The Bilge Pump

The Official Log of the Northwest R/C Ship Modelers

March, 2013

The Winter Doldrums are Over

Dates of interest

March

4th Skagit Meeting

7th Club Meeting

10th Fun Float

April

1st Skagit Meeting

4th Club Meeting

7th Fun Float

Do Something for the Club!

Some of you may have seen the orange orb in the sky recently. It means the Bellevue Pond is open and Fun Floats are fun again. It is time to begin planning your participation schedule and adding it to the family calendar and calling Bob Jacobsen to ask what you can do to help.

There is only a little over two months until the club regatta and there are many things which will need your participation. Early planning not only makes the job easier but also makes the regatta run more smoothly. Trophies have to be ordered, raffle prizes requested, courses designed and most importantly, food decided upon. It is not a one man job, give Bob a call.

Our meetings have been well attended and Bob is keeping them interesting and informative. April's show and tell is unique, read ***From the Bridge*** to learn about it. The information presented by our two members, this last month, was most interesting and shows the ability that lies beneath the mild mannered men we drink coffee with at different times. Many of us have the same ability and could add much to the make up of our meetings. Give it and think of something some thought see if you haven't a subject we all would like to know about.

Our Skagit members would like you to know about their next meeting, in Mt. Vernon. They are having a pot luck/swap meet and we are all invited. Read the invite and the rules elsewhere in this newsletter.

We are off to a great year!

In this issue:

View From The Bridge – Bob Jacobsen

Just a few days ago the sun came out - it was a beautiful day and spring fever hit me in an instant! I mowed the lawn but what I really wanted to do was throw a boat in the lake and run it around!! I hope you are all getting spring fever too. Now is the time to pull down the boats, blow off the dust, repair the things you know need fixing and get ready for a fun year. Plus it is always more fun to run in a group, so get ready!

The March meeting was a blast and very educational. Thanks to Dr. Ron & Robert Osmond for the special presentations. Those were great plus we had some outstanding show and tells. One of the questions that came up in the meeting was about the website. I know it's behind but a plan is in the works to get it back up to speed and then completely update it. Lee Stewart (who does a great job on our newsletter) has volunteered to take on this task. It is a big job so please be patient, but we should all be seeing some results soon.

For the April meeting we are going to have a special category again. Last time it was your oldest project and this time it will be your BEST display stand. You might think it is a bit weird but a really good display stand can really make the boat (and impress the judges), so be prepared to bring out your favorite. I wanted to give you all a heads up early, in case your best stand right now is a cardboard box, so you can get to work.

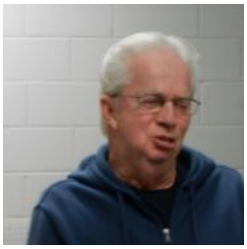
My e-mail is bobandlaurie@nwlink.net and my cell phone is 206-790-2367. Your input and ideas are always welcome, and remember keep the side with the bottom down.

Bob

MARCH MEETING MINUTES by Ron Bray

Our master in command, **Bob Jacobsen**, called the meeting to order at 1905. A great turn out of old and new members attended. Bob introduced his son **Mark** and his wife **Wendy**. Mark is a major in the USAF and is currently stationed at Travis AF base. It

was great to see our missing members – **Lonnie Butler**, **Barry Bertran** and **Terry Hufnagel**. Terry brought **Bruce Olson** as a guest who plans to join the club and switch from building airplanes to boats. **Richard Kruger** joined last summer and made the trip down from Bellingham despite the rain. **John Pauly** is our newest member who became fascinated with the Southampton tug, which he saw at Expo, and joined the club shortly thereafter. He has finished modifying his tug and plans to christen it at the fun float this Sunday.



Bob presented our past president, **Lee Stewart**, with a plaque for his past services to the club. Lee was also recognized for formatting our monthly

newsletter and for volunteering to tackle the job of continuing our web site.

There was little in the way of new business except for announcing the fun float this Sunday at the Bellevue pond. **Al Kinsman** said he was informed by **Mel Suelzle** that there will be a model boat event in Spokane on July 25th, but it probably won't be called the Tidewater cup. Bob promoted the 10 o'clock coffee and donut get together at Galaxy every Thursday to discuss building techniques, problems and just plain yak yak. He also mentioned **Gordy Canney's** coffee and cookie klatch on Mondays at his home at 9:15 AM.

A presentation on resistance soldering and techniques for constructing railings and ladders was provided by **Dr. Ron Bray**. A handout was provided but this will also be in the newsletter for those who were unable to attend. Following the break **Robert Osmond** presented a discussion on every way possible to make holes and demonstrated the tools to do the job. He also passed out a chart providing the

numbers, gauges and metrics for drill sizes which he obtained from Tacoma Screw.

Cliff Elowson started the show and tell by showing his modification of

the small cut off saw allowing one to cut repeated and precise lengths of materials by way of a sliding fence held in place by a clamp. Robert Osmond demonstrated the

many modifications he hade to the superstructure of his Southampton tug. **Lonnie Butler** brought a Dumas barrel back runabout kit he has had on the shelf for seven years and offered it for sale since he already has several other unfinished projects in the pipeline. He also queried how to convert his Nautical Commander radio to 2.4 ghz.

Dr. Ron discussed his build of the ***Nanuq*** tug, which **Leif Bentzen** won at the Foss Cup Raffle and donated to him. The merits of the Nautical Commander radio was lauded and the functions on the ***Nanuq*** were demonstrated.

Phil Northrup showed the pewter captain and ships wheel he purchased at a garage sale. **Tom Stevens** displayed some large fenders which were made by **Amie** after Tom produced the plug from balsa. He plans to use them on his *Tolly* and Unaflite box boat.

Barry Bertran has been working on his Jack Spore ***Shelly Foss*** tug and plans to motorize the tow winch. The anchor winch is operational as well as the radar and lights in the superstructure he cannibalized from his Atlantic tug. He plans to purchase a sound system and to coordinate movement of the ships wheel in the wheelhouse to turn as the rudder moves

After raffle prizes were awarded the meeting concluded at 2045. Another great meeting orchestrated by Bob Jacobsen.

RESISTANCE SOLDERING

By Ron Bray

Stemming from the jewelry industry some 20-30 years ago the application of resistance soldering to industrial uses, especially in the field of electronics, has eventually found its way to the hobby industry. Resistance soldering has the advantage of creating intense heat directly and rapidly within a joint area in a tightly controlled manner. This faster ramp up minimizes thermal travel away from the solder joint and therefore potential damage to materials or components in the surrounding areas. The process is much more energy efficient due to its rapidity, negating the necessity of a soldering gun or iron to reach operating temperature and prolonged contact to bring the joint temperature up to the point where solder melts. In addition, most hand pieces are lighter and cooler, thus reducing the possibility of burn injury.

The fundamentals are similar to those required of traditional soldering. The materials to be joined need to be prepped and cleaned to remove high resistance materials such as grease, paint, oxidation, etc. and fluxed if using solid core solder. The joint must not be subject to movement before the solder solidifies to prevent a weak or cold joint.
Heat generated to melt the solder is based on ohm's law (V=IR). Heat generated is expressed in watts, (W=VI). Thus the flow of current through the resistance of the joint supplies enough heat to melt the solder. A transformer is necessary to drop the line voltage of 120 volts to a few volts. A couple of devices are available from Micro Mark. The Triton supplies 17 amps at 6.5 volts or 110 watts on the high setting and the American Beauty has an adjustable voltage source supplying up to 250 watts. Carbon electrodes are employed because they have good electrical conductivity, good thermal conductivity, good mechanical strength and are chemically inert so as not to adhere to the soldered materials.

Making Holes

1. There are several ways of making the holes we need in our hobby. There are manufactured twist type drill bits, countersink type drill bits, broaches, punches and small pointed files.
    a. The twist drills are what most people have at their house, usually in sizes that are fractions of an inch ¼", ½" 1" etc.
        i. In the industrial world these drills actually come in several measurement systems. These systems are:
            1. Fractions of an inch.
            2. Wire sizes typically #80 to #1 which is a little less than a ¼" in diameter.
            3. Alphabetic sizes A to Z
            4. Metric .
        ii. Positive point about these bits, they will drill as deep a hole as the length of the drill bit, which could be 14" plus for an aircraft type drill. These long drills are great for drilling a long hole for a stuffing box for a boats prop shaft to run inside of.
        iii. Negative point about these bits, they tend to jerk and pull through as they start emerging from the back side of material, and can try to tear the side of the hole in soft material like plastic.
    b. There are Unibits which are conical drills which usually have from 10 to 14 different sizes on the same bit.
        i. Positive point about these bits will not grab material and try to tear out the hole as they come through the other side of the material.
    c. Countersinks will always make a hole with tapered sides which might or might not work for the location you want a hole. Unless they have just 1 cutting face or 5 cutting faces they tend to not make a precise smooth hole.
        i. Negative point about these bits they will only make a hole through material a little over an 1/8" thick before the bit begins to drill the next size up.
    d. Made for plastic drill bits, these usually only come in fractions of an inch sizes and have a special long taper to the drill tip to help make a better hole. Other than that they are a typical twist drill bit.
    e. Broaches are very tapered fine long hard cutting tools typically used by jewelers to make slight enlargements in holes.
    f. Fine small pointed files can be turned to hand drill a hole if you do not have the proper size bit.
2. Punches can punch a hole, but you need something backing up the material and a hammer to hit the punch to make a hole with a punch. This is good for flat material before it has been made into something

When drilling in plastic heat buildup can be a big problem drill slowly without a lot of pressure. For thick material stop and let the material cool several times, if you don't you could melt styrene and make a

wobbly hole. In acrylic and polycarbonate plastic the material can melt and then grab the drill bit and the material will start turning or you could break a small drill bit.

Determining what size hole you want

1. Decimal Equivilent Drill Chart
2. Drill gauges
3. Vernier Caliper

ANNOUNCEMENT FROM THE SKAGIT GROUP

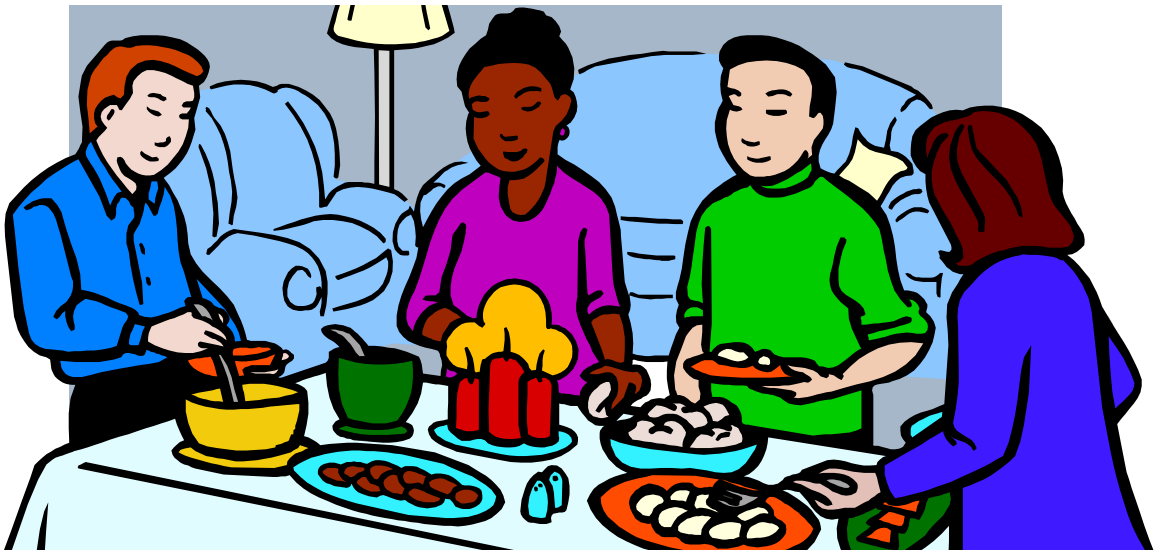
2nd Annual Pot Luck—Swap Meet April 1, 2013 7:00 P.M

This is the first big meeting of the spring and time to clean out the shop/closet and make room for more with the Skagit's annual meeting/swap meet/pot luck.

No charge for a space to sell or swap old projects, tools, supplies or other hobby related items while enjoying the gathering of friends and good food for a different kind of meeting.

This is no April Fools joke unless you miss this fun evening.

Open to all who would like to attend. Just bring a favorite dish to share with others and your own drink and enjoy the opportunity to find "new" from someone else's "old".



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SATURDAY MAY 25, 2013
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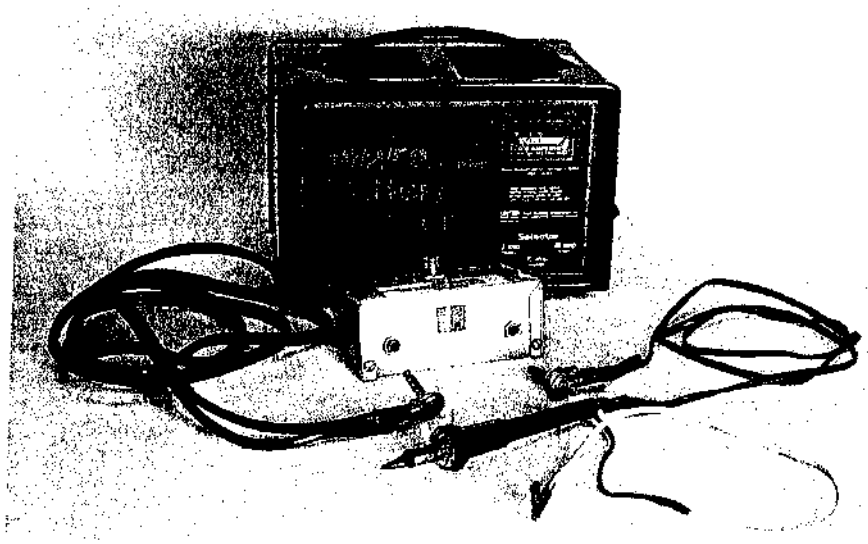
Build your own resistance soldere

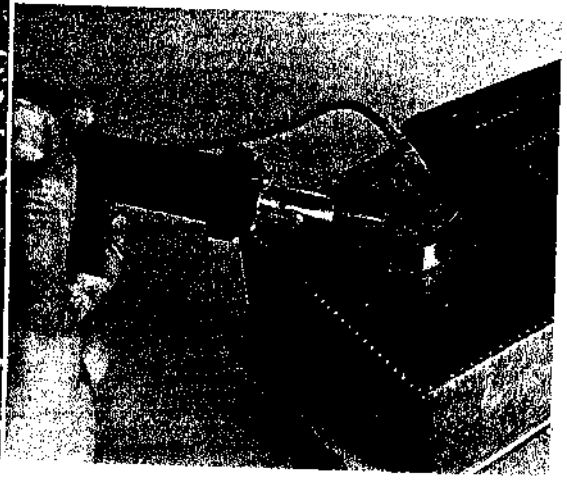
Great results for minimal investment

by Vance Bass | Albuquerque, New Mexico
Photos by the author



The three components of a resistance s
the power supply (in this case, a batte
the foot switch, and the handpiece, or

If you're like me, you don't solder things unless you absolutely have to. The little hassles add up: plug in the iron, wait (and wait!) for it to heat up, and wait some more while your work piece warms up. Watch out for the hot iron while you're readying the next joint! And when you're done, wait some more for the iron to cool down. It's too much work for a small job, so I put it off until there's no avoiding it. But there is a better way, both for small jobs and for more complex ones..I'll show you how to get over your resistance to soldering by building your own resistance-soldering unit.



Delicate jobs, like soldering the handle onto this brass tender lid, cannot be done with a soldering gun or torch.

What is a resistance solderer?

A resistance-soldering unit is similar to the familiar soldering pencil or gun, in that it uses a resistive metal to convert electricity into heat, permitting you to apply the heat at a specific point. It differs from the conventional soldering gun in that the piece to be soldered provides much of the electrical resistance. Thus, you are heating the work internally, insuring that the metal is the right temperature to make a strong solder joint. Additionally, since the heat is developed only where you want to solder, you don't have to worry about wasting time heating a larger area and perhaps having some of your previous efforts come loose from the spread of the heat.

A resistance solderer also differs in that the heating of the material is practically instantaneous, especially on smaller parts. You step on the foot switch and the work piece is heated to working temperature

MATERIALS LIST

- **Automobile battery charg**
12V DC, switchable ampera
desirable (typically 2A, 5A,
Cost: around $50. **Alternati**
12V or 24V transformer rate
10A or 5A respectively, or e
6V transformer rated at 20A
thing that will produce arou
120 watts of power.
- **Soldering pencil.** A 20W
30W iron from a radio or ho
shop. Cost: around $5.
Alternative: If you have a la
you can use a wooden dowe
drilling out the center to acc
carbon rod and wires.
- 1/4" **carbon rod.** The easie
place to find these would be
welding-supply store. (Make
you get the hard kind.) You
also find them in the core of
certain carbon batteries, but
chemicals that surround the
are noxious and require care
disposal. Cost: $20/box of
50.**Alternative:** metal electro
from PBL or Micro Mark.
- **Aluminum project box**
- **5A push-button switch**
- **Heavy-duty electrical cord**
- **Computer-power-supply pl**
or guitar-cord plugs/jacks (2
Available at radio shops. Cost
around $15.
- **Wire stripper, solder, flux,**
soldering iron. You should al
have these in your toolbox. If
cost: around $15.

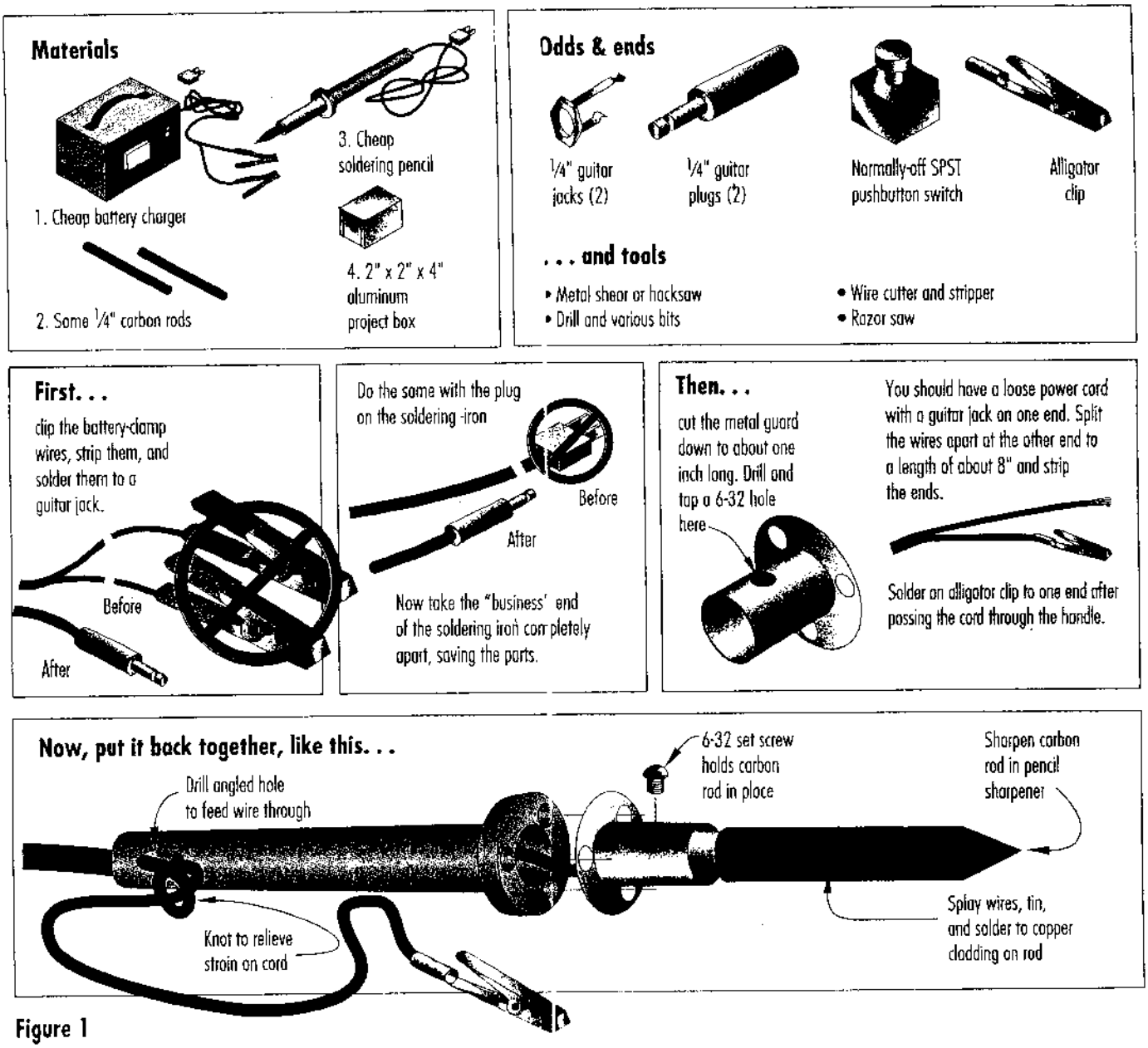


Figure 1

in a second or two. When you release the switch, the solderer's tip is almost immediately cool to the touch. Only a small portion of the soldered piece got hot, so it cools more quickly, too.

This removed almost all of the obstacles of conventional soldering for me. No waiting for the iron to heat up, no waiting for the work to take the heat, no worries about burning my shirt sleeve or the workbench top, no waiting for the iron to cool. And of course, you're wasting less electricity on all that unused and unproductive heat.

What's the cost?

If you have read this far, I have probably addressed some of your irritations now you're wondering, "Where do I get one of these wonderful things, and what's it going to cost me?" You have two choices: buy or build. You can buy excellent units from PBL, MicroMark, and other well-known hobby suppliers. They are fairly expensive (typically around $250-$300), but they are of high quality and will last a lifetime—a worthwhile investment according to those who own one.

Or, you can build your own for a fraction of the cost. It won't look as polished, perhaps, but it will do the same job. (Your trackwork uses the same voltages and amperages as the solderer, by the way, so don't worry too much about safety. If you use common electrical pre-

simple homemade solderer, you can solder wiring joints or attach brass detail parts in seconds. A unit like this will not be suitable for soldering really large pieces like 1:20-scale brass-locomotive cabs or boilers, however. For that, you'll still need to use a torch. But it will replace your soldering iron for most jobs and will let you do many things impossible to do with an iron.

Construction made simple

Hobbyists have circulated plans for building resistance solderers for years, and the *Narrow Gauge and Short Line Gazette* published an article in 1981 showing a unit constructed from a power transformer, a wooden dowel, and a cheap

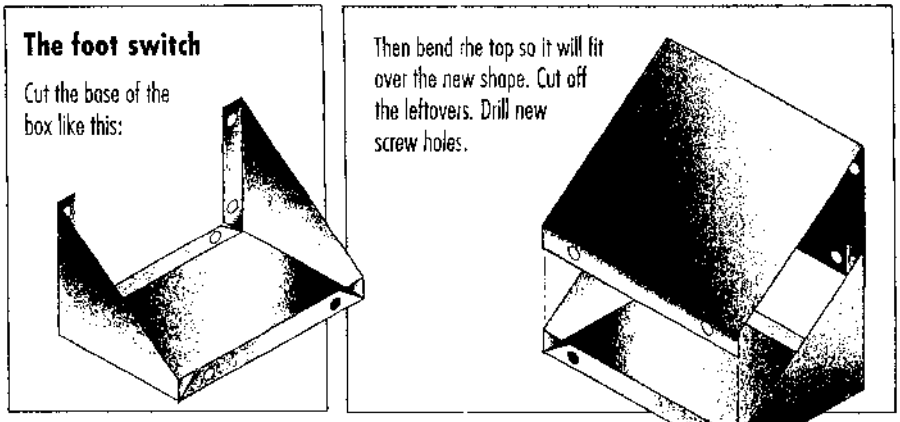


Figure 2

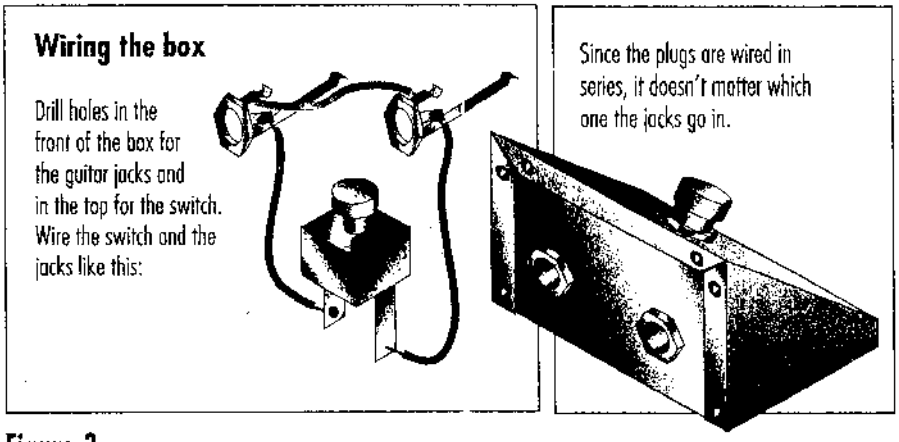
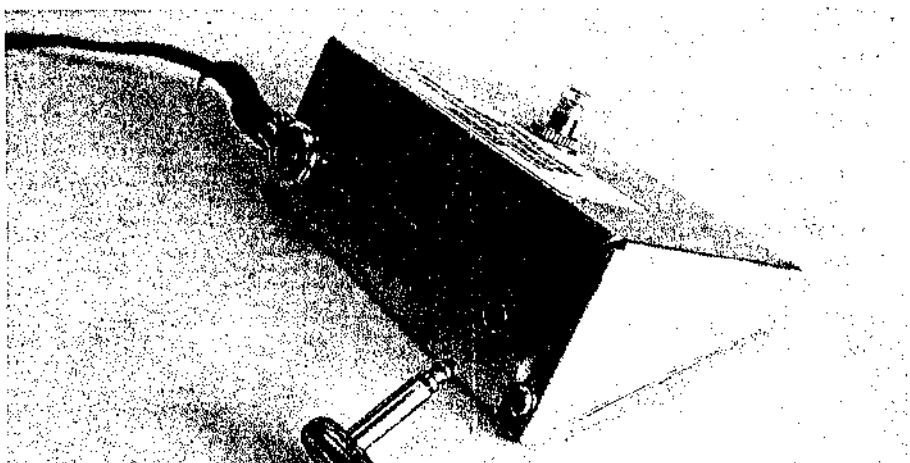


Figure 3

project for the faint-hearted, however. There is a safe and simple alternative, though, and the resistance solderer is now an item every workshop can (and should) have.

To simplify the construction, we're going to use commercially available products and modify them somewhat so they can be combined to form a resistance solderer. The materials list on page 74 tells what items you will need to build a basic unit. You can substitute equivalent parts wherever you wish. (That old Lionel ZW transformer in your attic would make a good power supply, for example.) Construction should take only a couple of hours once you have the materials at hand.

The resistance solderer I'll describe consists of three main pieces: the power source, the foot switch, and the electrode (see lead photo). You may also add a voltage controller if you wish, made from a household light-dimmer switch.



The power source for your so
an automobile-battery charge
chargers produce 12 volts of di
rent (12V DC) at between 2 and
(2-20A). Most people who have
of these units recommend 5A as
mum. If you want to compare
your conventional soldering ir
can calculate the wattage by mu
the voltage times the amperage
DC, 5A unit consumes 60W. Th
to say that a resistance solderer
the same heat as a 60W solder
however. Since the heat is genera
at the spot you want to solder,
will radiate into the air, so you
using less wattage to do the same
small parts, you have to be fast
on/off switch, even at 2A, or yo
your part red-hot!

A foot switch permits you to
the flow of electricity from th
source to the electrode. The box
the foot switch has ¼" jacks bui
into which the cords from th
source and the electrode are
These are standard musical-co
and plugs (see photo).

The electrode consists of a
handle holding a carbon rod. (T
die could also be made of wood
insulating material.) A heavy,
cord connects the electrode to
switch. One wire of the cord is
to the carbon rod, while the oth
loose, with an alligator clip att
the end. The smallest package o
rods I found was a box of 50. Y
really need all 50 (I still have
box), so try to find some friends
a box, or ask the welding-supp
to sell you just one or two. If y
to buy the entire box, though,
ber that you're still saving a lot
ing it yourself.

Putting it all together

First, modify the battery ch
cutting the terminal clips off of
tery cable. Strip the wires and so
of them into one of the guitar plu
may be a tight fit—be sure you
the clearances in the plug's sh
you solder the wires.) That comp
power source!

Next, make the electrode har
apart the soldering pencil and d
the cord from the heating tip.

The foot switch allows you to control the
while leaving both hands free. One plug
to the power supply while the other is a

plug off the cord, separate the wires on one end of the cord for about 6", then strip both wires about 1/4". Strip the other end of the wires and solder them into the other guitar plug. Drill a 1/8" hole, about 1/2" from the bottom end of the handle, then gently angle the drill, while it is still running, up towards the top (the hot end) end of the handle, giving the hole an angle of about 45 degrees (fig. 1). This will simplify moving the ground wire through it later.

With a metal saw (hobby or hacksaw), cut the metal mounting barrel to leave about 1" above the base. Drill a 1/8" hole through the side of the barrel and thread it for a 6-32 machine screw. (This screw is a set screw, and its dimensions are not critical—use whatever is available that will hold the carbon rod in place.) The rod can be sharpened to a fine point in an ordinary pencil sharpener. The fine point will permit you to focus the heat right where you need it.

Connect all the pieces of the electrode: thread the cord into the back end of the handle. Push one of the wires through the angled hole, and move the other all the way through the handle and out the other end. Solder the lower wire onto the alligator clip, and tie a knot in it to keep if from falling out the bottom of the handle. Connect the wire on the upper end to the carbon rod. If your carbon rod is plated with copper, the wires can simply be soldered onto the copper coat. Otherwise, you'll have to devise something that will transmit the electricity to the rod and still permit changing it should it break. It's possible to use telescoping brass tubing to adapt the rod to the handle. Winding ten or twelve turns of thin copper wire around the rod also would provide a good place to connect the power wire; this can then be clamped firmly by the set screw for positive contact at all times.

Finally, you'll need a foot switch to control the power and leave both your hands free to work. Use heavy-duty components in this part, or you'll find yourself rebuilding it after the switch or the wires melt from the high amperage. Take a 2" x 2" x 4" aluminum project box (a two-part box for electronics projects) and cut the sides of the half with the screw-hole flanges at a 45-degree angle with your hacksaw or hobby saw. Flatten out

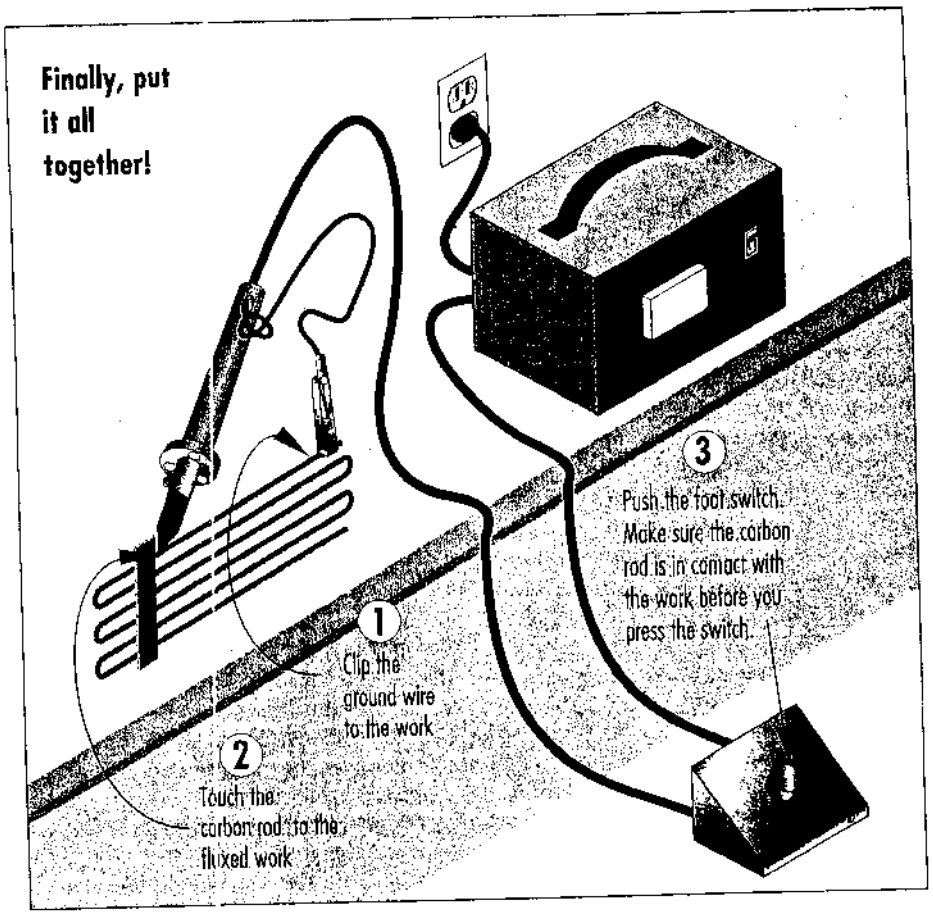
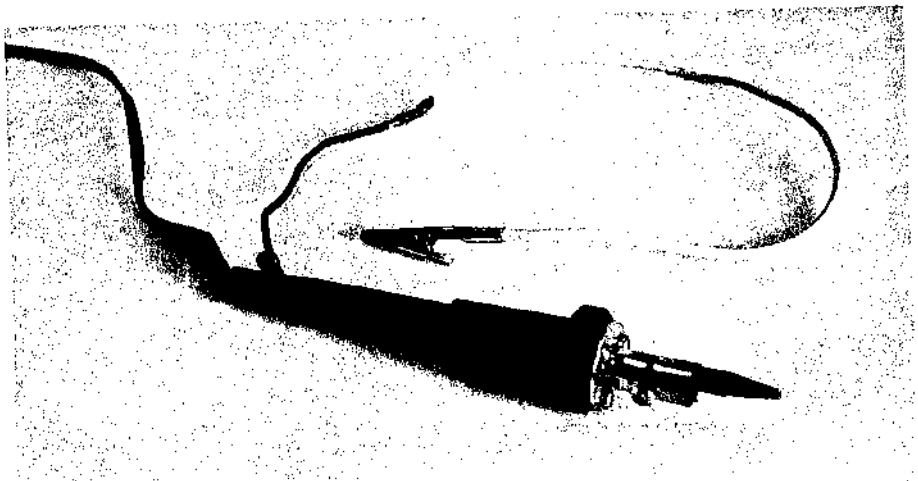


Figure 4

one bend in the other half, cut off the excess metal, bend a new edge, and drill new holes for the screws (fig. 2). This will give you a box with an angle that will allow you to reach the switch easily with your foot.

Drill three holes in the box: one in the top and two on the front. Measure the depth of the switch you're using and position the top hole to ensure the switch will clear the bottom of the box when mounted. Mount the two 1/4" jacks in the two holes on the front side. Using a heavy-gauge wire (heavier than household extension cord wire—look for it at the hardware store), connect the plugs and switches so that the ground connections of both plugs are directly wired to each other (the aluminum box also carries the ground). Solder the two connectors on the switch to each of the remaining connectors on the two jacks (fig. 3). Screw the box together and your solderer is finished!



The electrode is made from an inexpensive soldering pencil, a carbon rod, and an alligator clip. The carbon

Building Your Own Carbon-Rod Resistance Soldering Unit

by Bruce Eaton
Photos by the author

I was introduced to resistance soldering by Bill Peter of PBL. Bill made it look so simple I bought one of his units and started experimenting. I still have a lot to learn but I do know that many soldering operations are easier and faster using resistance soldering. In this article Bruce Eaton describes how to make your own resistance soldering unit. If you do not want to build your own unit then contact PBL, Box 749, Chama, NM 87520 or Bob's Brass, P.O. Box 884, Baltimore, MD 21203 for comercially available units. Bob Brown.

Awhile back I borrowed a spot welder and used it to do some work. By the time I had to return the welder I was hooked on resistance soldering and decided I had to have a system of my own. It had to be both inexpensive and adjustable for model work since sending too much current through a small part can vaporize it. I decided that the best way to cut costs was to design and build my own resistance soldering outfit using parts I had on hand or could easily obtain second hand at my local surplus store. The design I came up with has the advantage that you don't have to have parts just like the ones I used. You can adjust the design for parts you have or can find in your area.

Here's a list of the parts needed:

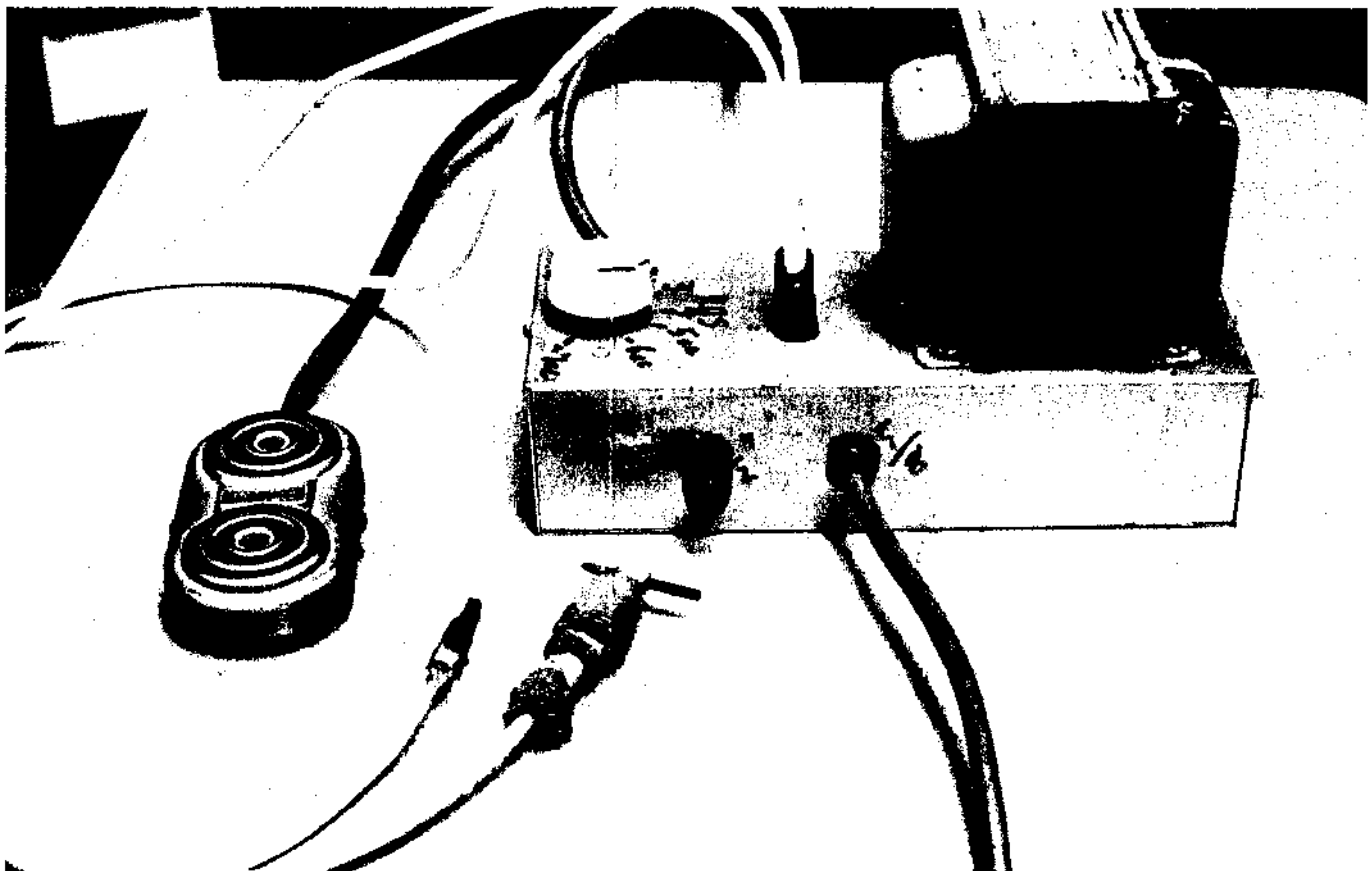
A step down transformer
A circuit breaker or fuse
An incandescent light dimmer
A foot switch
Alligator and crocodile clips
Resistance Rods
Heavy gauge flexible wire
A box to put the parts in and on and some banana plugs and miscellaneous screws, nuts, and bolts.

The schematic shows how these parts are wired together to make my unit. The unit itself is shown in the photo. If you have any experience with electrical design or repair you should be able to create your own resistance unit from parts you have or can easily get just by studying the schematic and checking out the photo. I have included here some notes on the construction of my unit which should get you off to a good start. If you don't feel comfortable about building your own unit several excellent ones are available commercially.

The central item in my unit is the transformer. This can be any step down transformer with an output between five and ten volts capable of handling currents from ten to 30 amps. On the input side of the transformer is the 115 volt line voltage standard in the U.S.A. This is labelled the primary side in my schematic and contains the fuse, the foot-switch and the ordinary incandescent light dimmer which I used to make my unit adjustable. On the secondary (output) side of the transformer are the flexible wires and clips which are the "business" end of the unit.

It would be safest to put the fuse or circuit breaker in the primary circuit. I had some small fuses in a junk box so instead of putting a large fuse on the secondary side of the transformer where the current would be 30 amps, I put a smaller fuse on the primary side. The fuse value can be calculated as follows. The maximum output was about 30 amps at 8 volts and the input voltage maximum was just the 115 volt line voltage. Since the power (current times voltage) has to be the same on both sides of the transformer we can solve for the maximum primary current: (8/115)30

The completed soldering rig. The surplus foot switch actually had two switches so I wired them in parallel so it would go on no matter which side was hit.



= 2 amps). Thus a 2 amp fuse in the primary served the same purpose as a 30 amp fuse in the secondary.

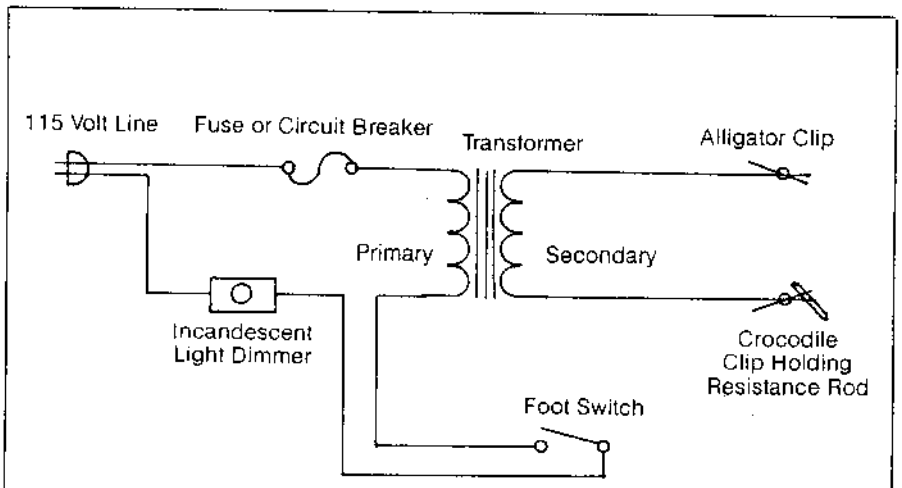
In order to have a variable output I used an ordinary incandescent light dimmer on the primary side of the transformer with a foot-switch. A foot-switch is not only desirable – it is really necessary. You *must* turn off the current before you remove the carbon from the part being soldered, otherwise you will have arcing. This will, at best, pit your part and, at worst, vaporize it. The foot-switch allows you to control the current without moving your hands. Parts can thus be held in place until the solder sets. The foot switch should be in the primary circuit because the current being switched is much less than in the secondary side.

Many craftsmen extol the virtues of tweezers and suggest either how to make them or where to purchase them. I prefer the single carbon rod technique. On the end of one wire I have an alligator clip, and on the end of the other wire I have a large crocodile clip. The crocodile clip is for holding the resistance rod while the alligator clip just clips on the part at a convenient spot to close the circuit.

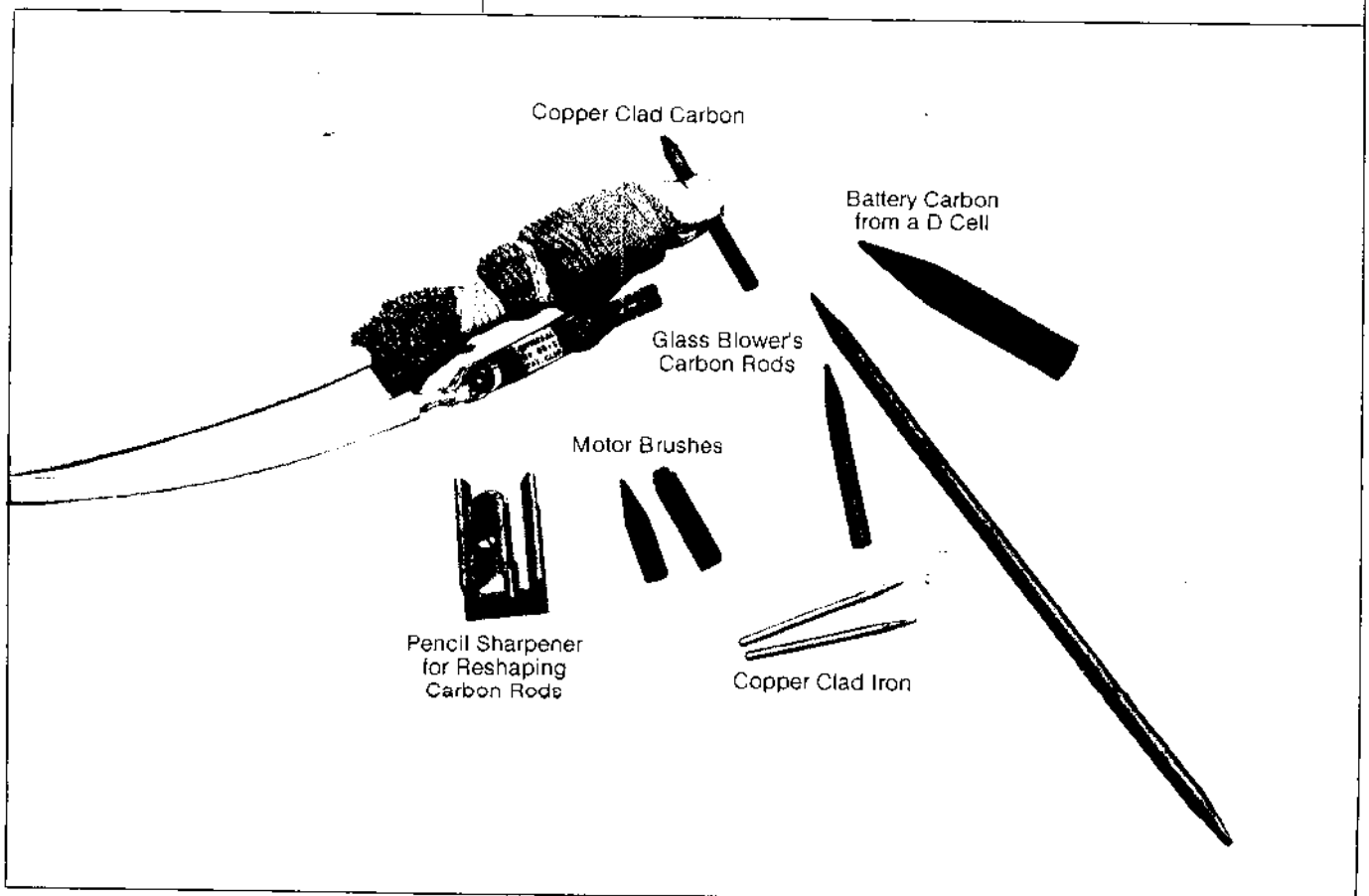
I have used a variety of materials for resistance rods including copper-clad arc rod, small electric motor brushes (filed to the appropriate shape), center carbons from used batteries (these smoke for a while), and small glassblower's graphite rods which are my favorite. These are smaller than the arc rods and have a finer, more even texture. The carbon rods will occasionally have to be reshaped and cleaned which can be accomplished with a pencil sharpener, a file or a steel brush.

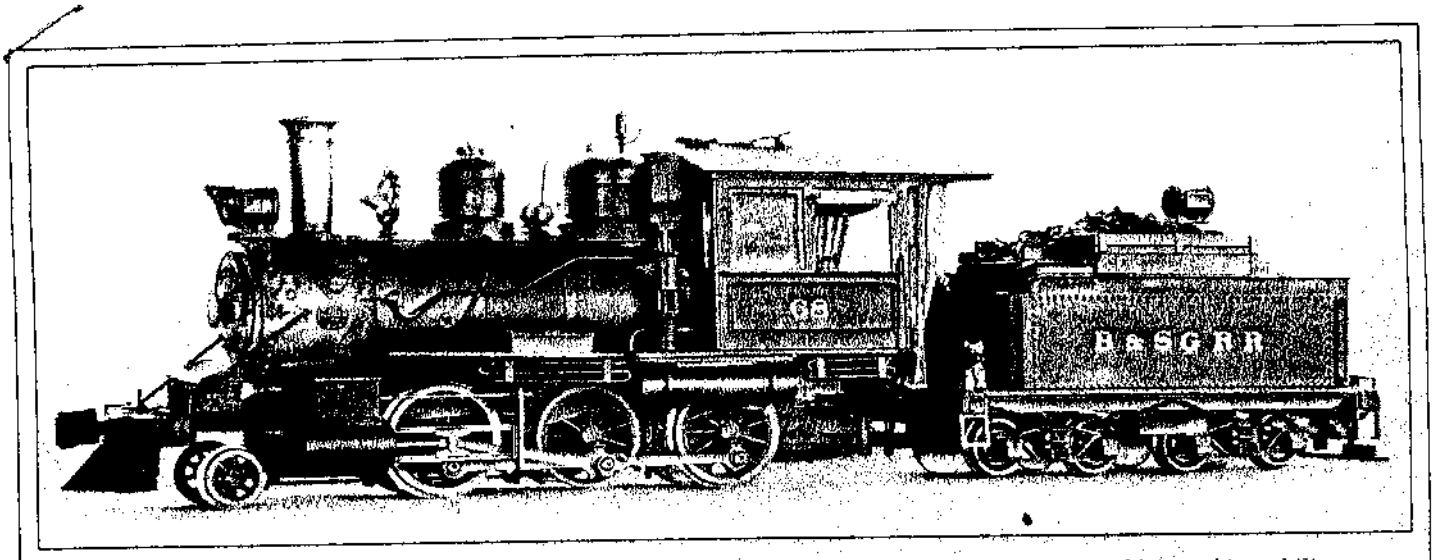
For really small jobs I occasionally use a copper-clad iron rod which is sold with a soldering tweezer set. This set is marketed by PBL, Box 740, Chama, NM 87520 and by Jensen Tools, 1230 South Priest Dr., P.O. Box 22030, Tempe AZ 85282.Replacement tips may be purchased from these sources.

Use heavy gauge, flexible wire for the output. I have found that a small bit of cloth tied around the crocodile clip keeps me from burning my fingers. Experiment on scrap pieces before you attack that brass model you have stored in the vault. Use a permanent-type marker to indicate convenient settings of the light dimmer knob for different size jobs. I use paste solders with resistance soldering and have found both the Sears and Swift solder-flux mixtures satisfactory. Please remember that you should box your unit and be very careful in wiring and assembling this device to protect yourself from a shock.



Schematic for an inexpensive resistance soldering rig.





This 2-6-0 began life as a Bachmann 4-6-0. It was much modified by the Author, who vastly improved its smoking ability.

Stretching the Smoke

Improving smoke-unit performance

by Bob Baxter
Santa Ana, California
Photo by the Author

I AM A MEMBER of the Del Oro Pacific Large Scale Modular Railroad Club in Southern California. My trains sometimes run around and around the club's layout for hours, so adding smoke fluid is a constant chore that detracts from the fun of playing with the trains.

One of my locomotives is a Bachmann "Plus" Ten-wheeler (converted to a Mogul) that came equipped with Bachmann's usual smoke generator. This works well at full speed, but leaves a lot to be desired at scale speeds. So this loco provided me with two challenges: to make smoke at lower speeds and to run longer between fill-ups.

THE SMOKE UNIT

A good friend and fellow club member, Dave Bozarth, has been experimenting with smoke-fluid reservoirs in some of his creations for awhile, so I joined the research team. Dave's first suggestion was to convert the loco to a Seuthe smoke unit, available at your local big-train store. This is the same kind of unit found in LGB locos. It can be easily installed in Bachmann locos by drilling out the stack. I use the 6V version of the Seuthe unit. To control the voltage, I use a simple voltage regulator made from Radio Shack components. This regulator (see figure 1) produces 5V but still produces plenty of smoke. A slightly more complicated voltage regulator can be made that will provide 7V and produce more smoke, but will probably shorten the life of the smoke generator.

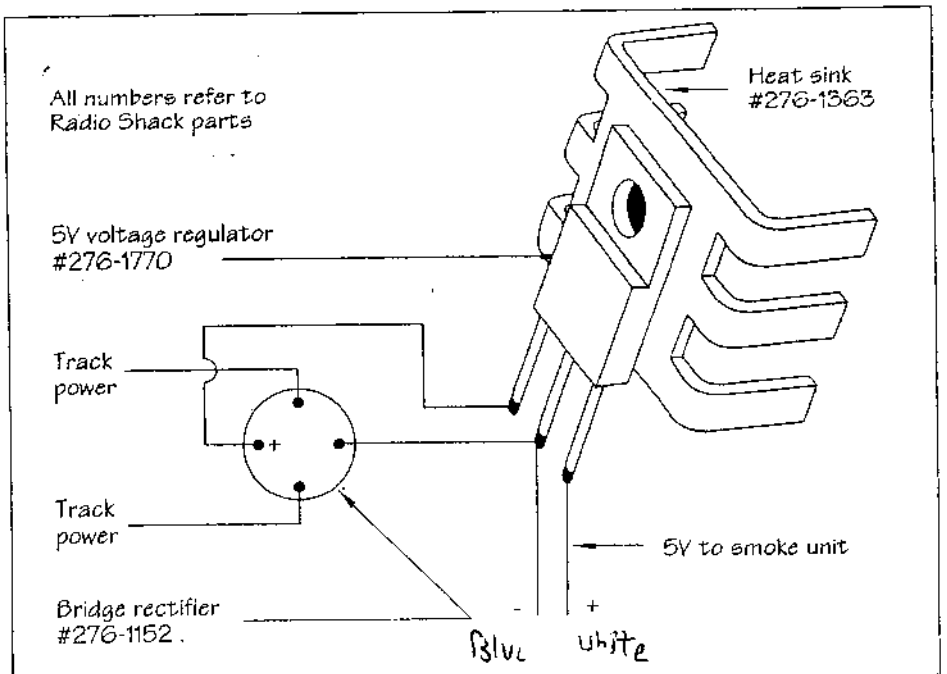


Figure 1
Low-voltage regulator

THE RESERVOIR

Building or finding a reservoir can be a problem. My first attempt was a disaster. I'll share my experience so no one else will be tempted to go in this direction.

I removed the one piece, clear plastic window unit from the cab ceiling and cut out the individual windows to be reglued

in place later.

false ceiling [illegible]

from .060" styrene plastic, sealing everything in place with strips of plastic and lots of Plastruct cement. This formed a storage tank for the smoke fluid. I detached the cab's roof hatch to provide a filler and glued a short length of 1/16" styrene tube into the new ceiling, extending down into the cab. To this tube I attached some neoprene tubing to carry the fluid to the front of the locomotive.

None of this worked! The smoke fluid softened and distorted the styrene, opening the sealed edges, and the neoprene hose also softened, and fell off the tubes, spilling the fluid into the structure of the kitbashed portions of the loco and threatening to disassemble my Mogul. Luckily, I caught all this before the fluid could work its magic on my beautiful styrene work. It was back-to-the-drawing-board time.

Before I talk about the solutions to these problems, a word about how to get the fluid from the reservoir to the smoke unit's element might be in order. The fluid is carried from the tube on the bottom of the reservoir to a tube emerging from the bottom of the smoke generator by a flexible hose that passes through the boiler (figure 2). The most critical and exciting part of the project occurs when you drill a 1/16"-diameter hole up through the epoxy bottom of the smoke unit. This must be done *very* carefully to avoid touching the heating element with the drill. I recommend using a pin vise and lots of patience. The next step is to insert a piece of 1/16"-diameter brass tubing through the hole and about 1/16" into the unit. I used five-minute epoxy to seal the tube in place. So far I've had no problem with it. I think it's a good idea to make the brass tube as long as possible to keep the heat away from the flexible hose.

As we know, fluids in a closed system will seek a common level, so this dictates the location of the reservoir and the smoke generator. The top of the reservoir tank should be horizontal with the middle of the smoke unit; the tank bottom should line up with the bottom of the unit. Consequently, the tank must be wide and shallow and be placed just under the cab roof. This works on some locomotives but not others. It works beautifully on a Bachmann Ten-wheeler.

Back to the reservoir problem. I found a model airplane wing fuel tank (figure 3) at a hobby shop and installed it under the roof of the cab. This unit is plated metal, so it shouldn't be bothered by the smoke fluid. I cut a 1/2" hole in the top of the tank and soldered in a short section of 1/2" brass tubing. This passes through a hole in the roof to become a filler. The outlet on the bottom of the tank is 3/32" tubing. Because the neoprene tubing reacted with the smoke fluid, I had to find another kind of tubing.

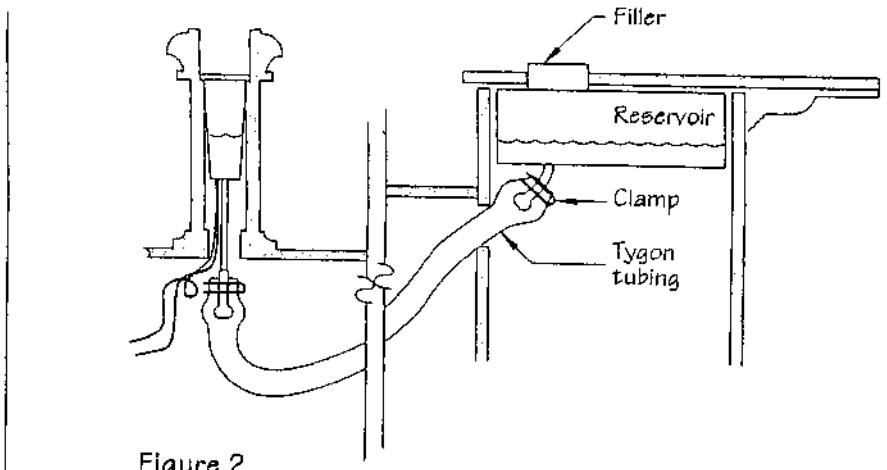


Figure 2
Schematic of revised smoke system

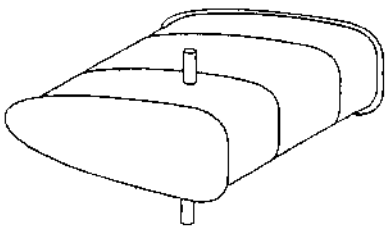


Figure 3
Model-airplane wing tank

I attended a hobby show and walked the aisles asking model airplane people if there was a soft, flexible hose with a 1/16" inside diameter, which could tolerate kerosene-based fluid. There isn't, but there is one in 3/32"! This product, called Tygon, is sold by the Du-Bro Company, a major distributor of model supplies (they even carry miniature hose clamps!).

I found some Tygon and clamps at a shop, then set about altering the 1/16" tube under the smoke generator. Soldering a 3/32" section of brass tubing over the 1/16" tube was no problem. I've found that creating a flared end on the tube with a little solder helps to seal the joint between the tube and the hose (figure 4). A clamp is an absolute necessity. Although the hose will seem snug when slipped onto the tube, it will leak without a clamp.

I struggled with this project for quite awhile. But the Tygon hose, the clamps, and the metal tank all seem to be doing the job. My Mogul now motors around the layout by the hour, with smoke pouring from the stack.

I hope all this will be useful to readers and will inspire them to do a little experimenting on their own.

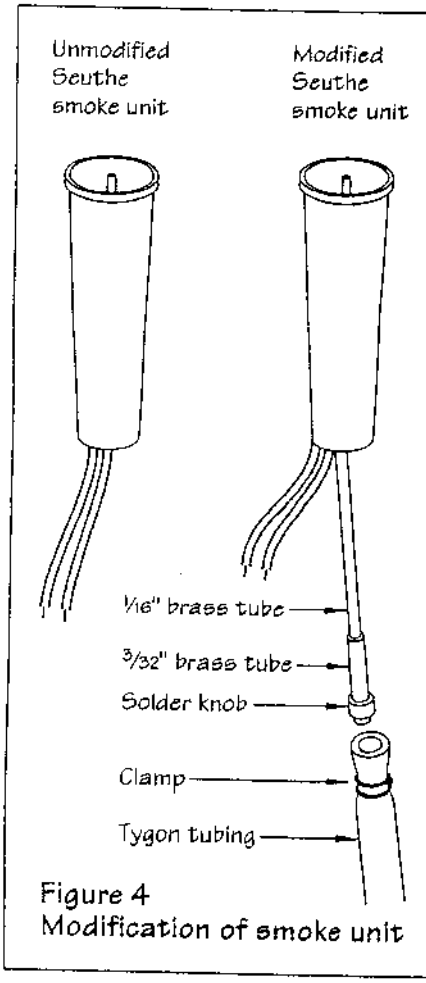


Figure 4
Modification of smoke unit

A Member Speaks Out!

A Hobby Shop Dies

Radio Control Hobbies in Woodinville has closed its doors for the last time. I don't think it is too hard to figure out why. It's all about the internet.

Hobbyists have found they can buy their kits or RTR models at lower prices from Amazon or Tower Hobbies or other online sources. The kit prices are terrific!

But when it comes to operating those cheap kits, they are left all alone. Amazon isn't going to look at their problems or mistakes and show them where they went wrong or advise them on a better method. And where will they find the small extra parts they need to repair or improve their models?

A good hobby shop will stock thousands of parts and materials for the modeler. Just try to get those multitudinous materials from Amazon or look for good advice. You will only find those from your local hobby shop, if hobbyists still have one.

Sure, you can get 25% off on the big items at online hobby stores, but your local bricks and mortar retailer needs those sales to subsidize the thousands of low-margin items he carries. Oh, and Amazon and Tower Hobbies don't offer club meeting rooms…

So one local hobby store bites the dust. Let's hope that others do not follow.

Thanks.

Scott Baumann

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