Subject: Used UPS a substitute for a new Inverter
Sent: 10 Oct 99

We have talked a lot about needing an inverter to take DC and convert it to 110 volts 60 cycle AC. We haven't mentioned much about UPS (Uninterruptable Power Source). In simple terms a UPS is a very fancy inverter that produces clean sine waves with in 3% to 5% total harmonic distortion (THD) at uniform volts and frequency. Most Inverters usually produce modified sine waves (MSW) which produce lots of harmonics 30% to 45% THD. Some items we will run can have trouble with this. MSW can cause buzzing noises in audio and radio electronics. Most laser printers will not run on MSW. Motors run hotter, less efficiently and some are harder starting on MSW.

The UPS technology is used a lot today with critical computers file servers, mainframes etc. The cooperate world tends to write computing equipment off the books every 3 to 5 years. These are then sold at junk prices and show up in surplus electronics scrap yards. These units cost plenty when new but when you buy them 3-5 years old they sell for very, very much less.

To give you an idea of what you can find if you look. I bought a 1450 watt American Power Conversion (APC) Smart-UPS model AP2000 with batteries (48 Volt) for $30 unknown condition. The Silicon Salvage place I bought it from didn't know if it worked or not they hadn't plugged it in. The thing worked fine in fact it looks practically new and acts like it.

The point is keep your eyes open for used UPSes as they get surplused out of the computer industry. Even if you have to spend more than I did to make sure you have a working unit. It still will be a fraction of the original price and often priced below the price of a new MSW inverter for the same power.

A UPS is designed to take variable amounts of input voltage (within a limit) and variable frequency and charge a bank of batteries, then it runs the load off the batteries, producing clean power in a continuous fashion. If the source power gets out of range or cuts off, it then switches to run off batteries totally until the source power comes back within range or the batteries get too low.

For our use it doesn't care how the batteries get charged. If a windmill or hydo-power is changing the batteries directly, then the UPS will be happy to convert DC to 115 Volts 60 cycle AC as long as the battery voltage doesn't fall too low. If this happens it will start beeping and finally turn off. Through a serial cable the unit will also do a shut down on your PC before it runs out of battery. This is a complexity I don't plan on using. I do plan to add many more batteries in parallel.

Some UPS's take 120 volts AC to get them going and some do not. This can be fooled if one wants to poke around on the internal board but it is simpler to supply Some AC from a generator or other source for long enough to get it going.