on my transmitter begins to flicker noticeably while I'm transmitting. A gel-cell battery shouldn't have these corrosion and fluid loss problems.

In summary, I get a kick out of operating like a fully solar-powered Field Day station.

Because the whole station runs on 12 volts, in theory I'm always ready for Field Day and there's nothing to stop me from going mobile. One of my back-to-nature dreams is that, during a power failure, I can go right on operating and thumb my nose at the evil corporate power monopoly. Twice during power failures I have galloped downstairs in the dark to make my first 100% truly independent radio contact. But before I could even tune the transmitter, the *#@%!$ lights came back on. Oh, curse those efficient fellows at Xcel Energy Company!

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LED THERE BE LIGHT

Emergency Station Lighting

As I explained above, I run my whole station on solar energy stored in a 12 volt battery.

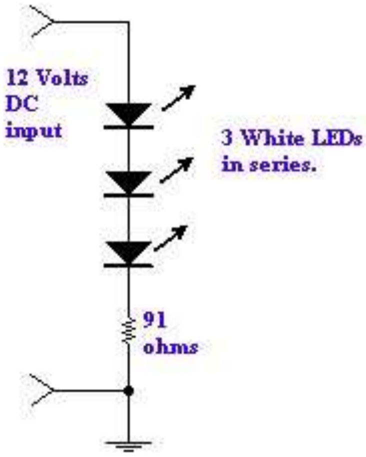
An advantage of battery power is that I operate free from the power grid. This saves very little money, but it's quite romantic. Of course at night, even on batteries I need to keep a log and

throw the correct switches. Using candles or a flashlight clenched in my teeth didn't seem very sophisticated.
My first idea was to dangle a 12 volt automotive light bulb over my shack. My buddy Bob, NØRN, uses such a light in his tent on Field Day. This solution is completely practical, but it seemed old-tech and boring. It also draws about 10 watts of power. If I am going to all the trouble to build a custom 12 volt light, I figured it should at least be ***an interesting light***.
Modern lighting methods produce more light per watt than tungsten bulbs. Also, energy conservation is important when your station is powered by a battery charged with a small solar panel.

A homebrew LED and flourescent station lamp

White LEDs – a modern marvel.

I happened to notice some "white LEDs" for sale down at Radio Shack. (Part # 276-320)
I thought cynically that they were probably really dim and not really white. I bought one and hooked it to a variable power supply. I slowly turned up the voltage until I obtained the rated 20 mA DC current. Hey! Not bad! The beam of white light has a slightly bluish cast, but otherwise, it throws a spot of light out to a couple feet. It's rated at 1100 mcd. That's impressive brightness when you consider its beam angle is 100o. One LED makes a perfect key chain light and many LED flashlights are now on the market. I'm told these white LEDs are made from sophisticated layers consisting of yellow and blue LEDs and a phosphorous that glows white. As LEDs go, it has a rather high voltage drop, 3.6 volts. I figured if I put three in series plus a single dropping resistor, it could run on 12 volts. The current is limited with just one 91 ohm resistor. The resulting triple light consumes just 0.25 watts and is adequate for keeping a log and operating the station. That's amazing when you think about it. We routinely squander hundreds of watts to illuminate entire rooms when all we really need is ¼ watt to read our newspaper or book.



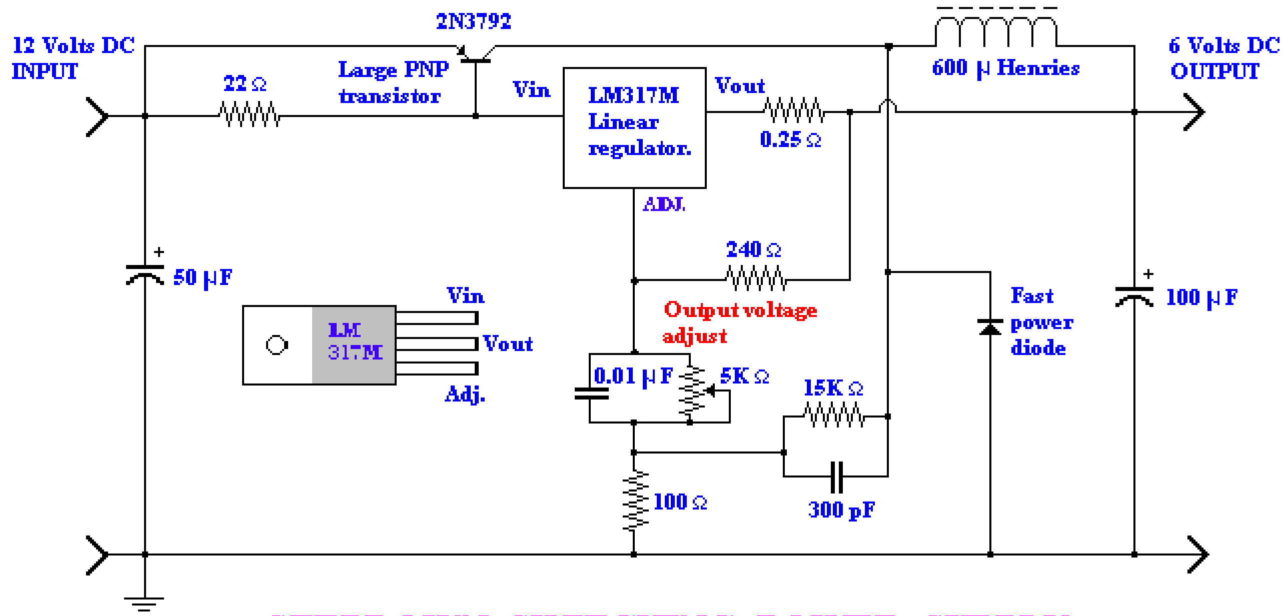
Flourescent lighting

Unfortunately, "adequate" isn't the same as "comfortably bright." So my next project was to build a 12 volt powered compact fluorescent. I fiddled for a couple hours trying to build a power oscillator capable of producing the required 800 Volts AC needed to ignite the miniature fluorescent bulb. I had several transformer and switching transistor problems and solutions did not present themselves. I also fried my voltmeter because I forgot to change the range when I put it on the high voltage. There's nothing like dead test gear to make you think differently.

I remembered that I had still a 6 volt fluorescent lamp that I used to use for lighting my pup tent while camping. One day I rolled up the tent while the light was still hanging from the tent ceiling. Oops! The plastic housing was splintered and the remains of the light assembly were still in my junk box. I found the parts of the light and resoldered the broken wires. I connected it to a 6 volt power supply and it still worked fine. Next I built a shiny reflector/ lampshade out of sheet aluminum and it produced loads of light. Unfortunately, I need a 12 volt light, not a 6 volt light. I didn't have a second light to put in series with the first, so I used a big dropping resistor to run the light on 12 volts. That worked OK, but it seemed pretty crude. Besides, I was already "cheating" because I hadn't built the fluorescent high voltage supply.

Nifty "buck-type" switching power supply

I replaced the dropping resistor with a switching power supply to reduce 12 volts DC down to 6 volts. I got the design from the National Semiconductor data book. Using the switcher the fluorescent light draws about 2.5 watts at 12 volts. The switcher is about 80% efficient. That is, it dissipates 10% of the total energy. In contrast a resistor would have dissipated 50% of my energy. I have used this little supply design for several home projects so far and found it thoroughly reliable. If you're a homebuilder, this simple, buck-switcher belongs in your bag of tricks. If you're bored with building a 12 volt light, maybe this little switcher will interest you.



STEPDOWN SWITCHING POWER SUPPLY

(12 Volt DC to 6 Volt DC Converter)

Switching power supply made from a linear regulator

How can this work?

This switcher uses a LINEAR regulator to generate the pulsewidth modulation needed to implement a switching power supply. This is essentially the same linear regulator used in the suggested line-powered QRP power supply. But, when you put a scope probe on the inductor, sure enough! The linear regulator is switching full on and off in rectangular pulses. Apparently the 15K Ω resistor and 300 pF capacitor are coupling a feedback pulse from the inductor into the regulator to cause it to switch full on and full off. The pulse width varies with load and responds just like a real switcher. Aside from my amazement that linear regulators can work as switchers, I was also surprised that I hear very little switcher noise in my receiver. The RF noise it produces is apparently sufficiently isolated from the receiver that I rarely hear hash competing with the ham signals. On the rare occasions when I do hear it, I simply turn off the fluorescent. Subjectively, the fluorescent produces roughly twice as much light as the LEDs. In other words, for ten times as much power the light seems to be twice as bright. On the other hand, it illuminates a much wider area than the LEDs, so I just run both of them simultaneously. The LEDs illuminate my log and scratch pad while the fluorescent lights up the station as a whole. I've used this light for hours at a time. It's bright enough that I'm content with it and I don't think about running across the room to turn on "the real lights." In summary, battery power and energy conservation are entertaining games. And, if we're really unlucky, someday our hobbies might even be useful in a community crisis.

BIRTHDAY WISHES:

The president and its council of the Amateur Radio league wish the following many happy returns on their birthdays in the coming months and trust that they and their families many more happy years with the Namibian Amateur Radio League.

For January 2011:

Name:	**Call Sign:**	**Date of Birth:**	**Status:**
Roland Hagmann	**V51LK**	06/01/1939	Member

Gerhard Coeln	V50BK	13/01/1958	Lic.
Peter Andraschko	V51PA	15/01/1960	Lic.
Gerhard Coetzee	**V51TG**	19/01/1966	Member
Pierre Breitenbach	V51PP	25/01/1959	Lic.

XYL:

Name:	**OM:**	**Call Sign:**	**Date of Birth:**	**Status:**
Elsabe	Nico	V51MH	05/01/….	Lic.
Irmgard	Peter	V51PS	29/01/….	Lic.

FOR SALE / SWOP / WANTED:

Do you have equipment for sale or to swop?. Are you looking for something?
Please let me have details for inclusion in this column.

The NARL is urgently looking for Motorola GM 300 Radios in VHF or UHF for a repeater project.

NEWS PROVIDED FROM MEMBER'S:

Subject:Windhoek Regional Repeater

Dear Fellow Hams

Please take note that the frequency for the Windhoek repeater has changed and you can set your radio up as follows:

TX: 145.175 MHz

RX: 145.775 MHz

CTCSS tone 88.5 Hz

I hope to meet you on the air soon.

73 and regards

Werner V51JP

If you have any news you think we should share amongst the Radio League, please feel free to contact me and forward to me via my contact address below :

"""No contribution from any Member received!!!"""

Contact address : Arnold.Koellmann@af.aurecongroup.com

NEWS FOR RADIO HAMS and THOSE WHO ARE INTERESTED:

Ham Gear (Transceiver, Antennas) / Contest :

01.01.2011: **New UK antenna manufacturer and parts supplier launches**: Vortex Antenna Systems, a new UK-based amateur radio antenna retailer, has begun trading following an initial extended period of R and D;

09.01.2011: **PEARS VHF/UHF Contest:** The PEARS National VHF/UHF Contest will take place on 21 to 23 January 2011. It is open to all licensed radio amateurs in South Africa and the neighbouring states of Namibia, Botswana, Zimbabwe, Mozambique, Lesotho and Swaziland. Only contacts with these states will count;

26.01.2011: **PowAbeam Antennas:** Derek Hilleard G4CQM and Richard Mason G6HKS have unveiled their latest PowAbeam Antennas website;

Propagation (HF, VHF, UHF, Sun spot cycles, Meteor Scatter):

02.01.2011: **Hannes Coetzee, ZS6BZP, reports:** that the solar activity is still at low levels. 2010 came to a close with a flurry of new sunspots. One region rotated into view on the eastern limb, and at the same time, three new sunspots have suddenly popped up. One of these regions located in the northern hemisphere appears to be growing at a good pace. Another region in the south is existing region 1 139. May 2011 be full of sunspots for all of us! The effective sunspot number is expected to be less than 20 for the coming week;

04.01.2011: **FANTASTIC SOLAR ECLIPSE:** When the sun rose over Europe this morning, a piece of it was missing. The Moon had covered as much as 86% of the solar disk, producing a partial solar eclipse and a fantastic crescent-shaped sunrise. The most amazing apparition, however, may have occurred in the Sultanate of Oman, where for a split second the Moon and the International Space Station partially eclipsed the sun at the same time;

08.01.2011: **Propagation de K7RA:** Average daily sunspot numbers were up nearly 24 points this week to 50, and average daily solar flux rose over 9 points to 89.5;

09.01.2011: **Propagation Report from Hannes Coetzee, ZS6BZP:** Solar activity is still at low levels. Sunspots 1 140 and 1 142 remain visible although Sunspot 1 142 is rapidly fading away. The effective sunspot number is expected to be less than 25 for the coming week;

14.01.2011: **FARSIDE SOLAR ACTIVITY:** Solar activity has been low for weeks, but a new active region on the far side of the sun appears set to break the spell of quiet. For the past two days it has exploded repeatedly, hurling bright coronal mass ejections into space and sending shock waves billowing through the sun's atmosphere. Although the region cannot be seen directly from Earth, NASA's STEREO-B spacecraft, stationed over the sun's eastern horizon, has a great view;

16.01.2011: **Propagation Report from Hannes Coetzee, ZS6BZP:** reports that the solar activity is still at low levels. The face of the sun is nearly spotless as Sunspot 1140 has rotated onto the western limb and Sunspot 1146 is struggling to remain visible. The effective sunspot number is expected to be less than 20 for the coming week;

22.01.2011: **Propagation de K7RA:** Average daily sunspot numbers dropped from 50 on the reporting week ending January 5, to 38 on January 6-12, and now 21.3 on January 13-19. Average weekly solar flux over the same three periods dropped from 89.5 to 83.8 to 80.4 over this past week;

23.01.2011: **Propagation Report from Hannes Coetzee, ZS6BZP:** Solar activity is still at low levels. Sunspot 1147 persists in the northern hemisphere and a few tiny spots have formed just to the south of it. The effective sunspot number is expected to be less than 20 for the coming week;

28.01.2011: **DOUBLE BLAST:** (http://spaceweather.com)This morning, a spectacular double eruption on the sun produced the strongest solar flare of the year so far (an M1-class event). Plasma clouds produced by the event are expected to miss Earth, so no geomagnetic storms are in the offing;

29.01.2011: **Propagation de K7RA:** Average daily sunspot numbers rose over the past week (ending January 26) by 11.3 points to 32.6, compared to the previous weekCC;

30.01.2011: **Propagation Report from Hannes Coetzee, ZS6BZP:** Sunspots 1 147 and 1 149 are about to disappear out of direct Earth view. Fortunately a new and as yet unnumbered sunspot is forming on the eastern limb;

Transmission modes / Software:

03.01.2011: **FUNcube SDR Dongle sells out in under a minute:** The second batch of AMSAT-UK FUNcube Software Defined Radio (SDR) dongles went on sale on Jan 2 at 20:00UT and completely sold out in under a minute;

09.01.2011: **Yasme Excellence Award for JE3HHT:** Makoto (Mako) Mori, JE3HHT, author of free Amateur Radio software for SSTV and digital modes such as RTTY, is one of the recipients of the 2010 Yasme Excellence Awards;

23.01.2011: **D-Star active in Johannesburg:** The first digital repeater in Johannesburg is active on the air. The repeater is on loan from Multisource for demonstration purposes and is offering amateurs an opportunity to experiment with D-Star;

25.01.2011: **LD-1B Software Defined Radio:** Pete Goodmann, NI9N, has produced videos showing how his LD-1B Software Defined Radio can be used to receive PSK-31 and Digital Radio broadcasts;

DX Activities / Special event station / Satellite:

02.01.2011: **F-1 CubeSat engineering model video:** On December 31, the engineering model of the Vietnamese Amateur Radio satellite, F-1, was completed and a time-lapse video of the assembly is now available;

04.01.2011: **Maldives operation:** Andrew, G7COD, will be operational from Adaaran Hudhuranfushi in the North Male Atoll, Maldives, AS-013 using the call 8Q7AK from 5th January to 16th January 2011;
Spratly Islands DXpedition: 37 amateur radio operators from 15 countries will take part in a three-team effort to put DX0DX on air between January 6th and February 1st;

05.01.2011: **DX0 - Spratly Islands DXpedition:** The call DX0DX will be used for a big multinational amateur radio DXpedition to the Philippine Spratly-Island Pagasa (AS-051), lasting January 6th through February 1st;

12.01.2011: **Spratly Islands DXpedition postponed:** Team Leader Chris VK3FY has announced the postponement of the DXØDX Spratly Islands DXpedition 2011, due to circumstances beyond their control;

Japanese ham radio team on Christmas Island: A group of seven Japanese ham radio operators will be active January 14th through 20th from Christmas Island (OC-002);

17.01.2011: **FUNcube Dongle Pro #200, plus your name in space:** FUNcube Dongle Pro serial number #200 is being auctioned on EBay - the purchaser will also have their name or call sign sent into space;

20.01.2011: **Jan Mayen DXpedition:** The Jan Mayen DXpedition set between July 6-14th, 2011, and led by Stan, SQ8X, has announced their group call sign will be JX7VPA;

22.01.2011: **Microlite Penguins DXpedition to South Orkney Islands:** From 27th January to 8th February 2011 the Microlite Penguins DXpedition Team will be active as VP8ORK from the South Orkney Islands (AN-008), Antarctica, one of the world's most wanted DXCC entities;

25.01.2011: **HI0RCD special event station plans AO-51 operation:** The Radio Club Dominicano invites satellite operators to look for their special event station HI0RCD via AO-51 as they commemorate 'The Month of the Patria' beginning on January 26, 2011 and ending on February 27, 2011 at 23:59 UTC;

27.01.2011: **Buddies in the Caribbean DXpedition:** The 'Buddies in the Caribbean' DXpedition (Team #1) which specializes in 100 watt or less low power radios and the Buddipole portable antenna systems will be on Dominica (J7), February 1-9th, 2011;

31.01.2011: **South Orkney Islands DXpedition:** Members of the Microlight Penguins hit the airwaves as planned on January 27th, from Signy Island (AN-008) around 1730z on 20 meters SSB. Activity by VP8ORK should last until February 8th;

Special Event Stations / Awards:

01.01.2011: **Amateur Radio and Emergency Communications**: When the Internet, cell phones, electricity and even police and fire radios won't work, amateur or 'ham' radio operators come to the rescue;

08.01.2011: **Amateur Radio World Castles Award:** Darius OK7OK will be active from Castle of Sluncova while Vlado Z35M will be operating from the Fortress of Butela, Heraclea;

09.01.2011: **HOST AN AMATEUR RADIO STATION AT SUN CITY:** Radio clubs are invited to submit proposals to set up an HF and VHF amateur radio station at the IARU Region 1 Conference at Sun City. The conference will run from 11 to 19 August 2011 with delegates arriving on 12 August. The special call sign will be ZS11IARU and will be operational for the week;

22.01.2011: **7th Asian Winter Games - amateur radio special event stations:** Members of Kazakhstan's Almaty Amateur Radio League (ARL) are organizing the activation of a number of special event stations to coincide with the games;

23.01.2011: **Amateur Radio World Castles Award:** Members of Tarragona Amateur Radio Club will be active on the 23rd of January 2011 from Torre de L'Abella, and Paolo I2AE will be active from Torre del Palazzo Caprioli di Sale a Gussago;

26.01.2011: **Special event station SI9AM, Sweden:** Special event station SI9AM from the King Chulalongkorn Memorial in Ragunda, Sweden, the largest Thai Pavilion in the world outside Thailand, will be active between January 26-31st;

31.01.2011: **Puerto Rico Hamfest special event station:** Members of the Caribbean Amateur Radio Group (CARG) will activate the special event call W4H as part of the celebration of the 6th Great Hamfest;

Contest / IARU – News / Regulation:

18.01.2011: **IARU E-LETTER, IARU Electronic Newsletter, January, 2011:**

The ITU - International Telecommunication Union, ITU

If you were to ask most amateur radio operators what entity is responsible for granting privileges to use portions of the radio spectrum for amateur radio purposes the answer would likely be their own national telecommunication authority. However, that's only partially true. The ultimate authority for the use of the radio spectrum is the International Telecommunication Union (ITU). It is desirable that each amateur radio operator understand what the ITU is and why its work and decisions are important.

Most countries are Member States of the ITU and by way of treaty generally agree to be bound by the decisions of the ITU when it comes to the usage of the radio spectrum. Each country can decide that a certain use determined by the ITU may not apply in their own jurisdiction. It is not common for countries to do that but it is within their sovereign authority to do so.

The International Telecommunications Union is a United Nations agency that deals with information and communications technology issues. They have an extensive web site at www.itu.int that details much of their work. The ITU is based in Geneva, Switzerland and includes in its membership 192 Member States and more than 700 Sector Members and Associates.

ITU has coordinated the shared global use of the radio spectrum, promoted international cooperation in assigning satellite orbits, worked to improve telecommunication infrastructure in the developing world, established the worldwide standards that foster seamless interconnection of a vast range of communications systems and addressed other global concerns, such as mitigating climate change and strengthening cyber security.

The top staff official of the ITU is its Secretary-General, Dr. Hamadoun Toure who is also a licensed radio amateur with the call sign HB9EHT. There are three sectors in the ITU: Radio- communication (ITU-R), Development (ITU-D) and Standardization (ITU-T). The IARU is a Sector Member in both the ITU-R Sector and the ITU-D Sector. The IARU fully participates in both of those sectors by attending any and all meetings that involve issues that may impact the amateur or the amateur-satellite services. The Secretary-General, the Deputy Secretary-General and the Directors of the three ITU Sectors are elected to four-year terms by the Member States at Plenipotentiary Conferences held every four years. The IARU is a recognized international telecommunication organization and is invited to participate as an observer at the Plenipotentiary Conferences. The most recent "Plenipot" was held in October, 2011 in Guadalajara, Mexico.

The ITU Council was established in 1947 under the name Administrative Council, following a decision taken by the 1947 Plenipotentiary Conference in Atlantic City, New Jersey, United States. The Council comprises a maximum of 25% of the total number of Member States, which are elected by the Conference with due regard to the need for equitable distribution of Council seats among the five world regions (Americas, Western Europe, Eastern Europe, Africa, Asia, and Australasia). The current Council is comprised of 48 members.

The role of Council is to consider, in the interval between Plenipotentiary Conferences, broad telecommunication policy issues to ensure that the Union's activities, policies and strategies fully respond to today's dynamic, rapidly changing telecommunications environment. It also prepares a report on the policy and strategic planning of the ITU. In addition, Council is responsible for ensuring the smooth day-to-day running of the Union, coordinating work programs, approving budgets and controlling finances and expenditures. Finally, Council also takes all steps to facilitate the implementation of the provisions of the *ITU Constitution*, the *ITU Convention*, the Administrative Regulations (International Telecommunications Regulations and Radio Regulations), the decisions of Plenipotentiary Conferences and, where appropriate, the decisions of other conferences and meetings of the Union. The IARU has attended several ITU Council meetings in the recent past.

The ITU-R Sector is very important for radio communication services, including the amateur and amateur-satellite services. Every 4 or 5 years the ITU holds a World Radio communication Conference (WRC) to revise the international Radio Regulations. It is the job of WRC to review, and, if necessary, revise the Radio Regulations, the international treaty governing the use of the radio-frequency spectrum and the geostationary-satellite and non-geostationary-satellite orbits. Revisions are made on the basis of an agenda determined by the ITU Council, which takes into account recommendations made by previous world radio communication conferences. The general scope of the agenda of world radio communication conferences is established four to six years in advance, with the final agenda set by the ITU Council two years before the conference, with the concurrence of a majority of Member States. The next WRC is scheduled for 23 January to 17 February 2012, just one year away.

Under the terms of the ITU Constitution, a WRC can:
1. revise the Radio Regulations and any associated Frequency assignment and allotment Plans;

2. address any radio communication matter of worldwide character;
3. instruct the Radio Regulations Board and the Radio communication Bureau, and review their activities;
4. determine Questions for study by the Radio communication Assembly and its Study Groups in preparation for future Radio communication Conferences.

There is a lengthy preparatory process for every WRC in which the IARU participates as a Sector Member. There are usually countless meetings dealing with each agenda item that has been determined to be on the agenda for a WRC. Many of those agenda items can, and do, have a substantial impact on the amateur radio usage of portions of the radio spectrum. It is important for the IARU to participate to "protect our frequencies" and when the opportunity presents itself, to expand our spectrum.

ITU-R Study Groups and Working Parties address each agenda item on the WRC agenda and try to arrive at a consensus and recommendation(s) how the agenda item may be addressed or dealt with at the WRC. Studies are conducted many times to determine how a proposed new usage may impact the other services, or not. Each of these agenda items are thoroughly discussed for at least a couple of years leading up to the WRC. You can imagine how important it is for the worldwide amateur community that IARU participate in the entire study group/working party process.

ITU-D is where much of the ITU's work on disaster response takes place. The development arm of the ITU considers emergency telecommunications an integral part of its projects integrating telecommunications/information and communication technology in disaster predication, detection, and alerting. Emergency Telecommunications play a critical role in the immediate aftermath of disasters by ensuring timely flow of vital information which is much needed by government agencies, and other humanitarian actors that are involved in rescue operations and providing medical assistance to the injured. IARU's task in the ITU-D Sector is to ensure that amateur radio's role in disaster communications is understood and appreciated by the ITU members. The ITU-D Sector also conducts a worldwide conference. The current schedule calls for a World Telecommunication Development Conference every 4 years. In 2010, the WTDC was held in Hyderabad, India in late May and early June. IARU participated in the conference.

The ITU also sponsors regional and global exhibitions called TELECOMS. An ITU Telecom offers a global ICT community platform that gathers stakeholders from across the telecommunications/ICT sector to connect, collaborate and create the future ICT landscape. Forums or seminars related to ICT are conducted at the Telecoms and IARU has participated in such forums, usually on topics related to emergency communications.

In one of the ITU buildings, there is a permanent amateur radio station, 4U1ITU. 4U1ITU is the club station of the International Amateur Radio Club.

In an upcoming IARU E-Letter, I will describe the organization of IARU and how it works within the ITU and the regional telecommunication organizations like CEPT, CITEL and APT to ensure amateur radio's continued place in the radio spectrum landscape.

73, Rod W6ROD

19.01.2011: **The Position on prEN 50561**
A briefing document to IARU Region 1 Member Societies
Background
This is draft of a standard for Power Line Adaptors (PLAs), currently being circulated to National Standards Committees for comment. A list of CENELEC National Standard Committees can be found at
http://www.cenelec.eu/Cenelec/About+CENELEC/Our+organization/CENELEC+Members/Default.htm
PLAs are PLT devices used in home networking to transfer broadband data via the mains power network from room to room. Because of the transfer speeds required, the devices use RF carriers in the range 3-30 MHz, transmitted down the mains network. Currently, there is an informal agreement that all amateur bands in the 3-30 MHz range

are “notched” meaning the emission levels are reduced by some 30dB in those bands. Outside the amateur bands the PLAs operate at full power.

Currently emissions from data equipment connected to the mains are governed by EN55022, a standard that has been in place for some years, and is based on the CISPR-22 standard. Alternatively manufacturers can use a Technical File to confirm compliance with the Essential requirements of the EMC Directive, which can be assumed to broadly equate to EN55022 levels of emission.

Many concerns have been expressed over some ten years that PLT devices represent a significant threat to radio communications systems operating nearby. In 2001 The European Commission, recognising that there was a lack of a specific standard for PLT, commissioned a joint working group of ETSI and CENELEC to consider the matter and produce a draft for a harmonised standard. Between 2001 and 2010 the JWG worked to address the requirements set out in the EC Mandate (Mandate 313), but it proved impossible to reconcile the conflicting requirements of properly protecting the radio spectrum, and allowing sufficient PLA transmit power (and therefore emissions) for PLAs to operate with the required throughput.

In parallel with this, the PLA manufacturers have been very active in CISPR, and a number of draft proposals were developed to legitimise high levels of emissions from PLAs, none of which were approved. The EC then turned its attention to putting pressure on CENELEC to develop a draft emission standard that would allow PLAs to operate. The draft prEN 50561 is the result of that pressure.

What does prEN 50561 say?

This draft standard sets levels of emissions for PLAs which broadly are some 30-40 dB above the levels which EN55022 implies. The EC justifies its stance by claiming to be “technology neutral” – by that it means not to impede the development of new technologies.

In addition to defining the “transmit” power of PLAs, the draft lays certain other requirements on PLAs:

a) They must safeguard short wave broadcast bands by either:

   i. demonstrating the capability to recognise broadcast signals above a defined level, and not transmitting on those specific frequencies

or

   ii. Permanently notching out all short wave broadcast bands

b) They must be capable of reducing transmit power when circumstances allow

c) They must permanently notch all amateur bands

The draft defines test methods for assessing compliance with the requirements of the standards

So why does the EC want a standard?

The EC finds itself in a difficult position, in that national administrations are coming under pressure to take action on interference from PLAs, and the only defence against those pressures is to have a standard that PLAs can meet, and which therefore bring a presumption of conformity with the EMC Directive. The standard does not seem to be intended to protect radio services, but simply to legitimise PLA devices being brought to market. The latest 5 to 10 years a number of plt products have been put on the European market - roughly more than a million devices (exact number unknown), and manufacturers have prepared Manufacturers Declarations based on old unapproved drafts which offers no protection of radio services. The national European authorities have experienced interference cases but have great difficulties in taking these products off the marked. This is also a reason for having a dedicated harmonized PLT product EMC standard.

What action can be taken?

IARU Region 1 is developing a set of arguments to present to CENELEC via national standards committees. We will shortly be asking National Societies to contact their national standards committees making the case for changes to the draft to introduce proper protection for the HF radio spectrum. Otherwise, there are concerns that it will not be long before the whole spectrum is rendered useless.

Is this standard appropriate?

There are some real concerns as to the degree to which this standard protects the HF spectrum. Some IARU Societies are working on a draft response for all MS to consider, which will be with you shortly.

What action does my Society need to take?
At this stage, please take three actions:

- Read prEN50561, and try to understand the key points in it. If you have an EMC expert, ask him/her to do the same, and begin to form a view on the current draft

- Speak with other users of the HF spectrum in your country to see if they are aware of the draft, and whether have any concerns. Perhaps you can make a joint approach to your standards committee

- Identify who your national standards committee is, and see if you know anyone who sits on that committee. Speak to them to let them know that you will be sending some comments shortly

Two weeks from now, you will have a synopsis of the IARU position, with arguments you can use with your national standards committee. It is really important that you submit an input to your national committee, and as quickly as possible, as all committees have to comment to CENELEC on the current draft by mid-April.
If you want to influence the IARU Reg 1. position your comment shall be sent to the Chairman of the EMC WG before 28. January (e-mail: cmv@vip.cybercity.dk)

News from other radio ham league and society:

10.01.2011: **8 year-old Arkansas Radio Ham:** Eight year-old Noah is one of the youngest people in Arkansas to take the test and obtain an amateur radio licence;

12.01.2011: **Lithuanian amateur radio special calls:** On January 13th, 1991 the Soviet Army tried to occupy independent Lithuania. All radio traffic was disrupted, but Lithuanian amateur radio operators managed to tell the world about the invasion;

14.01.2011: **Illegal broadcasters on 40m:** Ulrich Bihlmayer, DJ9KR, has published a list of broadcast stations operating in the 7.0-7.2MHz Amateur Radio band;

17.01.2011: **AMSAT India January Newsletter:** The January issue of the AMSAT-India newsletter is now available for free download;

18.01.2011: **AMSAT-UK Online Shop:** The UK Amateur Radio space organisation AMSAT-UK have introduced a new online shop for satellite ground station hardware and software;
Two amateur radio clubs to host SARL National Convention: The Sasolburg and Vaal Triangle Amateur Radio Clubs will host this year's SARL National Convention 2011, which takes place on 15 and 16 April;

19.01.2011: **WRO analysis shows ham radio activity and code use, both up:** An analysis by World Radio Online columnist Randall Noon, KC0CCR, suggests that levels of on-air ham radio activity and Morse code usage both have increased since the FCC dropped the requirement for Morse code testing in early 2007;
Goonhilly to rejoin deep space communications programme: Goonhilly is to become the UK's biggest centre for communicating with deep space missions and there may even be a chance for Amateur Radio moonbounce (EME) operation;

27.01.2011: **Pirate Alert - ZL9BS/ZL9BI:** Phillip, ZL2TZE, would like to bring to the attention of readers that this Pirate Station is active again on the CW section of 40 meters;

Whats Up in Namibia (North, Central, Coast and South):

North:

Central:

Well, we are moving closer to our 21 birthday and I wonder what the league members have in mind to do about it. Should we not set up some activity to promote more our hobby to the Namibian public? Sure that the committee will be happy to hear from its league members and others who are interested to what extend should we promote our hobby and who would like to participate in those activities. You are all welcome and it is our chance to show our strength in being a good ambassador for Namibia.

Coast and South:

NEWS PROVIDED FROM THE Http//:WWW:

Here some places where you can find news provided to you:

[1] http://dl0du.dl.funpic.de
[2] http://www.da0yfd.de
[3] http://www.dnat.de/
[dx] http://www.darcdxhf.de

http://www.arvm.org/index.illw2009.html

If you want to contribute anything regarding our hobby or want to suggest a better way to improve, please feel free to come forward with your suggestion and contact me under the email as provided: Arnold.Koellmann@af.aurecongroup.com !

Dear members and friends,

The newsletter to your all this time is may a bit longer due to the IARU newsletter and other matters. Certainly allow me to remind you that we are only 2 month away to celebrate our 21 years of independence and birthday of the Namibian Amateur radio league. Still you be given your chance to come forward with what you like to add to the Chronic of the Namibian Amateur Radio League. Even it is just a note or an picture of any event in the past concerning our hobby and its activity in Namibia.

Hope to hear from you either via email or normal postal way through the League post office box.

Wishing you all a splendid weekend with best 73 es awdh

Your editor

73 es awdh, your editor Arnold V51BI January 2011