August 2013 Edition – Vol 2 Issue 2

A publication of the Four State QRP Group and OzarkCon QRP Conference
www.4sqrp.com

Ozark QRP BANNER

We are pleased to announce the 4S-Link Digital Interface is shipping again. Shipping had been suspended due to a parts shortage. http://www.4sqrp.com/4s-link.php

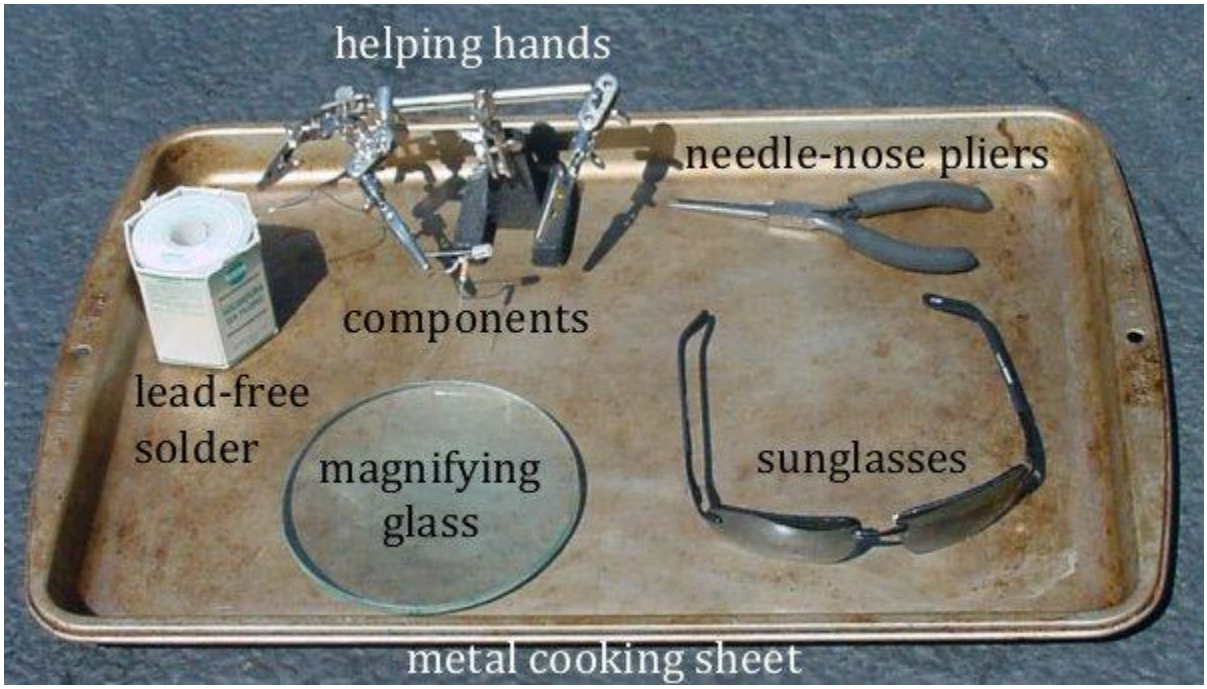
Index

Solar Soldering: Magnifying Glass Lens Solders Electronic Joints

http://www.robotroom.com/Solar-Soldering.html

A nasty rite of passage for all boys is learning to fry insects with a magnifying glass by concentrating sunlight through the lens. This summer, I handed down the heritage to my children with the inclusion of igniting magnesium particles, roasting marshmallows, and cooking cherry tomatoes from our garden using beams of light. Desperate to demonstrate a more practical application, I wondered whether it was possible to solder electronics using this form of solar power.

Yes! Solar soldering is possible with a large-enough burning lens, the correct setup, clear sunny skies, and some patience.



Example setup for soldering with a magnifying glass.

My set-up includes:

- Some electronic components to solder together, like an LED and a resistor
- Lead-free solder that will melt and permanently join the component leads
- Smooth-jawed needle-nose pliers to wrap the component leads and solder together
- Helping hands or other non-flammable gripping apparatus to hold the components steady during soldering
- A thermally-conductive non-flammable tray (such as a non-coated metal cooking sheet) to prevent damage due to misdirected light
- Sunglasses or a welders helmet to protect eyes against the intense light
- A large, clean magnifying glass lens to create the concentrated heat ray

Obtaining a Large Magnifying Glass

Soldering requires considerable energy because solder melts at over 400 degrees Fahrenheit and the metal in the electronics quickly conducts away heat. Therefore, a large amount of sunlight needs to be concentrated in a small area for a long enough period to raise the joint above the melting temperature.

A 5-inch glass lens in a common magnifying desk lamp.

For this experiment, I selected a five-inch diameter biconvex lens taken from a magnifying desk lamp. These types of desk lamps can be found at almost any office supply store for under $100. The lens is usually held in place with a removable snap-on ring.

The greater the lens's surface area, the greater the potential maximum solar power that can be delivered. The magnification of the lens determines the distance at which the light rays converge (the focal point), not the amount of energy or the size of the focal point. The actual minimum size of the focal point is determined by the quality of the lens (aberrations or distortions).

Since the desk lamp contains a large, cheap lens, the quality is not expected to be very good. On average, the smallest-size focal point I could achieve was about 1/4 of an inch in diameter.

Concentrated Light as a Heat Source

If you've ever left a dark object outside on a sunny day, you know how hot it can become. Imagine concentrating the energy from a 5-inch diameter area into a 1/4-inch (0.25-inch) diameter area.

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area of a circle = (diameter² × π)/4
area of a magnifying glass = (5²π)/4 = 19.6 square inches
area of a focal point = (0.25²π)/4 = 0.05 square inches
increase in energy = 19.6/0.05 = 392 times
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Of course, glass absorbs some ultraviolet and isn't 100% transmissive to visible and infrared, but you get the idea.

Certainly the center of the 1/4-inch focal point will have the most intense amount of solar radiation. A better quality lens would further concentrate the energy, which would permit soldering smaller, fine-pitched circuitry. At some diameter, a stand may be necessary to keep the focal point targeted in one spot, rather than jumping around burning everything.

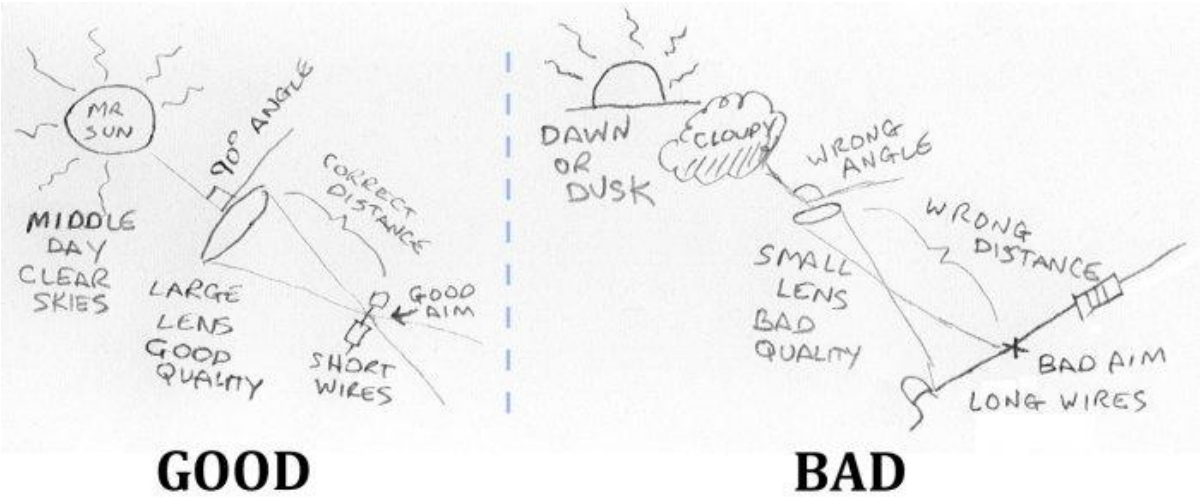
WARNING! This article describes an activity that involves risk of harm to persons and property.

- Playing with a magnifying glass on a sunny day is like playing with matches and fire

- Perform this away from buildings and flammable objects (such as dry grass or leaves)
- Cover the magnifying glass or place out of sunlight when not in use
- Glass lenses can shatter and cause cuts if dropped or mishandled
- Because exact targeting of a light beam is difficult, don't use this technique on expensive or flammable electronics
- Give the target time to cool before handling or connecting to an electrical source
- Keep a fire extinguisher around
- Always have adult supervision

Critical Factors for Solar Soldering

How and when you use the magnifying glass is even more important than the size of the lens.



Left: Multiple supportive factors result in maximum heat delivery. Right: Fail!

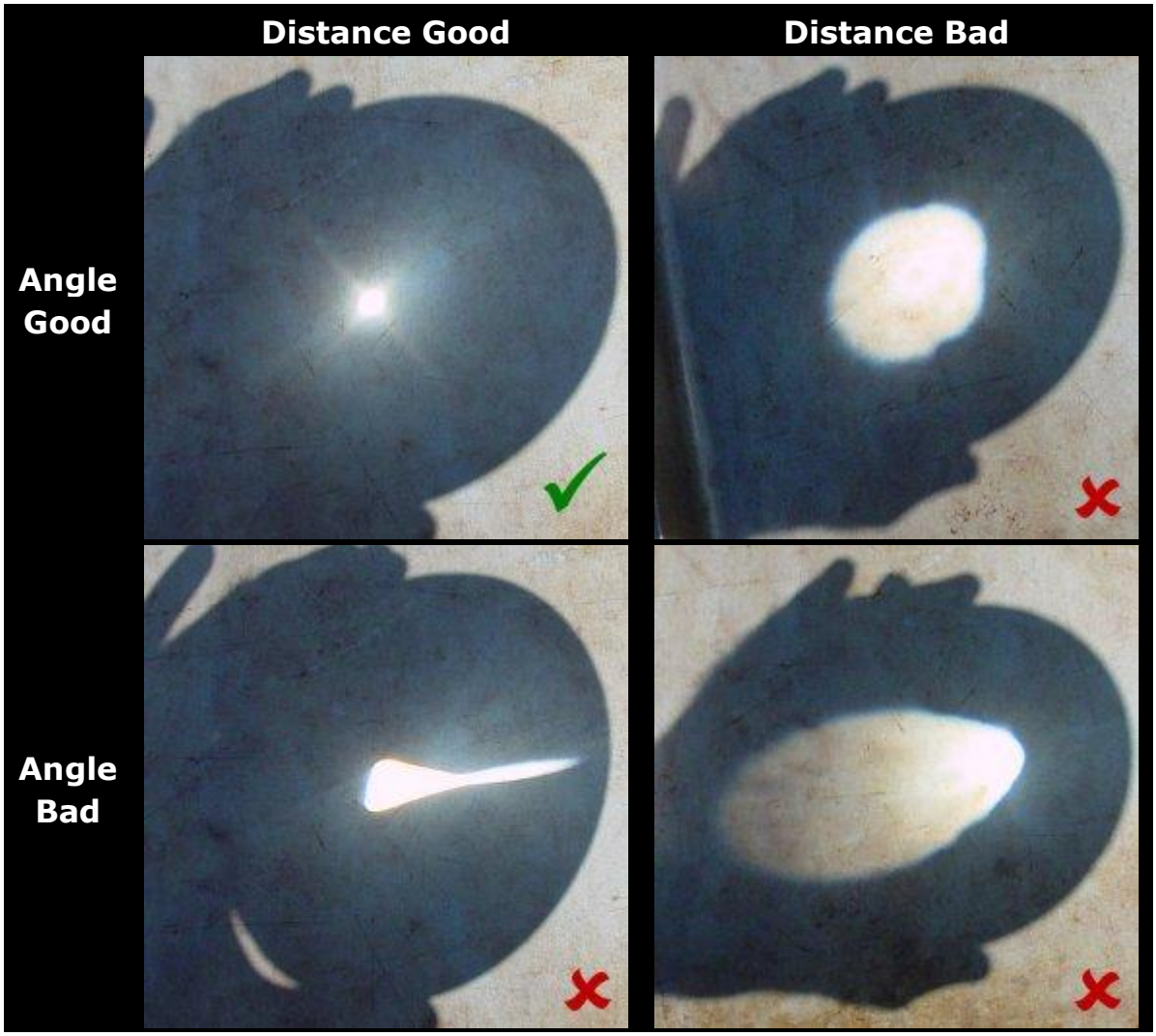
The factors that determine the amount power are:

- Sun overhead (mid-day summer)
- Clear skies. Haze or clouds significantly reduce received energy
- Large lens of reasonable quality
- Lens perpendicular (90 degrees) to sun's rays
- Target at focal point

- Wires or other conductors are as short as possible
- A steady hand (don’t drift away from target)
- Patience (amount of time)

Lens Angle and Distance

Before trying to solder parts, try practicing on a metal or stone surface until you learn how to create the smallest rounded point with the magnifying glass.

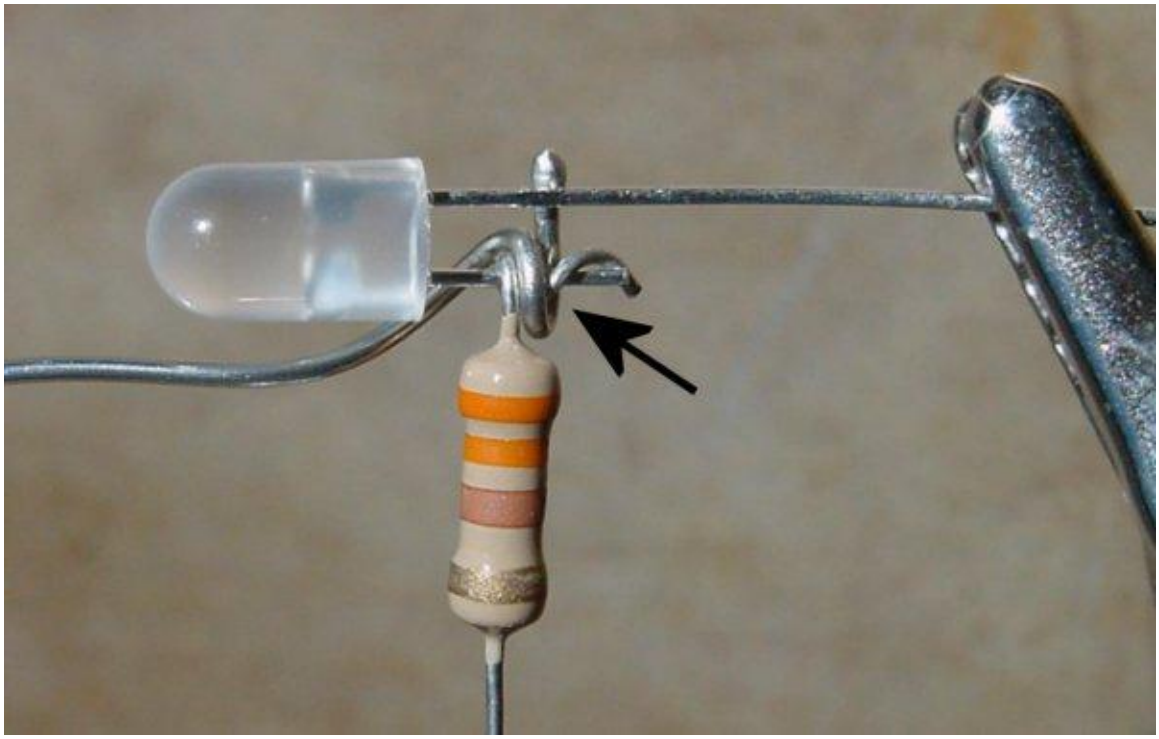


Solar Soldering Technique and Results

Proper manual soldering with a soldering iron requires that the leads of the parts are heated up, and then the solder wire is touched against the leads to melt and

wick into the joint. A weak solder joints occur when a person heats the solder directly with the soldering iron, since the rosin will then clean the soldering iron not the joint, and the solder will then coat the joint instead of penetrating it.

In solar soldering, there is no contact with a foreign metal (soldering iron tip) and the heat source is fairly non-specific (heating an area as large as 1/4 inch). Therefore, it seems acceptable to wrap the leads and the solder wire together and heat up the entire joint simultaneously.



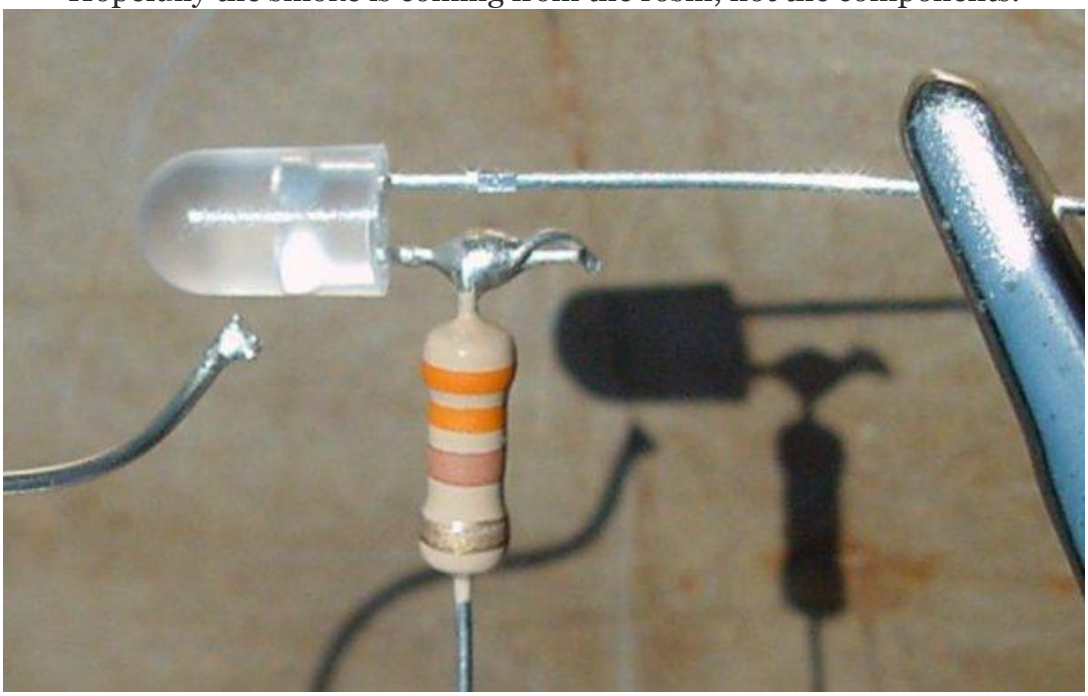
Solder wrapped around intertwined component leads.

To connect a resistor to an LED, the LED and resistor leads are first shortened with snips. Then the leads and solder wire are wrapped around each other with pliers.

Here's the video:

Here is a link to the video of Solar Soldering
http://www.youtube.com/watch?feature=player_embedded&v=lpOGg6oauNA

Hopefully the smoke is coming from the rosin, not the components.



Solder joint formed by solar power.

After fiddling with the lens distance and angle, it took less than 30 seconds to solder this joint. (5 inch lens, 12:30 PM August 31 in Chicago, IL)

Notice above that the solder wire connected to the main spool has melted free. It would have been better if I had cut off the excess solder wire before soldering, as that transported away some of the thermal energy.

The joint is surprisingly good for such a goofy method. The LED works fine.

Closing Thoughts

Theoretically, if you find yourself in a post-apocalyptic world or perhaps in a remote location after a plane crash, and the only way of surviving is to repair a piece of electronic equipment, then you can scrape off some solder from an unnecessary piece and solder parts together using a steady hand and a pair of eyeglasses.

Given a series of lenses and a lot of patience, you might even be able to perform some solar welding. Perhaps not on aluminum or a large steel I-beam, but perhaps on sheet metal or black plastic.

More realistically, it might be a fun challenge to solder together a solar robot using solar energy. The ants thank you.

Homebrew Tilt Tower

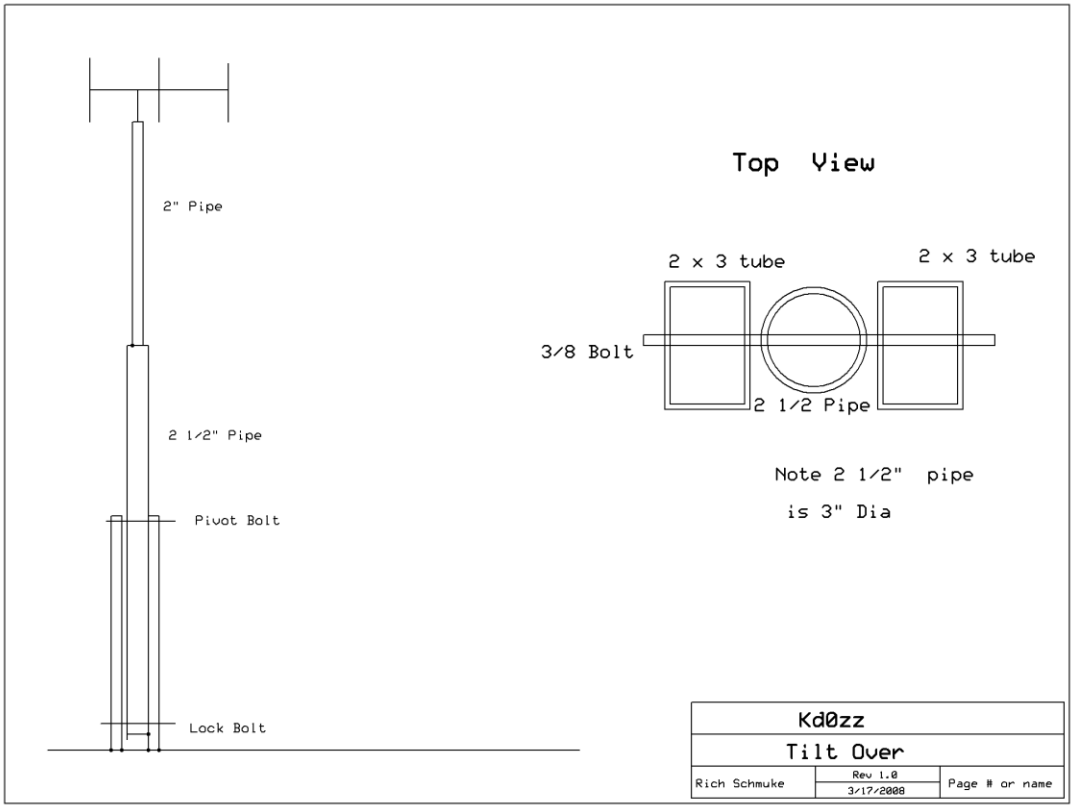
By: Rich - KDØZZ

I made the tilt set up because I can't climb any more. I made a quick drawing. I am no engineer so it is not the best. If I say things you already know forgive me but I don't know your background, so here goes.

Pipe and tube come in 21' length standard at your local store. The rectangular tube is standard 2x3, and this is outside dimensions, pipe is specified as inside so a standard schd 40 2 1/2" pipe is close to 3" outside. I had them cut the 21' tube in two making it 10.5 ft. It cost just a $1 to cut, easier then a hacksaw. The ladder is an 8ft so you can see I have about 2ft of steel in the ground. I drilled the required 3/8 holes, added a little piece of lead I had to the bottom of the pipe for ballast of the 2.5 pipe. It was a good balance until I added the upper pipe. The section above the 2.5 is about 16' of 2" pipe then some 8 ft of 1.5. I had it all from another set up so I used it. On top is a CD45ll rotor and a 3 ele 15m beam and a 2m J-Pole. At the bottom of the rotor is a lanyard to hang my80M delta loop from. This all can get heavy so I hook a come-a-long at the bottom of the 2.5" pipe to raise and lower the antenna. I have a bad back and don't like to dig so I went a little short

on the concrete. I made a hole for 4 concrete blocks. The bottom 2 blocks are off to the side with one hole inline with the bottom of each tube, think of it as one to the north and one to the south. The next two in the middle with part of the 2x3 in each hole. I put some scrap rebar through the blocks. Just think of it as recycling stuff.

I then bolted the 2x3's together with a 3 1/4" wooden block between them top and lower. Put the 2x3's into the concrete blocks, added 5 sacks of concrete. When it set up I removed the wooden blocks added the pipe. This is fine for the high wind loads I get here, if I was going to use a large tri-bander and bigger rotor I would use steel 2x4's and 3 1/2 pipe, then 3" and also deeper hole. 3,1/8th guy wires were added to the 20ft level later because we have very high winds here and small base I used.....Rich , Kd0zz



Coming September 14th & 15th, 2013

Big Brutus Bash
HamOut

Plus the
1st Flight of the 4sqrp SkyHooks

Big Brutus put the oooohs and aaahs in the backyard of the Heartlands!!! Miles before you reach this retired giant — you can see it on the horizon south of West Mineral, Kansas. Standing beside it makes one aware of how fragile he or she is.

The statistics give the hard cold picture —

- Bucyrus Erie model 1850B
- largest electric shovel in the world
- 16 stories tall (160 feet)
- weight 11 million pounds
- boom 150 feet long
- dipper capacity 90 cu. yds (by heaping, 150 tons — enough to fill three railroad cars.)
- maximum speed .22 MPH
- cost $6.5 million (in 1962)

ADMISSION:

Adults	$8.00
Sr. Citizens	$7.50
Child (6-12)	$5.00
Child (5 & under)	FREE

Group Rates Available
RV Parking Available - $15.00/day

For further information contact:

Big Brutus by calling
620-827-6177
Open all year.
Hours vary with Season.
Closed Thanksgiving & Christmas Day

Note: Several 4SQRP'ers are going to be arriving the Friday night before, so if you have the time, please join in the fun! Contact the Big Brutus office for RV parking reservations. Most of us will be self contained for radios, food, water, etc. However, Pittsburg, KS is about 30 minutes drive from the site and there are hotels, food, and shopping.

A 4SQRP Field Day Site

By: Terry – WAØITP

Johnny, Bert and I had a good time at Weston again this year. It was plenty hot on Saturday, but a screen room and big fans helped a lot. We had ~160 CW Q's and felt OK with that. Propagation was poor, very poor on Sat. and a little better Sunday morning. Like lots of guys we quit about 10P and started up agn abt 8A.

We used Bert's HB-1B and also his new TT Argo VI. What a nice rig the VI is, it has excellent audio and very good selectivity. After using Bert's Palm paddle and liking it, I decided I'd try to find a used one. Also going to try to find a used T1, what a nice little tuner.

We used a 40M delta loop in the vertical configuration and a 40M OCFD as an inverted vee. Both worked well on both 40M and 20M. 20M was the more productive band.


Argonaut VI
PWR
SPL
AGC
A/B
BAN
PRE
NR
MOD
RIT
MW
NB
USB
AF
RF
SW
PBT
OFF
CW
T
M
B

Four State QRP Group

Where QRP and homebrew is alive and well!

Four State QRP Group

is now meeting at
the Country Cupboard restaurant in downtown Seneca, Mo.

The Country Cupboard has a nice menu and they have a separate meeting room we can use.

The Country Cupboard restaurant is located in the first block north of the blinker light in downtown Seneca. From Barney's, head north on Cherokee Street (that's the main street of town). Go across the railroad tracks and keep going past the blinker light stop. The restaurant is located at 1038 Cherokee street, on the west side of the street.

Caution: If you are headed north, do not make a left "J turn" into a parking spot. "J turns" are illegal in the downtown area. Keep going north past the restaurant till you reach the residential area north of downtown where a "U turn" is permitted. Make a U turn there (it's a wide street) and come back to the parking in front of the restaurant.

Our group is an informal organization with no officers, no rules, no dues or any other things to get in the way of having fun with QRP.

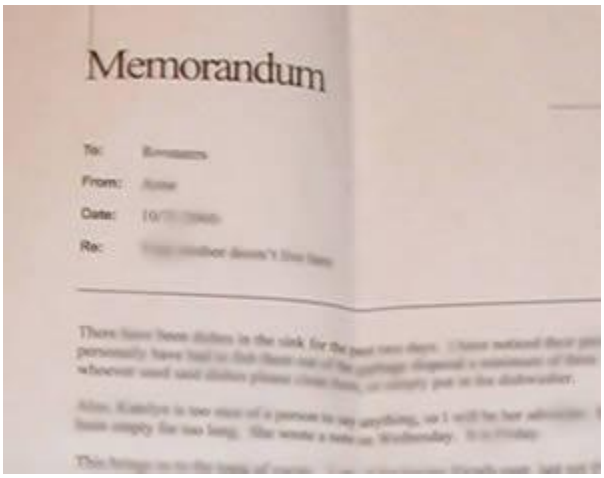
We get-together monthly for lunch and the sharing of ideas and information, parts swapping and just plain fun on our normal third Saturday of a month.

All ham radio amateurs (or prospective hams) are invited to participate.

HAM HIJINKS ***Completely made up, satirical, hilarious, fake ham radio news.*** *Follow us on Twitter: @HamHijinks*

By K5PO, on the scene

QINGZHEN, China; July 19, 2013 — Memos recently leaked from a top amateur radio equipment supplier have left the ham community embarrassed and the company scrambling to escape from a public relations situation run afoul.



This memo exposes the real reason submersible HTs were created.

The memo in question, penned from the ZuTango Radio Company's CEO Zeung Weng, was dated October 13, 2003, and was addressed to about a dozen employees in the Research and Development division.

In the leaked memo, Weng stated he had been attending a few hamfests on a publicity tour for the company in the summer of 2003. Weng was appalled by the poor hygiene of some of the hamfest attendees and remarked, "Some of these guys don't step away from the radio long enough to grab a shower!"

The unkempt amateurs gave Weng a unique idea: building a line of "submersible" dual band handi-talkies to encourage these stinky ops to shower up. Realizing that insinuating that your clients are smelly would not represent the company well, Weng devised a marketing plan to sell the HTs as if they were to be used in fanciful emergency situations.

"We'll show rugged-looking men in outdoor scenarios, sporting search and rescue gear with one of our 'shower-proof HTs' strapped to their orange ARES vest!" Weng said in the memo. "They'll never guess we're really marketing to some folks that could really use the fresh air!"

The research and development division hit the ground running and had the HTs in stores by early 2005. Since then, the line of "shower-proof" or "submersible" HTs has taken the company from a small industry player in 2003 to the world's premier HT manufacturer in 2013.

ZuTango CEO Weng has since resigned over the leaked memo and was quoted as saying that the situation "really stinks" but also quipped that he's got appreciative letters from XYLs across the globe and he "doesn't apologize for his product's improvement in the hobby's rank and foul."
www.hamhijinks.com

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SMOKE CURLS..... by Jeff Davis, KE9V

Five Megs

Most US hams avoid 60 meters like the plague. That's probably due to the many onerous warnings that attend almost any discussion of operating in that slice of spectrum.

For US hams it's a secondary service that's channelized, power restricted and bandwidth limited. There might as well be a big yellow warning sign on the front

lawn of the 60 meter band that says "STAY OUT". And that's really too bad given that 5 mHz provides interesting propagation results that are a curious mix of 40 and 80 meters properties.

I worked a friend of mine this morning on 60 meters who lives just about 100 miles from here. Excellent copy on both ends and compliance with the rules — which means we were barefoot and on frequency. He was using an 80 meter dipole and I was using my 88-foot center fed antenna which works very well on 40, 20 and 15, but it's just about perfect for 60 meters.

Some of **the rules for US hams** on this band were changed in 2012. Just a few of the highlights included:

- The FCC adopted the use of the name "60 meter band", to refer to 5 mHz amateur radio in the frequency range 5330.5-5406.4 kHz, but USA hams are still only allowed to transmit on 5 specific channels in the band.
- The FCC changed the rules to allow: Phone (Upper Sideband), RTTY, Data, and CW; with specific new limitations on the use of these modes.
- General, Advanced, or Amateur Extra Class license only.
- The maximum allowed power level is 100 Watts PEP (ERP) effective radiated power referenced to a half wave dipole. If another type of antenna is used, the station licensee must maintain a record of either the antenna manufacturer's data on the antenna gain or calculations of the antenna gain.
- Upper SideBand Phone, Data, or RTTY transmissions may use dial (VFO) USB suppressed carrier frequency as listed. Transmissions must not exceed the 2.8 kHz bandwidth channel. RTTY modes such as PSK31 must not exceed 60Hz necessary bandwidth. Data modes must not exceed 2.8 kHz bandwidth. CW bandwidth must not exceed 150Hz bandwidth and the CW frequency must be at the center of the channel.

It's hard to say just how valuable this morsel of privilege actually is to the amateur service, especially given that 80 and 40 meters are just a button push away.

But it certainly *feels like* most US hams consider 60 to be more trouble than it's worth.

4 STATE QRP NETS....join the fun!

Comfortable CW Nets [every Wednesday] –

7:00 & 8:00 PM Central time on 3564 KHz.
Net control is Terry, WAØITP in Ottumwa, Iowa.

At ~ 7:30 & 8:30 PM Central time on 7122 KHz (Memorial Day to Veterans Day).

At ~ 7:30 PM Central time on 7122 KHz (Veterans Day to Memorial Day).
and
~ 8:30 PM Central time on 1810 KHz (Veterans Day to Memorial Day).

After the 80 meter net, check out 40 meters on 7122 KHz. The start time is approximate depending when the 80 meter net finishes, and KCØPMH, Wayne Dillon is NCS for the 40M nets.

If we have to QSY a little, lets move up a half KHz at a time until we find a clear spot.

Both of these CW nets are at "comfortable" CW speeds. Slow and rusty fists welcome!

Wednesday Waarble -
We have an informal roundtable session each Wednesday evening throughout the year at 9:00 PM Central time on the 80 meter band (on or near 3580.5 KHz) using PSK-31 mode.
All hams within range of our signals are invited to join the fun. Dick Hammond, N0TGR is the NCS for the psk net.

2nd Sunday SPRINT – 7 to 9 PM CDST, around QRP watering holes, exchange is 4sqrp member number. You may want to also give the other station a RST report so they know how their signal is presented to the Sprint.

Four State QRP Group
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4State QRP 2nd Sunday Sprint

August 11th at 7 to 9 PM (cdst)

any mode and band, except WARC & 60 mtrs, we have an open, no NCS Sprint to keep the keys and mics active and collect the valuable QSO contacts that are needed to achieve the W25 awards.

http://www.4sqrp.com/ActivityRecognition.php

Suggested calling idea is.....CQ 4S....and obtain the station's 4SQRP number for W25 awards. If a non-member, then use their output power.

There is more at stake than the W25 awards, the most QSO contacts station by October 1st, 2013, wins the club callsign WQ5RP for the October 4x4 Sprint. With a massive multiplier attached, this may be the most coveted contact in your logbook for the 4x4 Sprint!

Reporting is easy.....send me an email, before the following Tuesday night, to
Spike55@outlook.com
Put SPRINT in the subject line then in the text body, indicate your number of QSO contacts and what mode.
.....I will compile the total of entries and post them on the club yahoo groups reflector, about Tuesday night!.....72 & GL
.....de K5EST

Share the knowledge and help promote QRP by sending your Articles msWord or compatible, help hints, radio mods, antennas, portable operations, mobile installations, pedestrian mobile, radio reviews, and any non-commercial QRP interest? You do not have to have a complete article; just give me an idea, pictures, etc! Email the "Banner" at **ozarkqrpbanner@gmail.com**

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Editor: Walter Dufrain – K5EST

- Deadline for publications copy is the 25th of each month -

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