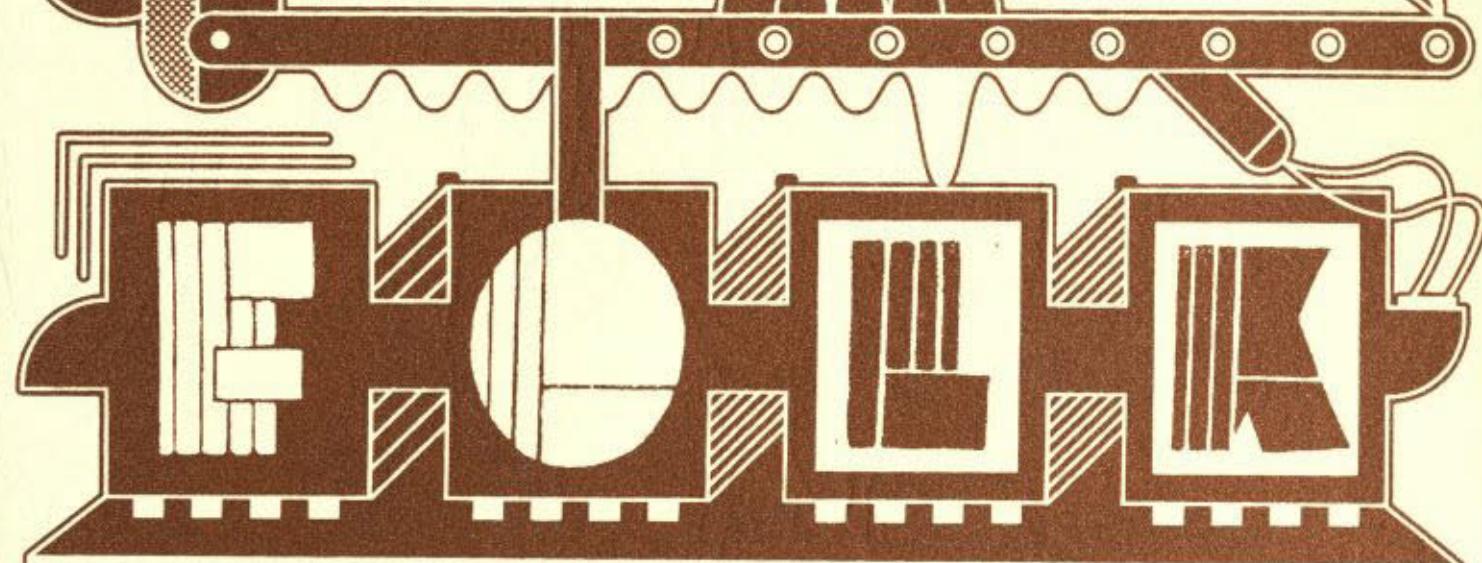


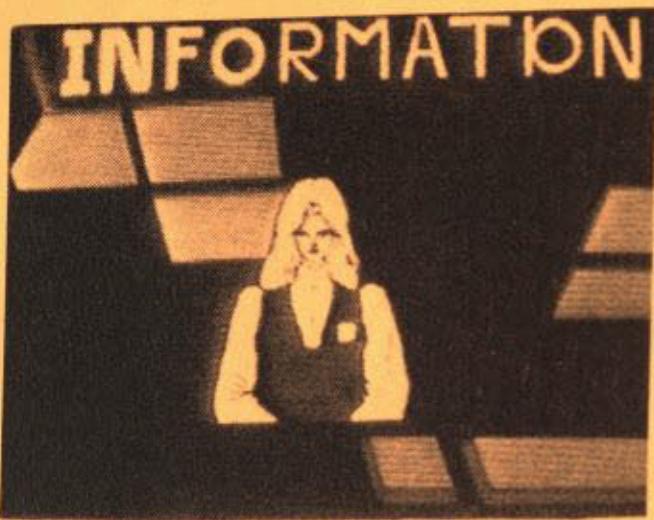
# CYBEE



DIGBEE'S ELECTRONIC CHRONICLE







1

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2





NEW JERSEY RADIO



# ♥ SEE FISH ♥

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TAPE  
MUSIC

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863-5992

DIGBEE  
ENDLESS  
LEATHER  
\*\*  
ELECTRONICS

# INTRODUCTION



I want to establish a framework to make what follows more intelligible. This book, *Cyber Folk*, chronicles my work in creating circuitry and instruments for the purpose of producing new music. All the instruments captured here are home-made electronic instruments that produce or alter sound.

This type of work has a rich history, dating back to the start of the previous century. In "Past Pioneers" I've given a glimpse of its historical precedence. "Artist Features" focuses on recent practitioners of original electronic instrument building. The individuals featured are folks who have directly influenced my own practice.

I've been planning a book of this nature for quite a while. It was conceived as a reservoir for all the work and ideas I had in relation to this field. I could not be territorial and withhold any of my methods, at least not in good conscience. I wanted to emulate the generosity and kindness of the books and individuals who I learned from.

I want to promote home-made musical electronics, and perhaps expose it to individuals

who'd like to try their hand at producing their own music machines. I'd love to see how someone new, from somewhere different, applies any ideas contained in this book.

The other exciting impulse to produce this book was to share my work with others. Only a very small group has seen anything contained in these pages. I have so much fun developing, designing, building, and playing these instruments that I sometimes forget that I owe it to the work, to the instruments, to share them with receptive individuals. I hope too, that readers of this book find refreshing the approach I've taken here. I'm a zealot when it comes to the advocacy for candid, healthy, and spiritual modes of art production. I've found all these qualities applicable to the world of electronics. In this spirit, with this motivation, I produced *Cyber Folk*. Enjoy.

- DIGBEE

Early drafts of this book included a "how to build musical electronics" section. In developing this section I found that I was trying to recreate material that was already available in existing literature, so, for those who, at the end of reading *Cyber Folk*, want to explore, I suggest these three books for getting started: *Circuit-Bending: Build Your Own Alien Instruments* by Reed Ghazala, *Getting Started in Electronics* by Forrest M. Mims III, and *Electronic Projects for Musicians* by Craig Anderton.

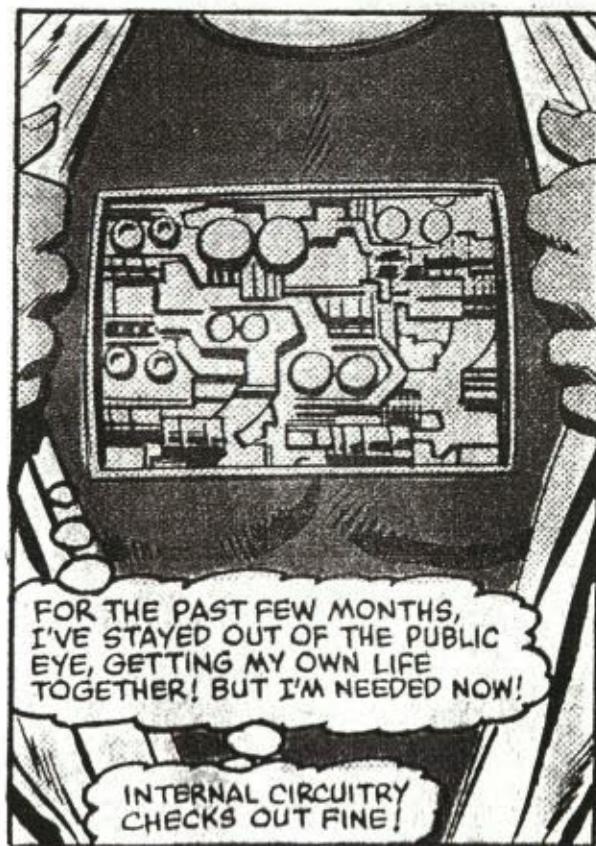
The only other section that was scrapped was an extended philosophical essay. I feel a good deal of the ideas for this essay have been included in a more concise fashion in this book's captions, and that what isn't said explicitly, I believe, is expressed by the work itself. The latter fact has become clear more recently. When I perform live and people see and hear my instruments, they speak to me afterwards, and the terms they use in describing the experience are almost identical to the terms I try to infuse in my work. After a great deal of thought and work it seems like the proof may, in fact, be in the pudding, and that these instruments are truly capable of speaking for themselves.

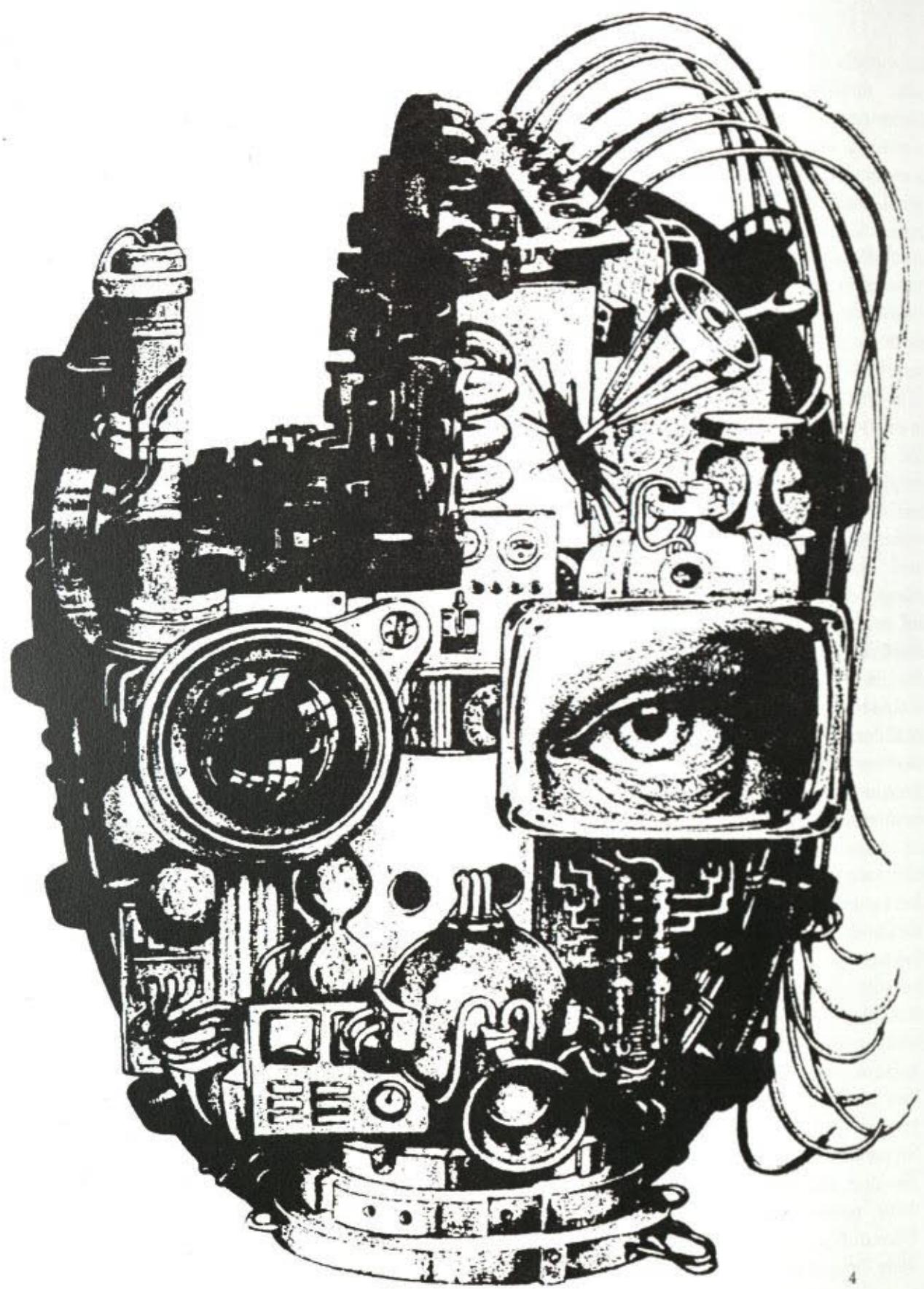
A reason this work has kept me so absorbed is that it combines so many of my interests. I've loved comic books and science fiction since I was a kid. Electronic musical instrument building offered a way to make elements of science fiction a reality - to make a style of music that could exist within one of these fantasy worlds. The comic book imagery included in this book are all images scanned from comics, books, and magazines from my personal collection. I have a deep respect for the work involved with producing comic books. The long, solitary efforts involved in creating comic books doesn't seem to be all that different from the nature of my own work - my fellow "whittlers". I have provided credits for

the images used in the back of this book.

I want to give a heartfelt thanks to **Michael Olivo** who created the cover and flexi artwork, designed the layout and instrument typography, and handled a great deal of *Cyber Folk's* production. Michael volunteered his skills to the project, and gave a great deal of thought and time to designing this book, and working with him was a pleasure.

The resultant look of *Cyber Folk* was also made possible by **Jason Rusnock**. Unless otherwise noted, all the beautiful photos in this book were shot and edited by him. It seems strange to imagine now, but I was considering at one point this book being entirely photo copied in black and white. Once I saw Jason's vibrant, clear, colorful shots I knew that I had to produce this book in color.





# INSTRUMENTS



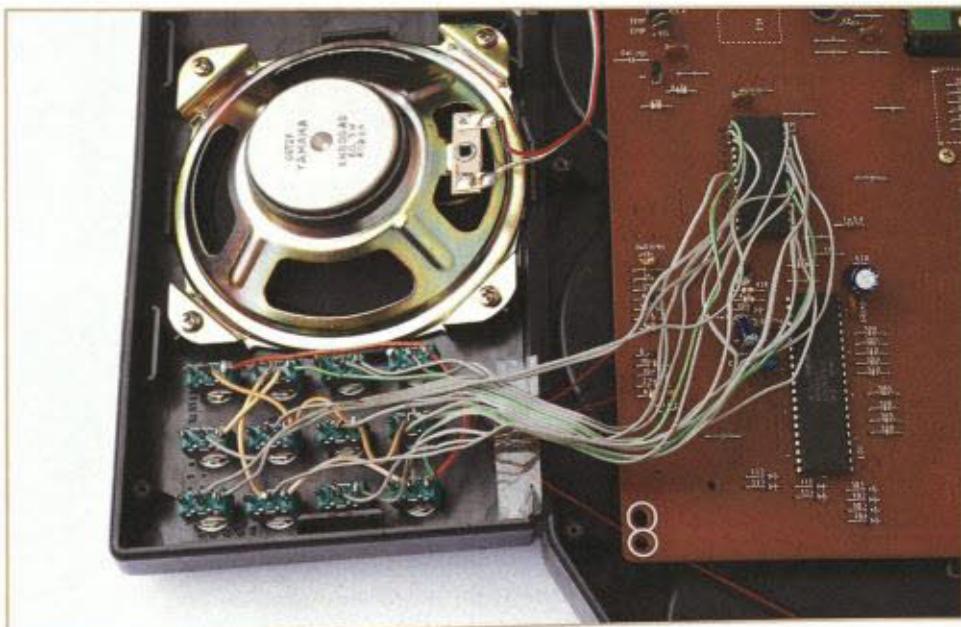


## MODIFIED INSTRUMENTS

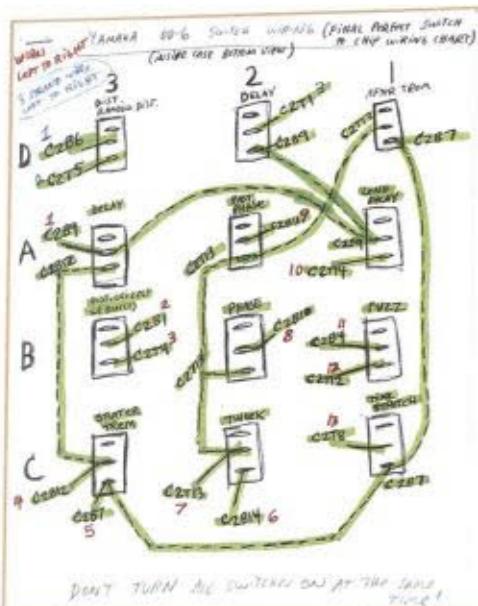
A great way to begin participating in the world featured in this book is by creatively modifying existing audio electronics. There now exists a great deal of literature on the subject. A more in-depth lesson is beyond the focus of this book, but I encourage anyone interested to research "Circuit Bending" as it is now generally called. With absolutely no engineering background, this is how I found a way to work with electronics. I didn't even have much interaction with electronic musical instruments prior to beginning circuit bending, but the prospect that the circuitry in commercial electronics presented a sonic playground and that mysteries hidden within could be revealed was so exciting that I was almost magnetically drawn to figure out how to interact with this universe. This field goes very deep, a cumulative study with its boundaries limitless. Through modifying instruments I began this journey. I spoke to a friend I hadn't seen in some time and he recounted years ago when the two of us went to a thrift store and I bought all these electronic toys I planned to rewire, he asked me if I was still doing that stuff. I answered, "yeah." This section compiles some evidence, both old and new, of my modified instruments. Above a circuit bent farm animal toy. It now produces bizarre decaying bursts of noise, re-housed in a cardboard box with a pen drawn Wolverine and residue from what was formerly bubblegum, used to hold the switch in place.



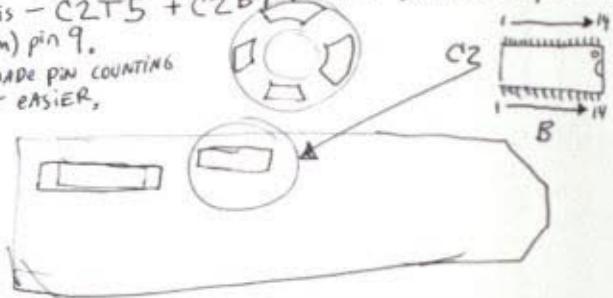
**MI.1** - This is the face of the Yamaha DD-6, with my new sound altering switches added to the front. The flipping of each of these switches individually or in combination changes the rhythm of the drums in crazy ways; fracturing, stuttering, skipping, distorting the original toy's drum beats. Tons of secret sounds exist in these common devices.



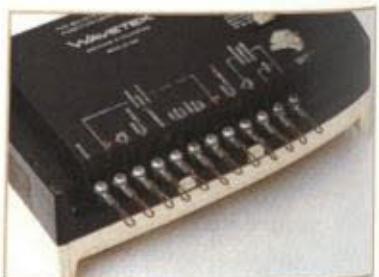
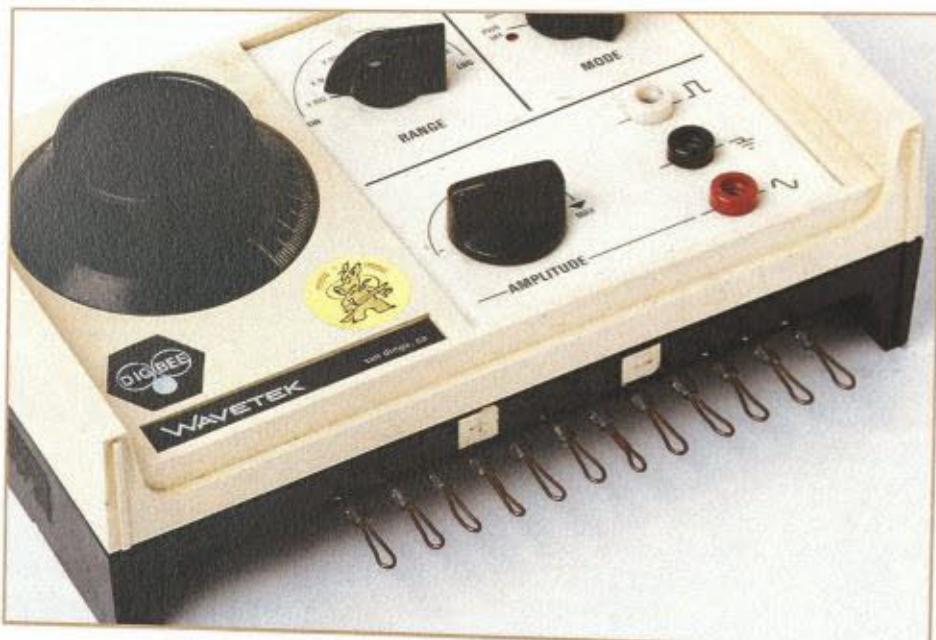
**MI.2** - This is the interior of a "hacked" Yamaha DD-6 drum machine. You can find battery powered toys and instruments like this all over. You open up their cases, and while they are making sound you use a probe to "hunt" for connected points that alter the sound. These points are noted, and then they are made permanently controllable by attaching wires from the points on the circuitry to switches and dials on the exterior of the case.



- FOR future reference, the point labeling system works like this - all points begin with C2 - C2 is the smaller of the two chips in the circuit. It has 28 legs, RATHER THAN NUMBER 1-28 the system begins at the bottom of the chip, the top (T) is the side closest to the speaker and the bottom (B) is the side further away from the speaker. So the points ARE LABELED FOR EXAMPLE like this - C2T5 + C2B9 (CHIP 2 - Smaller chip - T (top) - POINT 5 + C2, B (bottom) pin 9. This system MADE PIN COUNTING SOMEWHAT EASIER,



**MI.3** - These are some of my notes, the kind I mentioned on the previous page. It is necessary to document in this way in order to recall what alterations you'd like to make. Sometimes it helps to mark the circuit board with different colored Sharpie pens so you can recall which points on the board altered the sounds best. This also makes it possible to reproduce the circuit bends on another device if needed.



**MI.4** - An augmented Wavetek Model 30 Function Generator. I quickly found that with just touching the screw terminals on its underside I could alter the sounds in unique ways. I produced these copper "tongues" in order to make these points available while the instrument was right side up. I static-shocked this poor thing by touching its contacts one dry-carpeted winter day. I found the dead chip inside and revivified it. "Body-Contacts", as they are known, are a strange animal because each person's physical properties affect the electronic response differently. I once showed a finished body-contact controlled device to a friend. The instrument handled like a joy for me, the second he touched the contacts the whole circuit died, and never spoke again (body-contacts will be discussed at greater length later).



**MI.5** - This is a small drum toy I modified. The terms, hacked, modified, or circuit-bent all refer to the same thing, rewiring a device's internal circuitry to make new sounds available. For those looking to try their hand at circuit bending, a small toy like this is a good place to start, the older the toy the better, and no fooling around with AC Voltage powered gear.



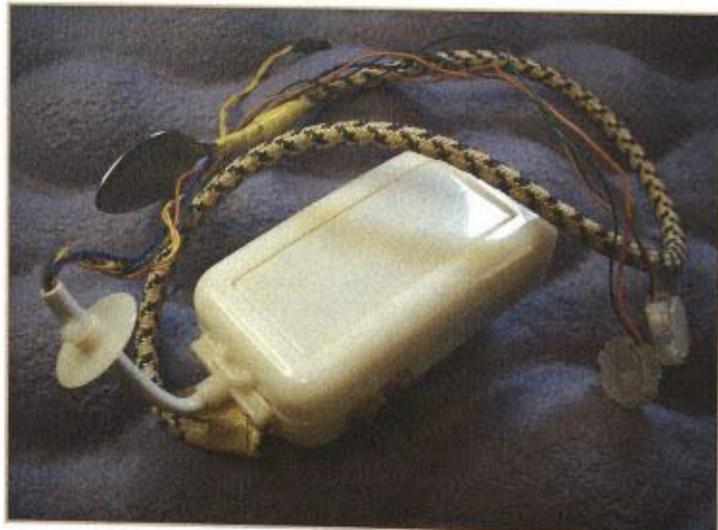
**MI.6** - A Casio MT-35 I modified awhile back, but revisited recently. It's an old keyboard that contained some great "bends", as they are often referred to. A friend gave me this keyboard since it wasn't working right. As I was hunting for bends the keyboard kept shutting off. I realized the circuit board had a crack in it. To fix the issue I had to solder wires across either side of the crack, like stitching a wound.



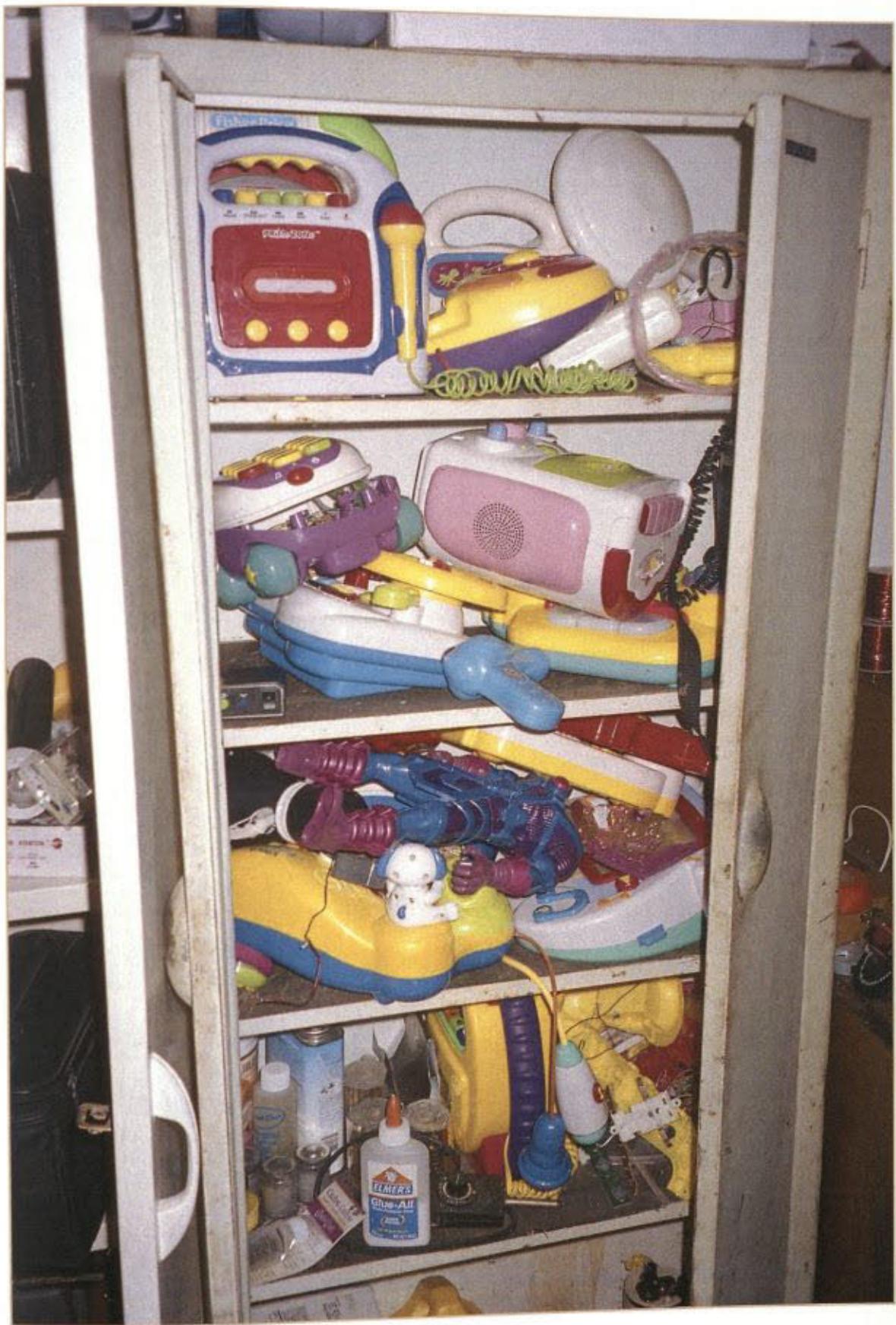
**MI.7** - The three devices on this page are actually the three oldest builds of mine in this book. I had fried a small amount of toys prior to this. At left, my first real successful "instrument" - a Vtech Little Smart Talk'n Type. I circuit-bent it with two severe pitch bend dials, one pitching up the other down. The "patch-bay" with the wires coming out was something I bolted on the body that allowed me to keep the sounds playing. When I finished making this I showed it to a friend. He was blown away - mystified. It was really like the way people react to magic. I loved seeing the effect it had on him.



**MI.8** - I can't recall what the original toy the circuit inside this box was from, but it was some kind of aquatic toy with bubbling deep sea sounds, that when shook generated a tune with flashing lights; here its hacked version. At the time of making this orange box, I was still very new to making music; I was primarily a visual artist. Instrument building was a way to merge worlds, both my existing visual world and my new musical world. I saw so much potential in what could be done with the creation of new housing for these devices. This was a very early attempt at that goal. I was moving a considerable distance away from the "demented toy" aesthetic.



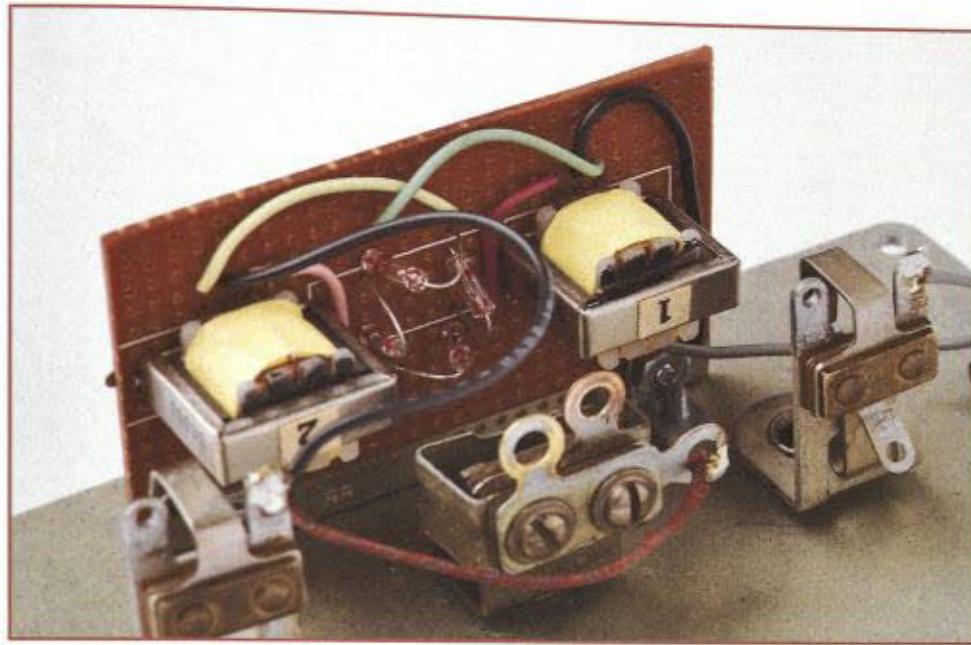
**MI.9** - This white box's origin remains a mystery as well, but I recall ripping it out of a stuffed talking doll of some kind. It is circuit bent in a great way. Brass upholstery tacks are attached to the cases exterior, they provide the body contacts to the circuitry inside. The other body contact is, in fact, the wired end of a spoon. Trigger the device, squeeze the hand-held contacts and the spoon, placed in your mouth, controls the mutation of the sound by the amount of contact it makes with your lips. I must implement this interface again in the future.



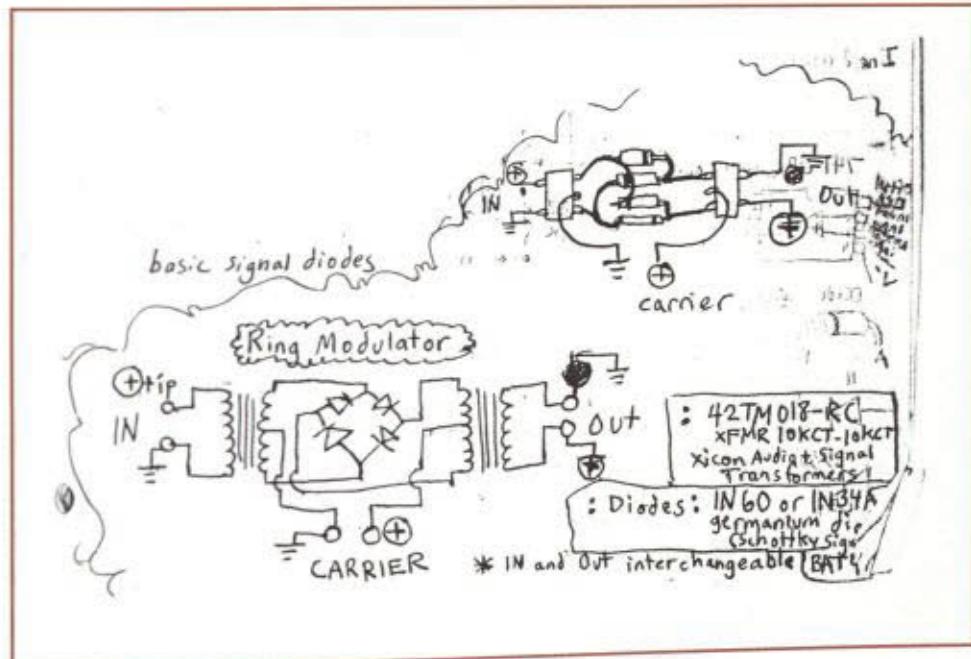


# RING MODULATOR

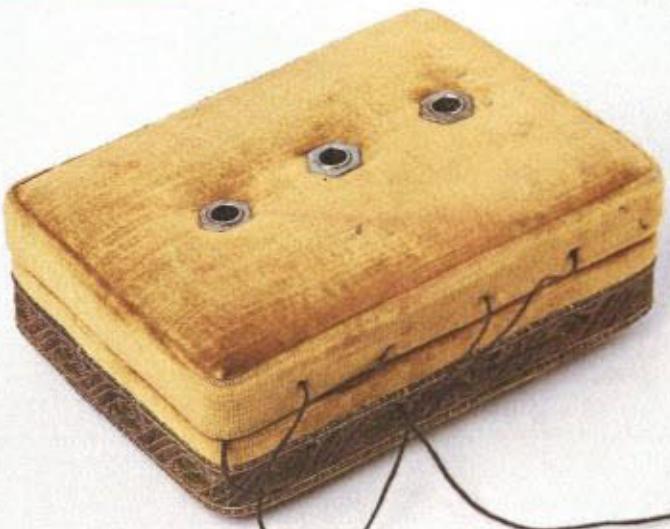
**RING MODULATOR** - Ring Modulators are a classic for making "sci-fi" sounds. They are also very easy to build, consisting of six components and three pieces of hardware. In their simplest form they are also passive devices, meaning they do not need any voltage to perform their function. For all these reasons the Ring Modulator was the first device I ever scratch built. By scratch I mean to build from individual components, as opposed to modifying an existing operable machine. The Ring Modulator effect is wonderful, produced by plugging in two different sound sources, a strange combination results, the separate signals both feeding and eating each simultaneously. The effect is generally associated with the sound produced when one of the input tones is a sine wave, but I have obtained amazing results combining very different sound sources than those traditionally used. The Ring Modulator pictured here is not the original I built, but rather my third, updated to my current standards, its case from an old Heathkit resistor decade box, and its panel a purple painted crackle finish metal with a custom graphic screen printed aluminum piece grafted onto it.



**RM.1** - Here is the circuit: two transformers and the germanium 'ring' of diodes from which the device derives its' name.



**RM.2** - This is a very early drawing from my notebook at the time of building my first ring modulator. This also would make it the first schematic I ever interpreted.

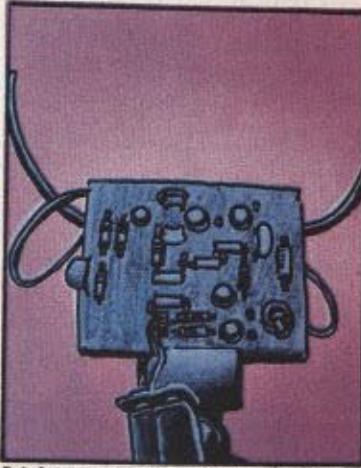


**RM.3** - A picture of the still breathing second Ring Modulator I built. The first isn't a lot to look at, just a green plastic travel soap holder with three unlabeled jacks. This one, on the other hand, is housed in a nice soft jewelry box.

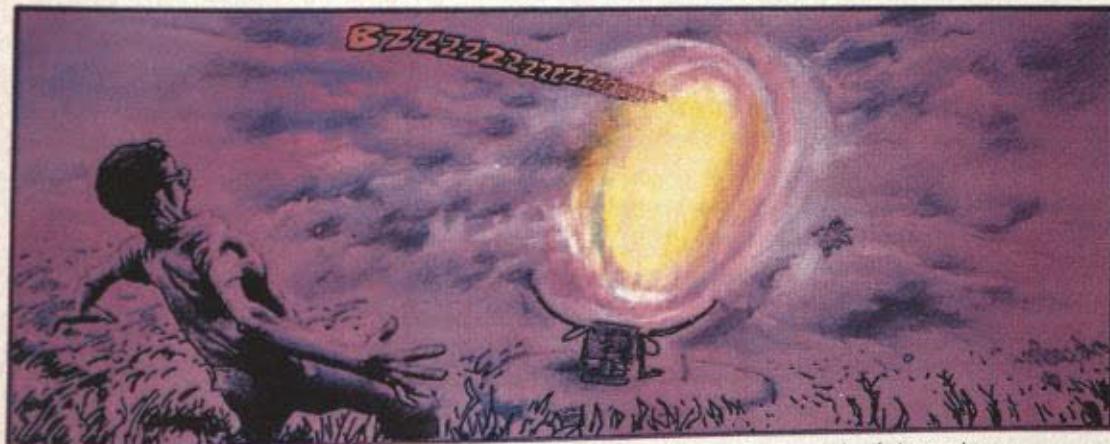
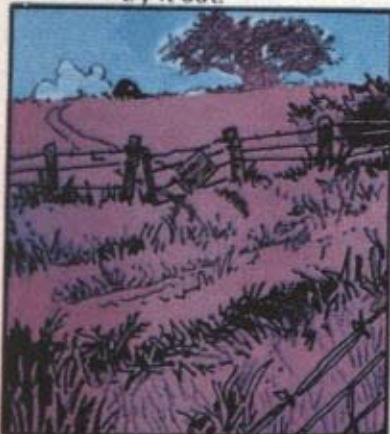


**RM.4** - My second modulator opened. I'd keep it closed by tightening the "laces" like a sneaker and slide up the beads at the end to "lock" it. Inside is my circuit "board", which is a piece of cardboard with the components pushed through and their leads twisted and soldered on the underside. To all my fellow cavemen, I send my love.

Collecting the parts required was not without difficulty. Some were exotic special order items; others had become obsolete. But most were readily available resistors, capacitors, diodes, transistors, etc. Finally I commenced work on the contraption.



When it was complete, I was still puzzled. What did it do? I felt sure that it was a clue to my uncle's disappearance. For fear the thing might explode when I turned it on, also to escape derisive comments of friends and neighbors, I took the device to an abandoned farm area to try it out.

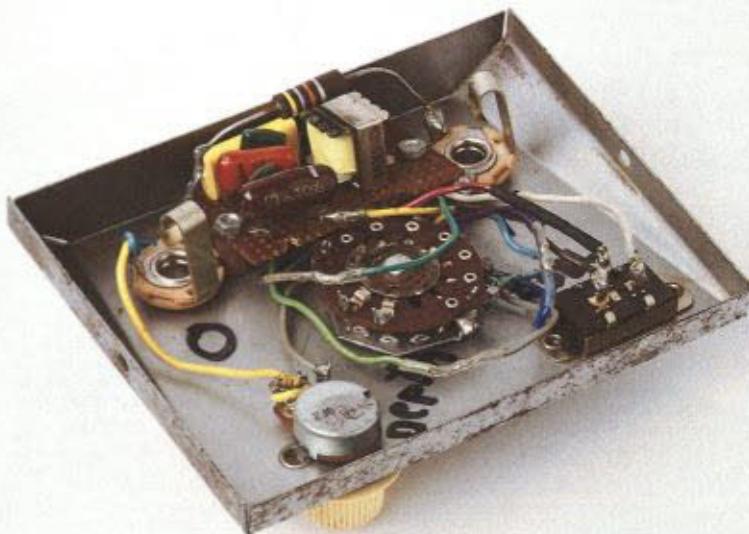


An electrical field was created. It was a gateway...into another universe. I don't know how the diagram came into my uncle's hands but he had built a machine like this one and entered into...where?...never will I completely understand what has happened.



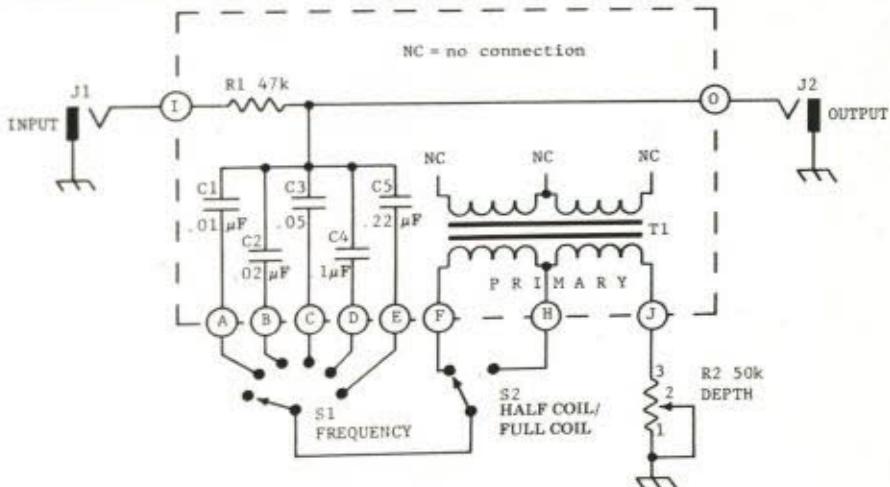
## TONE CONTROL

**TONE CONTROL** - This is a very old box of mine, built from Craig Andertons' book *Electronic Projects for Musicians*. At the time I was looking to scratch-build another device, and I found his book in the library, but most of the devices were way over my head. The only one within my abilities was this device. It was designed with guitarists in mind, so unfortunately its' effect is much too modest for my appetite for wild expressive sounds. It rests on a shelf in my studio now, on exhibition, a technological reliquary. The case I built it into is great, a cannibalized Sencore Align-O-Pak Model BE-3 TV Bias Supply. My big black letter stickers were applied more recently, as this box was produced well before I'd accepted my new moniker. This box was ahead of its time in regard to capturing early on an aesthetic I continue to pursue: a future primitive fashion. It does not abide on the other hand to my "Design Triangle"; an equilateral triangle I try to loosely abide by while designing an instrument. Its three points: Sonics, Ergonomics, and Aesthetics. The mission being to keep the triangle from distorting, for example, with the device looking beautiful, but sonically offering very little, or sounding great, but looking bland. Another bad scenario would be an instrument with great sound, but the controls are poorly laid out, making it hard to play. I'm trying to make something that sounds as good as it looks, and handles in a way that makes you want to play it, and make you feel you can express yourself with the controls. If I just wanted to make beautiful objects I'd be a sculptor, but for this work I need to consider the instruments' voice and how I interface with it. All these, when considered in a balanced way, can make a great instrument, the Tone Control on the other hand, is relegated now to just sitting there and looking pretty.



**TC.1** - The interior on display. Since I haven't used the Tone Control in ages, I wasn't compelled to rebuild the circuit to my current standards. So what you see here is a glimpse at my older work.

**Figure 5-23**  
Passive tone control schematic.

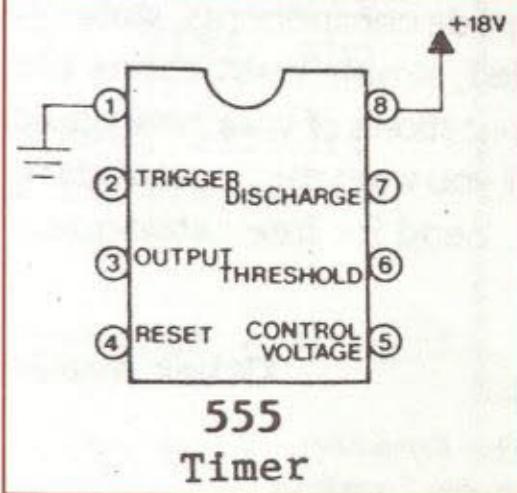
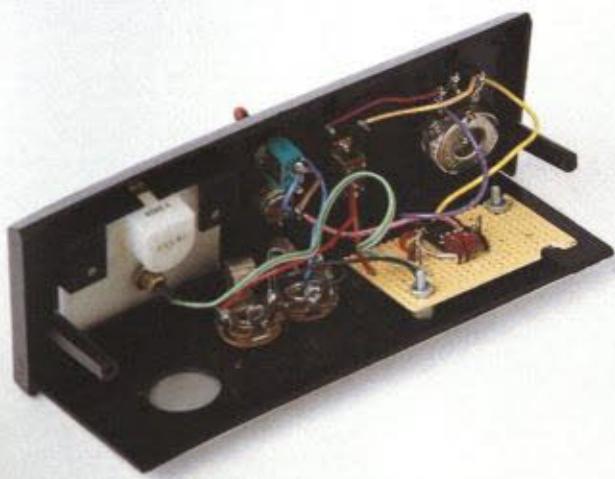


**TC.2** - This is the schematic from Craig Andertons' book *Electronic Projects for Musicians*. That book comes highly recommended, if only for the first portion of the book, which gives beautifully illustrated instructions on how to begin working with electronics, from identifying components, to reading schematics, soldering, and crafting your own custom cases. As far as I'm concerned, this book and Forrest Mims' *Getting Started in Electronics* are required reading for entering the field.

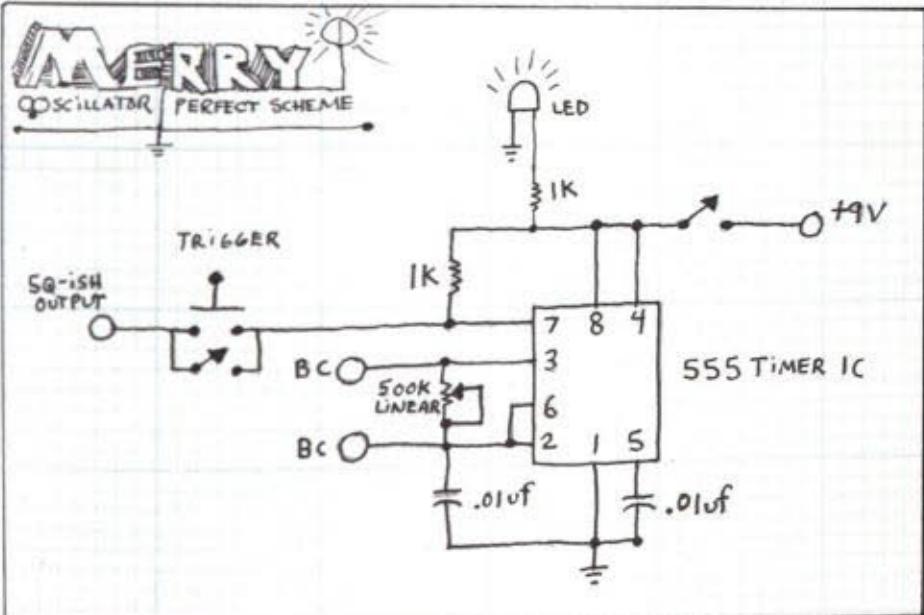


# MERRY

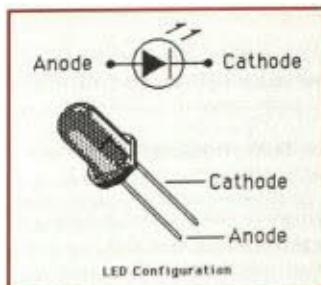
**MERRY** - Merry is one of my most played instruments, which considering how little it has in the way of components or controls, is very impressive. A simple one chip oscillator, yes, but a few of its properties make it awfully useful. I've shown the use of body contacts briefly already in this book, but I'll elaborate here. Body contacts are simply metal contacts (I typically use brass upholstery tacks like the ones shown here) which are mounted to an instrument's surface. On the interior of the case, wires are attached between these studs and points on the circuit board. This creates a dermatological interface allowing the conductive qualities of your skin, heat, moisture, and your body's natural electrical properties to interact with the circuit. The result is you can bend and shape sound with the degree of contact you make with the stud's surface. This technique is used in Merry for pitch bending. You make contact with these points while Merry is on and the frequency lifts in response. The amount of moisture on your fingers increases the body contacts response greatly. I don't know how else to put it, but a licked finger goes a long way. Other applications of Merry's body contacts are discussed on the page following. Built into the host body of a former Micronta Field Strength/SWR tester with its meter removed and a yellow jewel covered LED inserted, plus radiating letratone lines for a powerful look. Originally a picture of the Mother Mary was in this window. Once I removed the picture I changed the name from Mary to Merry.



**M.1** - One of the best features comes from the capacitor value used in Merry. It allows the oscillator to sweep high, beyond the audible frequency. With the dial in the "supersonic zone", one hand in touch with Merry's contacts, simultaneous body contact with the studs of almost any other instrument produces outstanding sounds. Grabbing the grounded back panel or moving the dial subtly within the 'supersonic zone' provides even more musical control. For this reason I sometimes think Merry is the real leader of the pack. We are practically discussing magic at this point, the human as medium for audio electrical magic.



HMM... THAT  
WOULD EXPLAIN  
WHY... HMM...  
SHOW ME YOUR  
**COMMUNI-  
CATOR...**  
I KNOW  
SOMETHING  
ABOUT  
SACRED  
**ELECTRONICS.** 8



**M.2** - When I was rebuilding the circuit recently I realized I'd misinterpreted the schematic the first time I made it, but I'd since grown accustomed to my version. It has a "sweeter" sound than typical square wave generators, so I replicated the early version when I built the circuit anew. This schematic is for my unique "sweeter" sq. wave.



Gooch

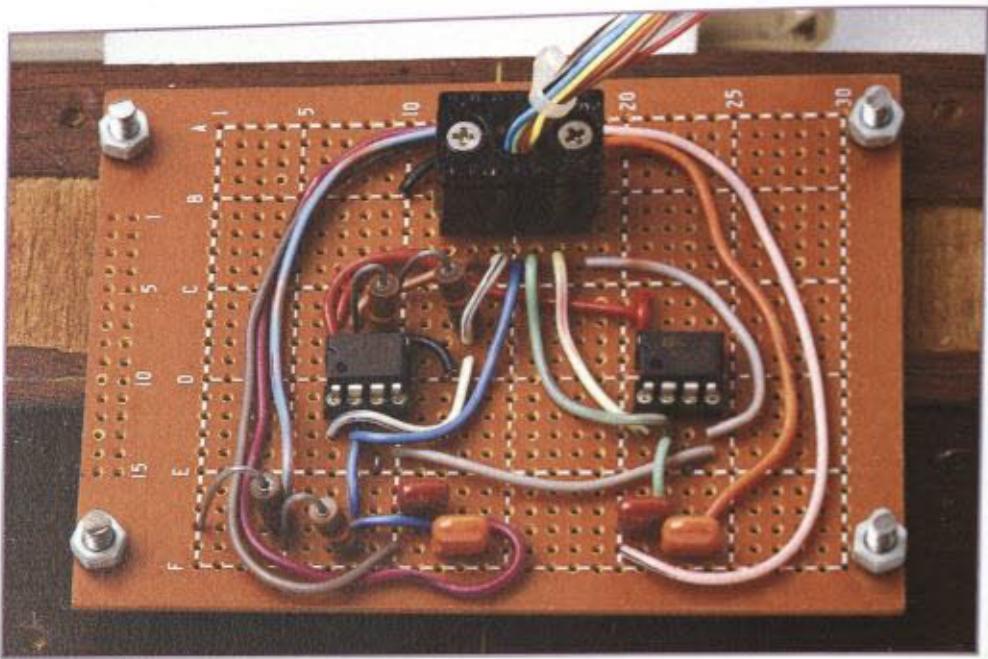
**GOOCH** - Gooch really feels like playing a percussion instrument, but at a fraction of the size. A simple oscillator that is triggered with the push of a button, the sounds are a wild range of cartoony bells or bongos. It sounds in tune with any instrument. The frequency range of Gooch is extreme, it is capable of piercing highs and sub-sonic lows, and its single pitch dial handles incredibly smooth. The decay and tone can be controlled, producing a tiny tinkling bell or a giant bass drum. The name Gooch is derived from the nickname of the man from whom I bought the case. He actually ran a café whose name came from a certain hand-drum, which makes an even greater connection to the instrument. I met him by responding to an ad he placed in regards to surplus electronics for sale. It turned out he needed to sell his late father's stock in order to pay for a lawyer on account of "accidentally" running his car over part of a police officer after a botched traffic stop. He didn't seem like a hardened criminal, but someone whose bad choices would somehow always turn awful. He had a good deal of merchandise, so I met with him a few times, with each visit a witness to some other incident, he'd spilled a barrel of pickle juice all over the front stoop, dart out unexpectedly and return three minutes later with a pair of Spider Man ice cream pops, repeatedly ask me if I wanted to buy a Sahara Beige BMW, and once in the middle of a debate with his friend over alkaline batteries he turned to me and said "Do you want to buy a horse saddle?" and sure enough, directly behind him, splayed over a guitar amp was a giant horse saddle. He was typically very funny, but he once said to me, alluding to his legal trouble, and with a sort of melancholic beauty, "If things were different, I think we'd be good friends."



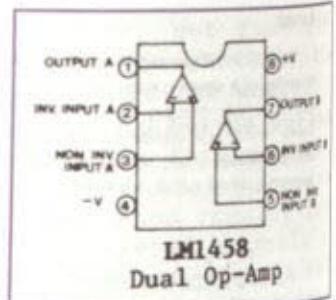
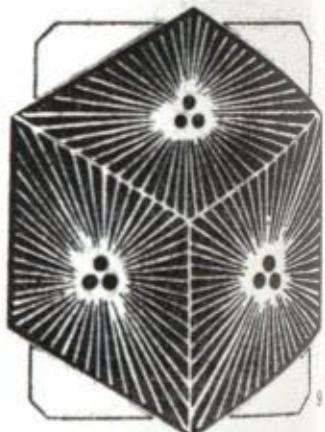
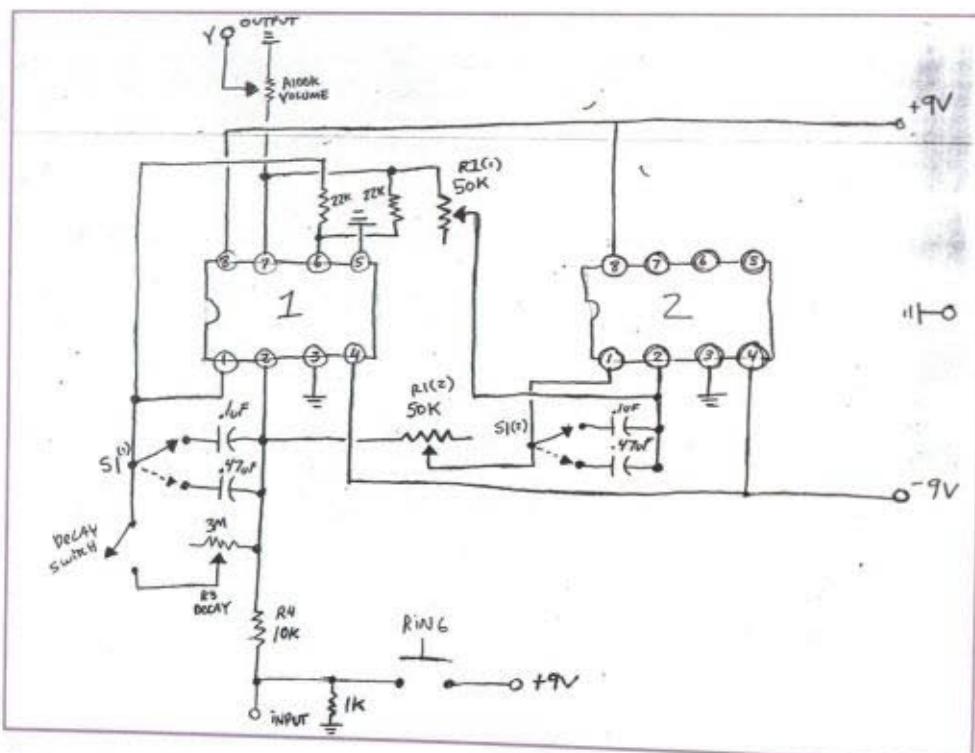
**G.1** - This view shows the audio input and output jacks. Gooch doubles as a very dynamic high-Q bandpass filter. I typically have Merry connected here, making the two a very musical pair.



**G.2** - Gooch un-corked. The case looks like maybe the housing for an old thermostat, and the base, wood from an orphaned street piano. I may one day try to insert a bright light in Gooch so the case would glow like a lantern.



**G.3 - Gooch's pretty circuitry.** The big socket at the top interfaces with a cable connector. The system connects the hardware to the board and so if the board needed to be worked on separately the two could be easily disconnected.



**G.4 & G.5 - Tone, decay, and frequency control** were all additions I made to "An Electronic Bell", a feature in the Nov. 1973 issue of *Popular Electronics*. Another article from Charles Cohen's data file. When I was testing out the circuit and first developed the frequency control, I was so happy I called Charles so he could hear the sounds over the telephone.



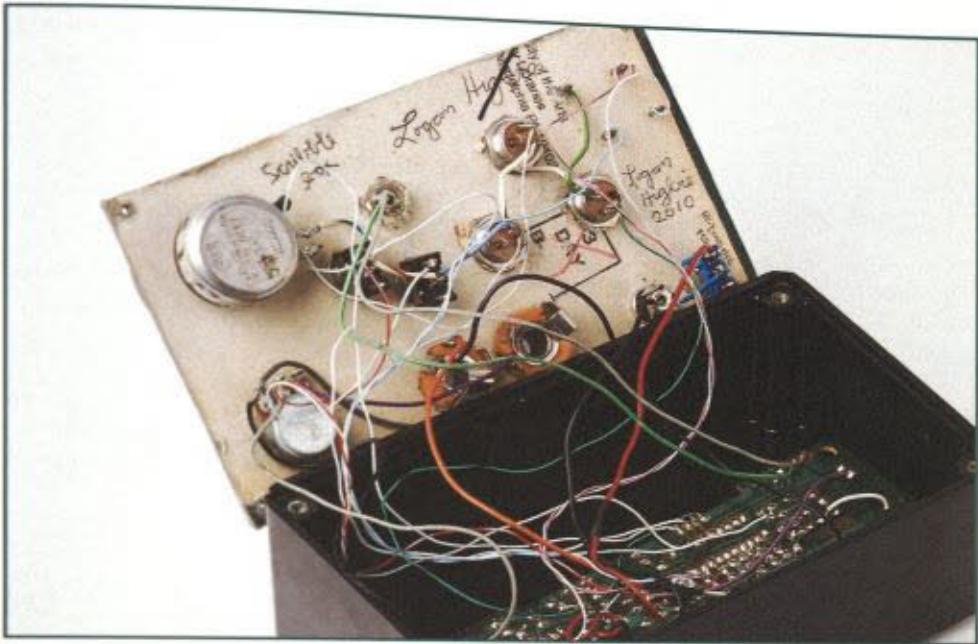
And Devil's Meets

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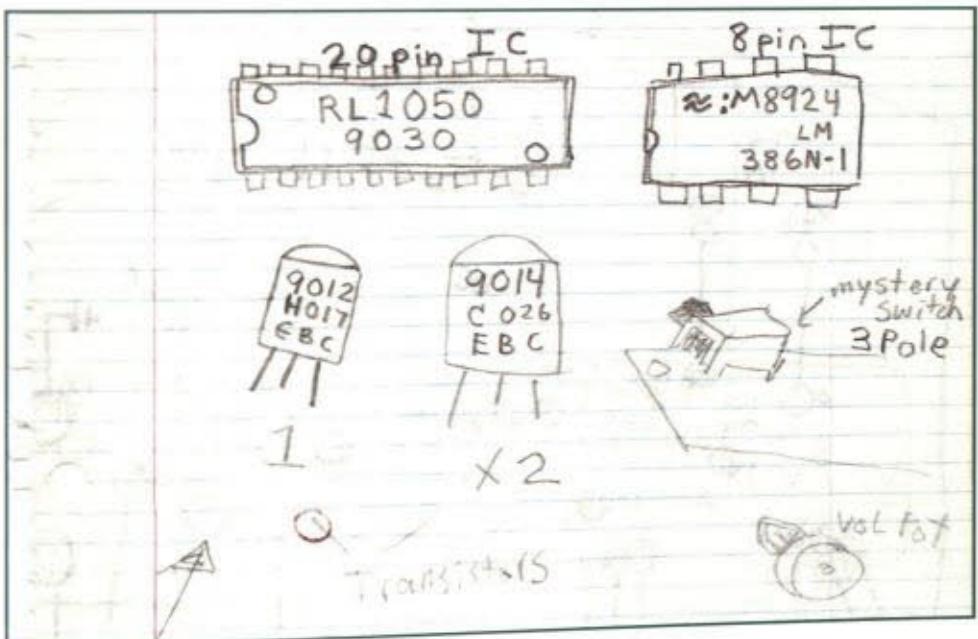


# POLLYWOC

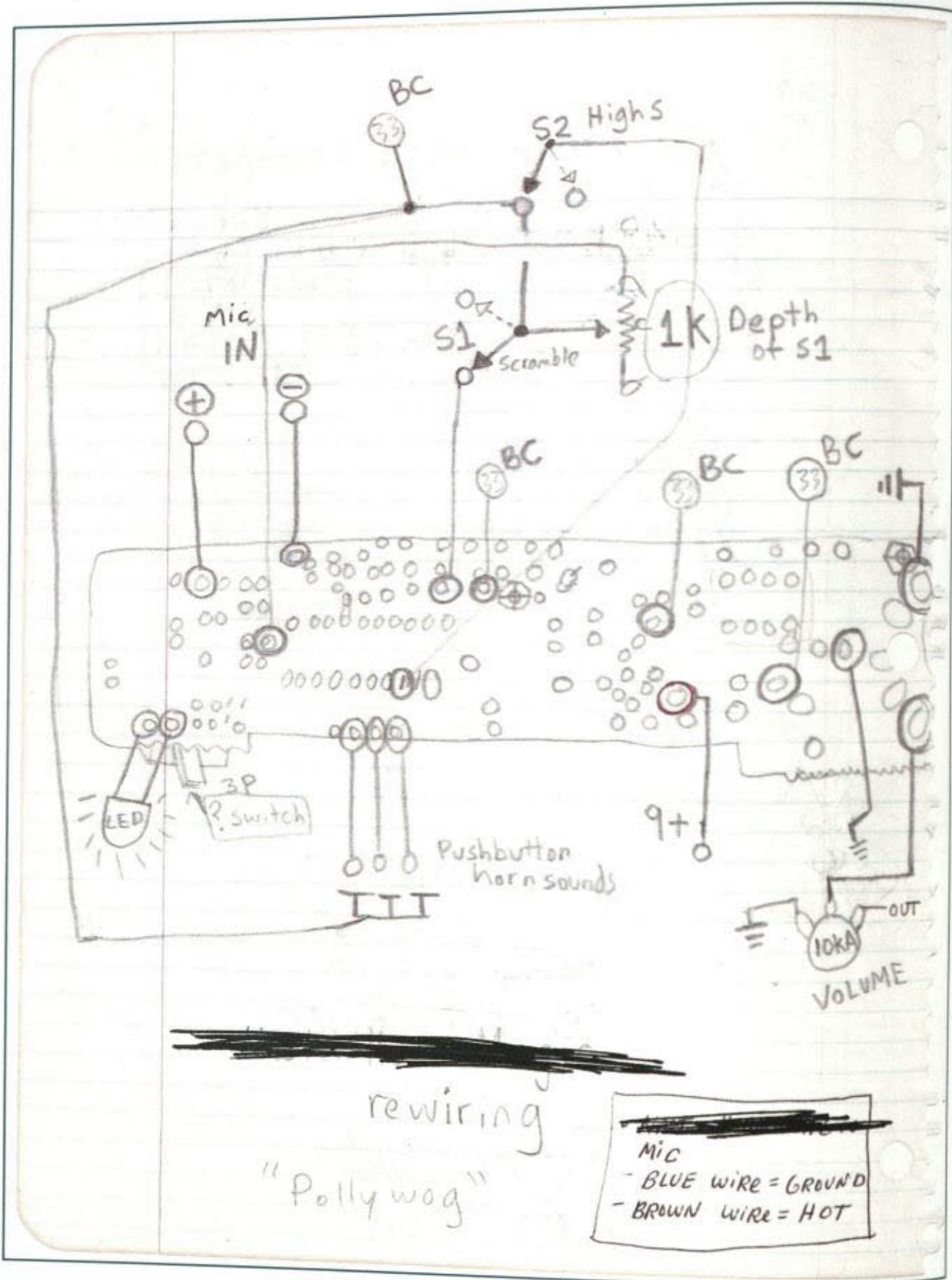
**POLLYWOG** - Pollywog is in fact a modified instrument, a circuit-bent electronic toy trumpet, housed in a custom case. I thought the toy would be a good target for modification so I convinced a friend to let me have it. A strange world unfolded. Pollywog creates three unique musical horn sounds that can be triggered by the microphone, it matches the pitch of its input signal. Additionally, using my added switches, dial, and body contacts, Pollywog creates the sounds of new exotic organisms. Its body contacts touched in tandem with my other instruments increases the severity of these sounds and also gets the Pollywog to rhythmically sync with its compatriots. The microphone is actually a makeup applicator, the Maybelline Instant Age Rewind Eraser. The microphone is embedded at the foam top, its cord running through the tube that would normally draw up the makeup cream. The grip, what I believe is the handle for a handcart, I purchased from a used bike shop. A touch I added more recently is the psychedelic swirl pushbutton tops; made by barely mixing a tiny thinned pool of different color Mr. Hobby lacquer paints, putting my finger in the paint mixture and then pressing the button tops.



**PW.1** - Like a crab switching shells, I removed the circuit from the toy trumpet and transferred it into this box I bought at one of the last surplus shops on New York's Canal Street. Its top the cover from a hardcover book. Thick book tops make great panels, you can write on them, cut by hand, and they don't crack when drilling. I may use leather punches in the future to make cleaner holes.



**PW.2** - In the hopes of one day fulfilling my dream of reproducing this toy's circuit I wrote down some of the chips and transistors found in the original, but currently it remains a mystery. The page following are my "bending" notes, documentation of how to alter the original circuit to produce the sounds of Pollywog.



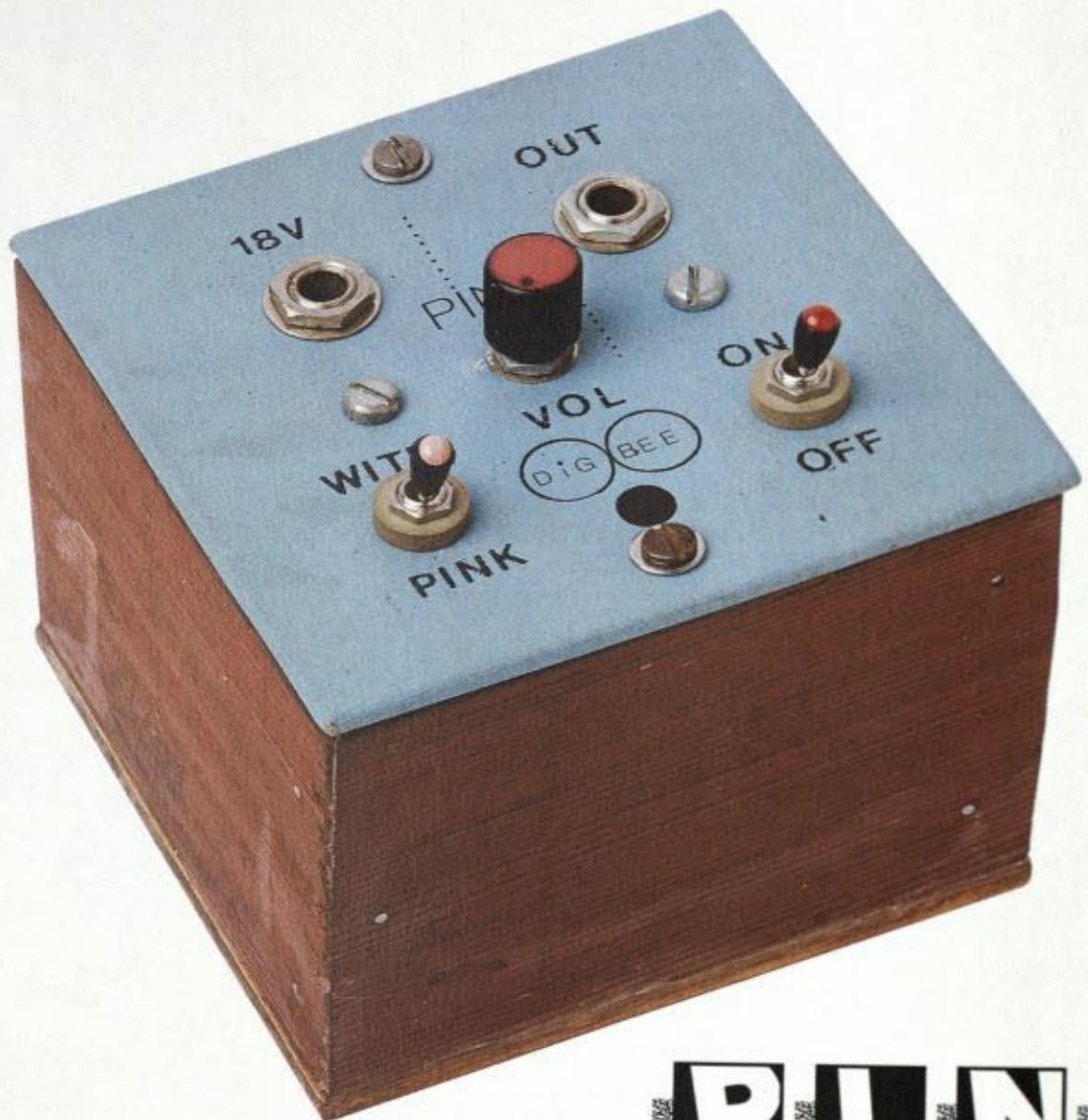
"PLAYING MY LUCK FOR ALL IT WAS WORTH, I ASKED THE LAMP FOR TOOLS AND IT GAVE ME WEIRD, UNFAMILIAR OBJECTS ... "

THEY'RE ALIEN TOOLS!  
I DON'T UNDERSTAND  
WHAT THEY ARE -- OR  
HOW THEY WORK!



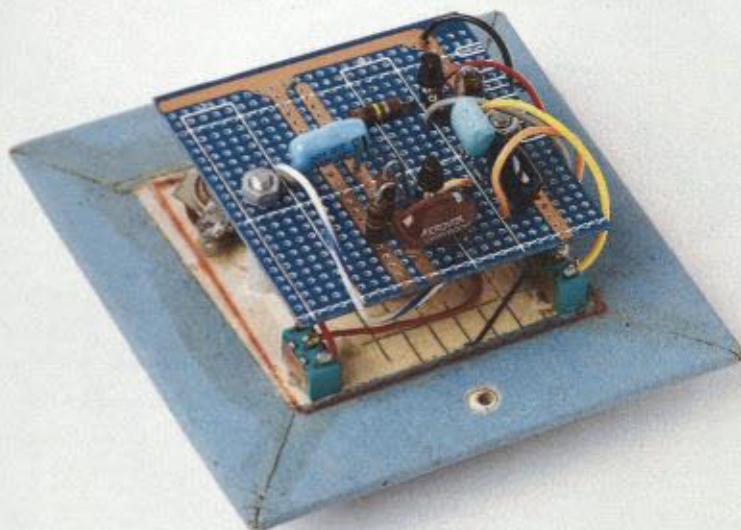
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# PINKY

**PINKY** - Pinky is a noise generator. It produces the higher white and the lower pink noise. Pinky makes nice TV "static" sounds, calm ocean waves, or bursts of steam and wind. The wooden box I built during my time as a custom picture framer. I'd use the shop after hours to cut and join my pieces of found wood, creating new homes for future musical instruments. I was channeling the look of Shaker design for Pinky, the Shakers being a religious sect known for their minimalist furniture design. They also made boxes, modest, with very simple colors. This box is my first to feature the dry transfer Letraset labeling. An art gallery I was visiting gave me a huge stock of the stuff, because they no longer used it. You transfer it, one letter at a time, by rubbing something like an unclicked pen against the alphabet sheets. If the Letraset sheet hasn't dried out from age then the letter will be transferred. The old sheets sometimes transfer a chewy letter, which can actually look very good for projects like mine. The transferred lettering I protect with a few coats of Krylon 1311 Matte Finish unless I need a gloss coat. The Pinky also was the first appearance of the "DIGBEE rings" logo. I simply wanted a decorative touch here and had a Letraset sheet with different sized circles. The logo has changed slightly since, with the bottom dot migrating up to join the rings. I once showed Pinky to an Asian man who repairs synthesizers, he looked up at me and said a single word, "Why?"



**P.1** - Another hardcover book top. I got the clean wrapped edge by peeling the cover fabric back beyond my desired outside dimension, cutting the cover to size then stretching the fabric back over the edge and adhering with book binding glue.

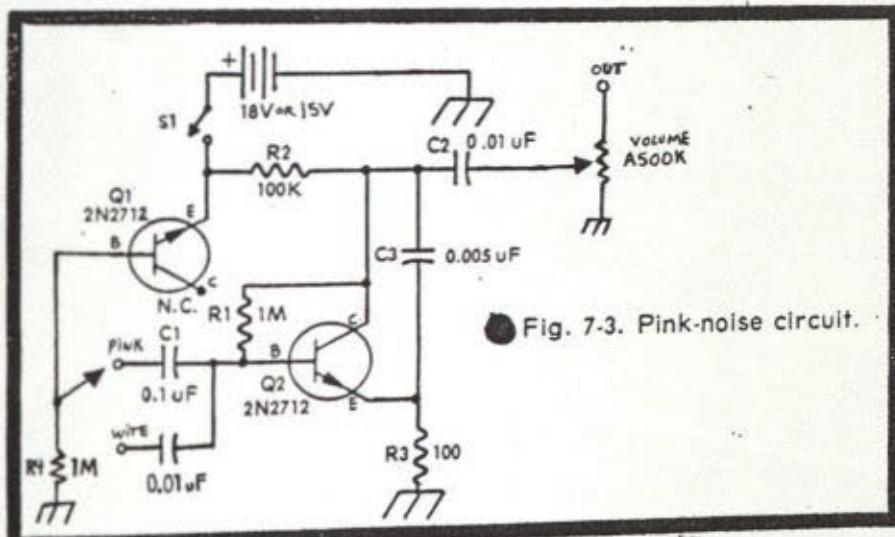


Fig. 7-3. Pink-noise circuit.

**P.2** - This circuit was originally printed in the article "Build A Pink Noise Generator" by John S. Simonton, Jr. in the December 1970 *Popular Electronics*. It was reprinted in 1974 in *Experimenting with Electronic Music* by Robert Brown & Mark Olsen. I added a way to switch between pink and white noise, as well as volume control to bring in and out the sound of "surf".



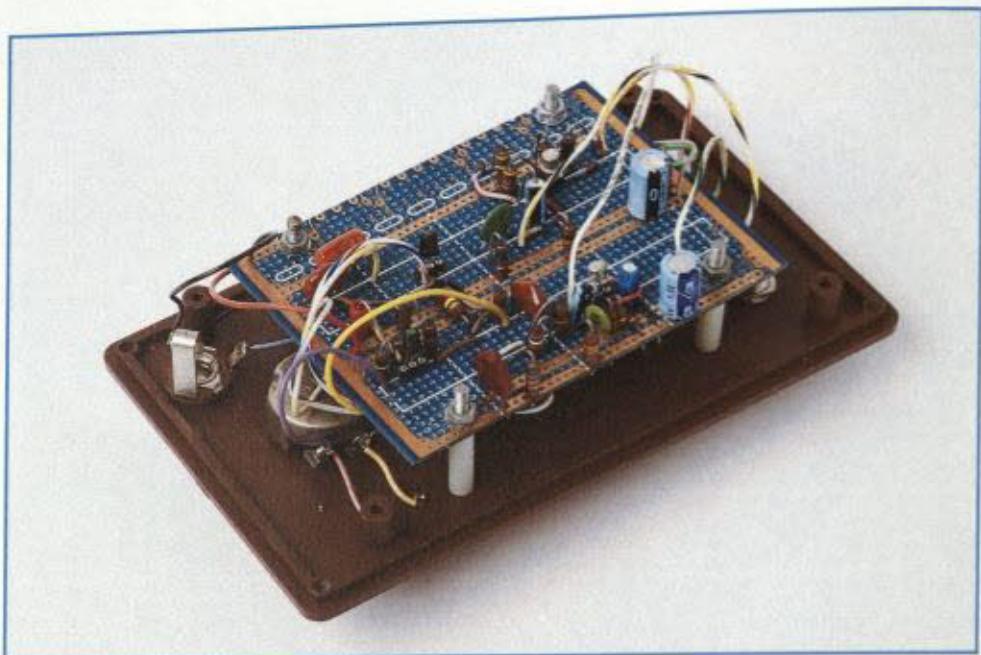
**BEEMER** - As the name suggests, Beemer sounds like the honking of a car horn, but Beemer's honk is controllable. Its pitch changes by the turn of the red dial. The softness or abruptness, and length of the honking sound can be modified by the Attack and Decay controls. The Tone switch changes the voice of Beemer, switching it, in musical terms between an alto and a baritone. Beemer almost sounds like a brass instrument, like a tuba or euphonium, but with a little more "buzzy" sound. Its case, some project box I was given, feels the way it looks, like a big soft piece of chocolate, which made this box build very easy going. The Beemer gets its name from my former bandmate's father's love of classic BMW cars. When the band wasn't recording we would go on drives in one of those lovely cars.



**B.1** - The brass tack body contacts act as a pitch bend. All these silver panels are actually chopped up pieces from the panel of an Eico decade box. Its chassis now houses the T&T box (coming up later). Like the Native Americans of old, every part of the carcass gets used.



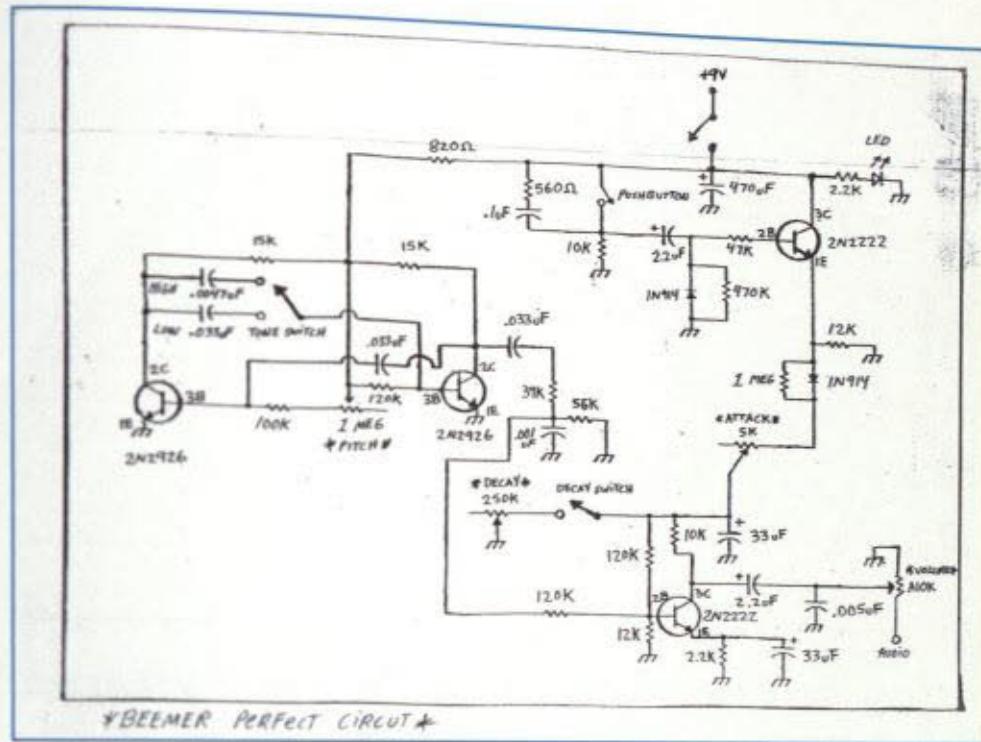
**B.2** - This "marbleized" toggle was made by dipping a small amount of Mr. Hobby lacquer paint into a small container of Plasti-Dip liquid plastic. The two won't chemically mix, so the mixture is given a little swirl, and when the switch is dipped into the plastic a look like this results. Plasti-dipping switches is discussed at greater length later.



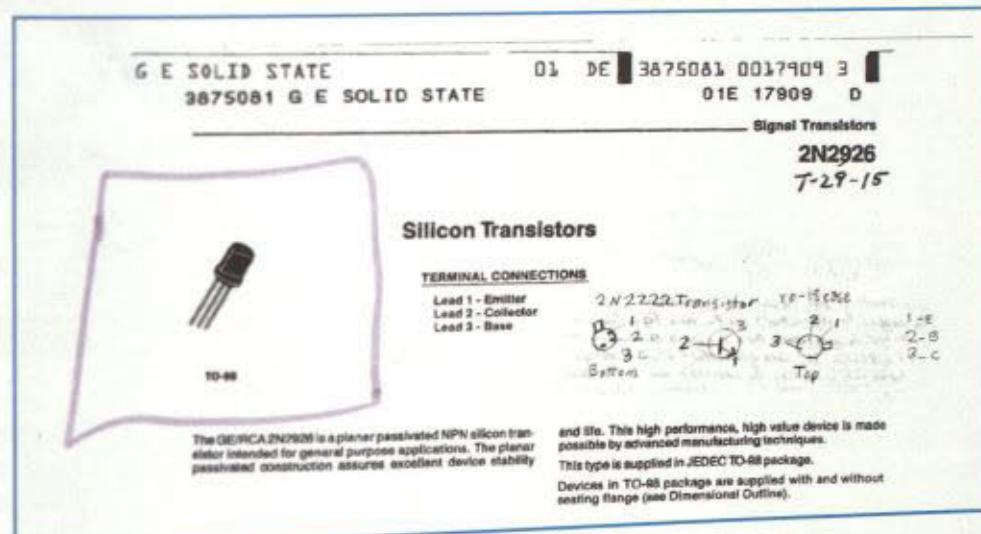
**B.3** - This is a rebuild of my original circuit. I buy most of my components used, many of which are old and grimy. If I don't clean their leads then they don't solder well. The first circuit had issues on account of some filthy leads.



**B.4** - It is some kind of shame that these beautiful tiny cities are hidden away inside a box. I think some of my future instruments will make these circuits available to view. The Group Motion Machine #2 (still to come) is my first foray into the "exposed circuitry" style.



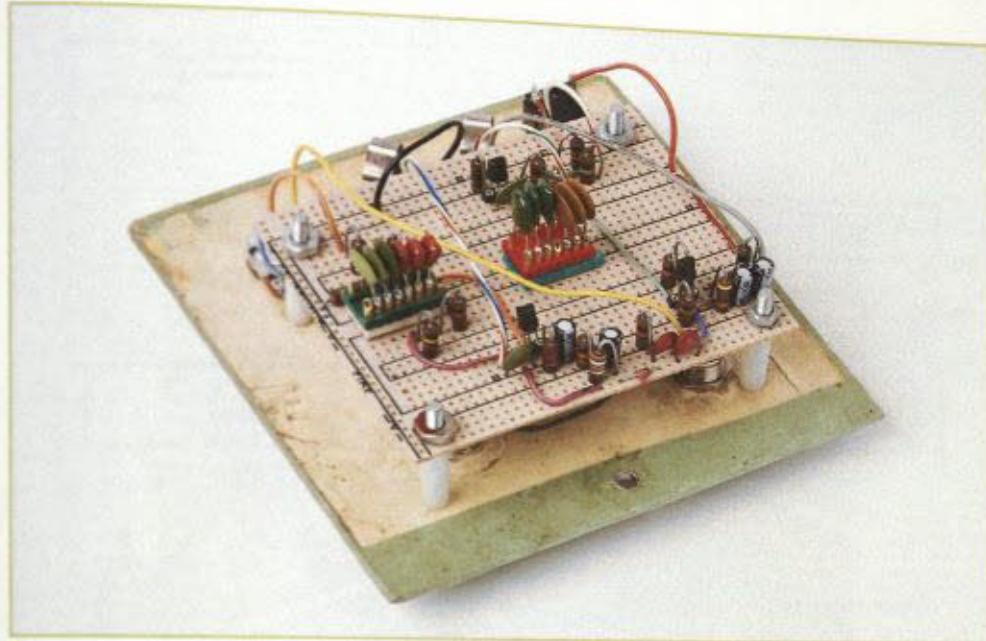
**B.5** - This circuit was originally published as "Honk Effect Circuit" in the book *Music Synthesizers: A Manual of Design & Construction* by Delton T. Horn. Shown here is the schematic with some of my subtle improvements.



**B.6** - Almost all my builds come from the pages of old magazines and books. The biggest issue with this approach for finding schematics is that old circuits are designed with old parts. It can sometimes be very hard to find a transistor or IC. The other solution is to find a modern equivalent that you can substitute for the original part. I'm sure this is a problem vintage car mechanics have as well.



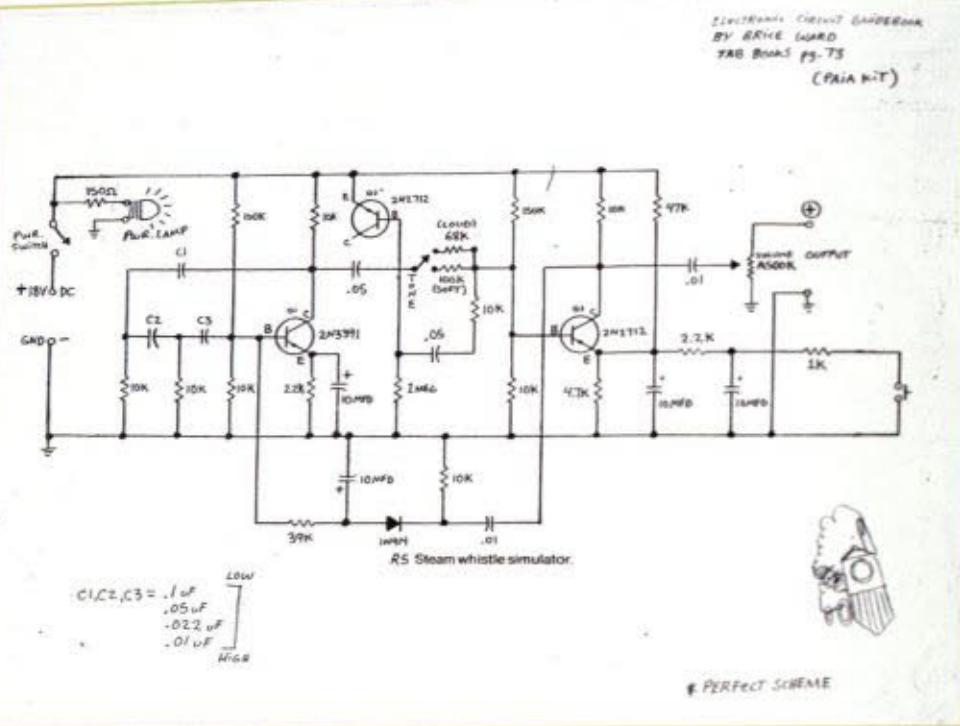
**R5** - The R5 is the train that runs from Philadelphia to some of its suburbs. I rode it weekly for several years on the way to the house where my former band recorded music. My R5 makes its own train sound. The push-button triggers the train whistle. A tone control switch adds or reduces the whistle's punch and apparent "steaminess". I love trains and have ever since I was a kid, and I get a great deal of use out of R5. It provides me my "signature sound" like those used by radio jockeys to remind the listener who you are tuned in to. R5 is evocative of model trains, which I don't think is far off from my own work. The wooden box, more salvaged piano wood, a glow in the dark tone switch, swirl painted push-button, Letraset and oil stick labeling, lacquer paint symbol, and finger print stamp. The train sticker on the side pulled from a sticker sheet for the anime Galaxy Express 999. The last touch is a Xerox transfer of the SEPTA logo (the symbol on the actual R5 train). The Xerox transfer was made by making a xerox of this logo, then soaking the paper with lacquer thinner and then rubbing the sheet against the panel, transferring the Xerox toner.



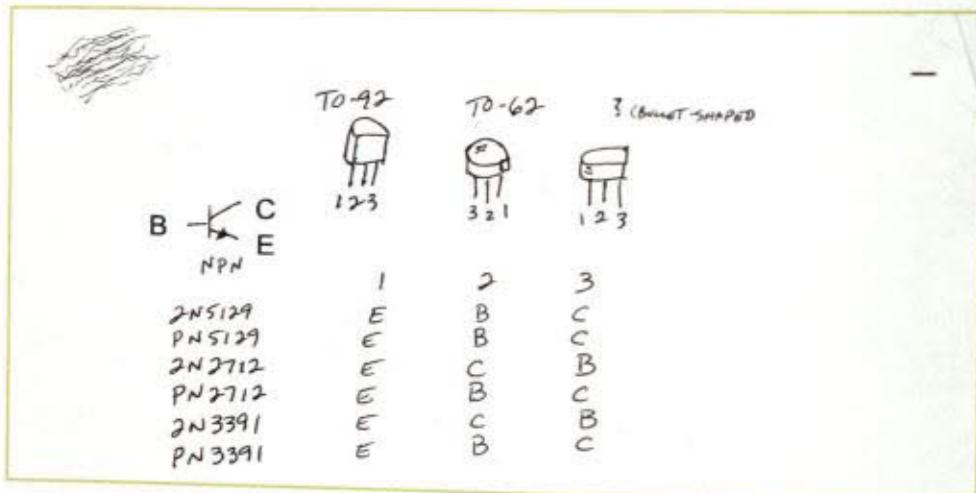
**R5.1** - I built a new version of my original circuit. Metal eyelets I added on the hardcover book top panel give a nice finish for the mounting bolt holes. The nylon spacers give some space between the circuit board and hardware. I either use these kind of spacers for the "sandwich" style or #4-40 angle brackets for the "vertical" style.



**R5.2** - Capacitor "train cars". Four different pitch options can be created by opening the box and removing and reversing the "green car" or swap in the "red car" behind it and place in either orientation. Not the sleekest control, but other switching methods proved problematic. A European "Heet Heet!" or an American "Hoot Hoot", and two spots between - choose the train sound you like.



**R5.3** - I built this circuit from the book *Electronic Music Circuit Guidebook* by Brice Ward, but it was originally an article by John S. Simonton in the May 1972 issue of *Popular Electronics*. The synth company PAIA also produced it as a kit. I added info for my silly "tone" switch and volume control.



**R5.4** - A diagram of the transistor lead orientation of the transistors in R5. You have to put the transistor in the correct way. I use nice gold, round-hole Mill-Max sockets for my transistors and ICs. Sockets allow a part to be easily removed if it is damaged, without de-soldering. You get sockets the size of the IC your using and snap-off single strips for transistors. Solder these sockets in and stick a tiny label beside it to make the orientation clear. Extreme attention must be paid to details; a misaligned part and you have a beautiful instrument unable to speak.

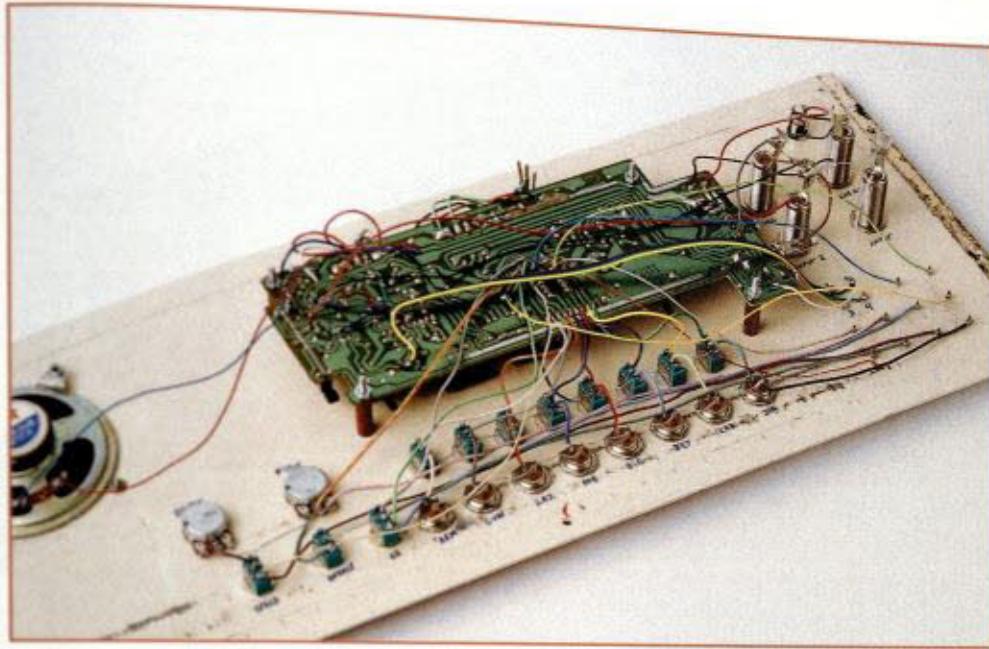


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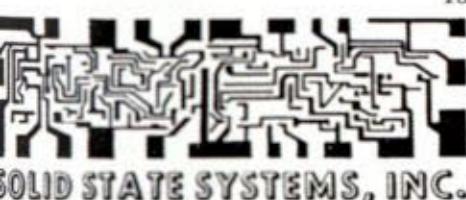


# coyboy 2

**COY BOY 2** - Coy Boy 2 is the center of my sonic network. It is a very powerful device, and generates its own unique world, the sounds of sizzling electricity, short circuiting crackles, a beeping laboratory, cannons of distorted blasts, a hi-jacked radio wave mainframe, and tiny electronic gremlins. It doubles as a mixer, all my separate instruments eventually funnel into the Coy Boy 2 and then are outputted to their destination. Coy Boy 2 speaks for itself as well, with a small internal speaker, which makes outdoor jams, and intimate indoor performances possible. I like to play quietly and sometimes when I jam at home I'll play just through this speaker. This was formerly a rather sophisticated child's toy which allowed one to be a DJ, mixing different tapes and adding sounds from its on-board effects. I modified the effects dramatically with sound-altering switches and dials, but most importantly the body contact panel. This panel connects to the circuit's sound generating chip, and interfacing with these points is where most of the control comes from. These points dramatically affect, and are affected by my other instruments. It takes a good deal of practice to operate Coy Boy 2 with any degree of control, it's a wild instrument. The wooden case is made from old floor boards, and the top panel a discarded piece of an unusual type of textured plastic from an old electronic organ. The name Coy Boy is in reference to an old album I recorded called *Coy* that was made using a good deal of radio transmissions. Coy Boy 2 makes the sounds of that album in a fraction of the time.



**CB.1** - Another re-housed circuit, freed from its commercial shell. I found the original electronic toy in the basement of my old house, a previous tenant having left it there. I opened up its case and the first thing I did was touch the solder points connected to the board's main chip, the sounds went crazy, and I knew I had a winner.



SOLID STATE SYSTEMS, INC.

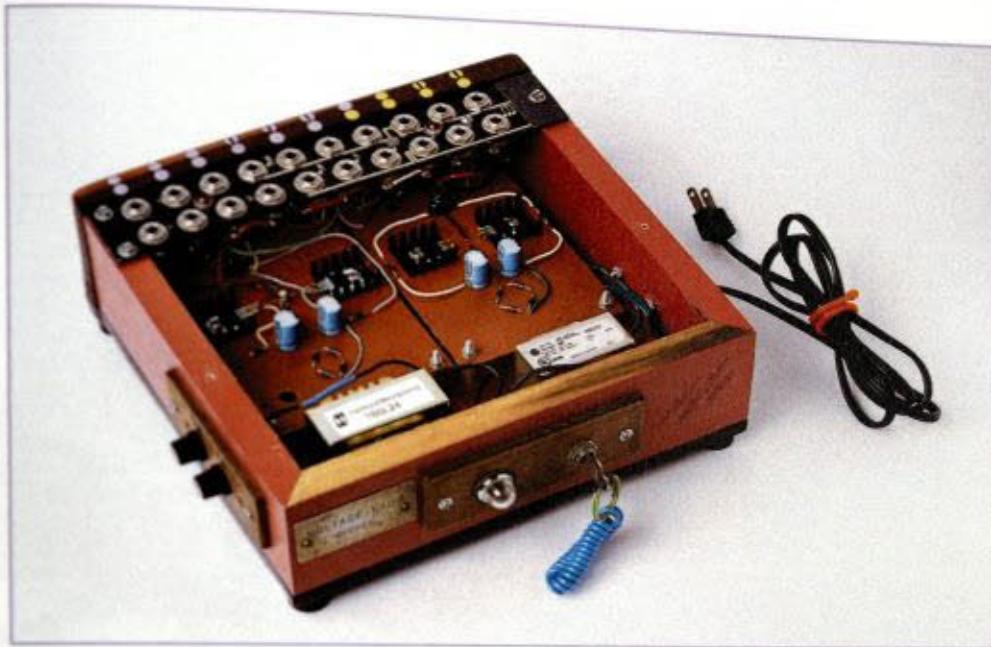


**CB.2** - Pictured here on the right is the Coy Boy 1, the original device that I re-wired. I added a number of switches, jacks, and body contacts. Typically I don't like the look of commercial equipment, but this piece is a notable exception. It really does have great design and already fits in with many of my instruments. For how much sound it creates and the fact that it acts as my sound systems final mixer I really felt that if it was going to be the flagship of my fleet that it would need my full custom treatment. The Coy Boy 2 was my first draft pick when considering a mobile live performance rig. This meant I was looking to make it double as its own suitcase, so I built it with travel in mind. Pictured left is Coy Boy 2's removable lid attached, leather handle, and d-rings for connecting a leather strap.

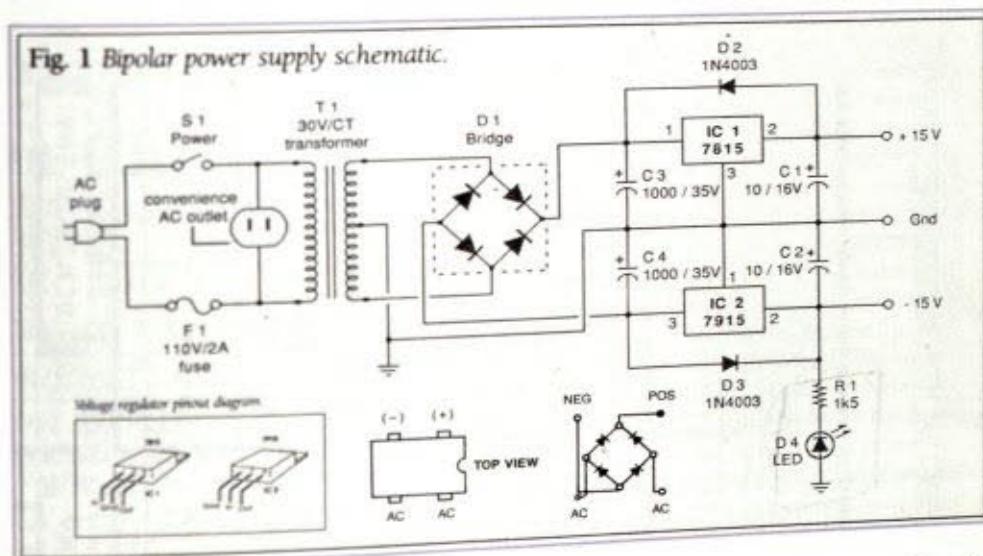


# VOLTAGE f a r m

**VOLTAGE FARM** - Batteries allow electronic music to be played anywhere, regardless of whether an AC line is available. This opens up a whole range of locations to share your music; a picnic in a park, a mountaintop, beside a creek. Outside of instances like these, batteries are a hassle. They can die at inopportune moments, spill acid inside your gear, leave you triple checking your devices after every session to make sure they are off, and of course trying to find a place to responsibly dispose of the dead boys. The Voltage Farm was developed to free me of these issues. It was designed specifically for my home studio, too big for gigging, but with enough power outputted to feed all my hungry machines. The Farm plugs into the AC line and through a bank of 1/4" phono jacks outputs single and dual 9Vs and 15Vs to all the devices presented in this book. The case was created from some scrap wood salvaged from a pool table and a kitchen cabinet door acting as the Farm's top. The jack panel is actually the face plate of a PAIA Master Synchronizer. Engraved lettered front panel and temporary tattoo X-Men electricity bolts provide the décor. The purple and green dots are a key for which jacks output which voltage.



**VF.1** - The Farm's interior. Left side 9V circuit, the right side 15V. The front switch, to the right of the power lamp, is actually an electrical switch that is turned on and off by a removable key, so the activation of my entire system is controlled here, like an old car or piece of farm equipment.

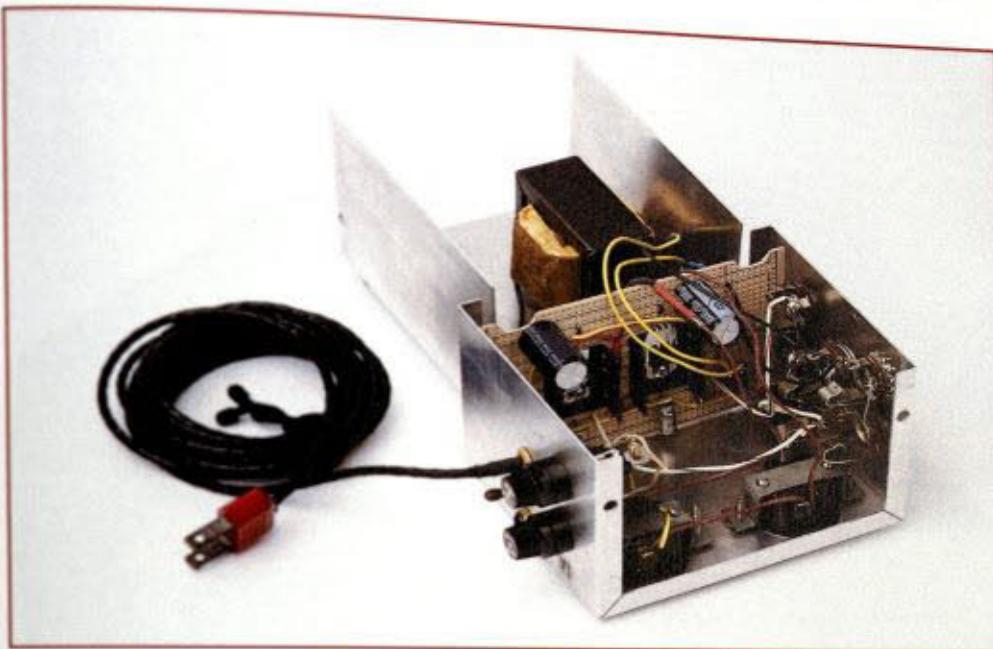


**VF.2** - This circuit was designed by Thomas Henry and originally printed in the November 1987 issue of *Electronic Musician* magazine. The original article "Build a Bipolar Power Supply" just showed building a 15V version. I swapped in 9V regulators in the scheme to produce the Farm's other half.

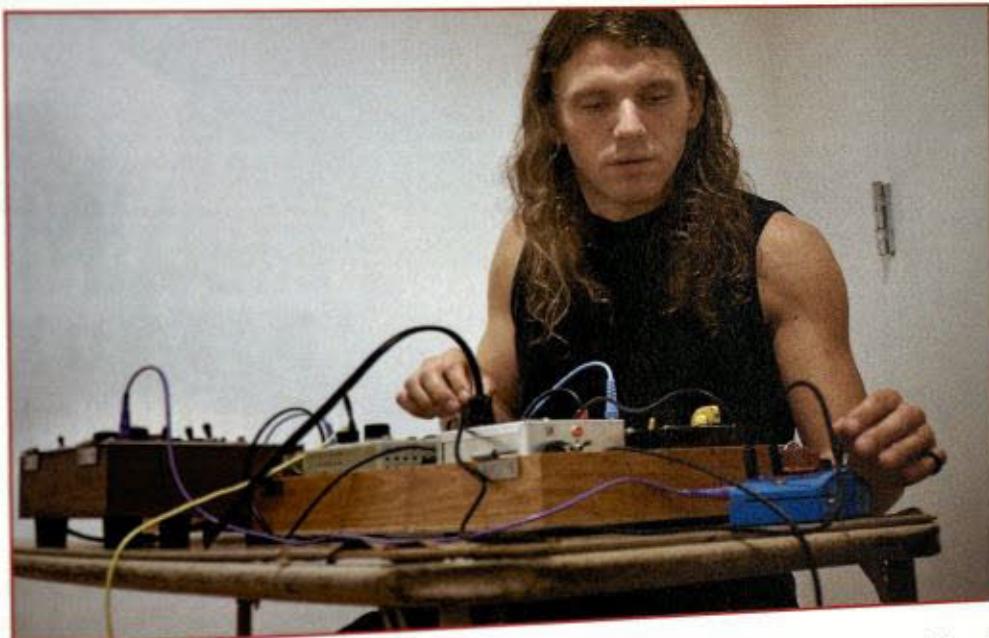


# MOBILE PS

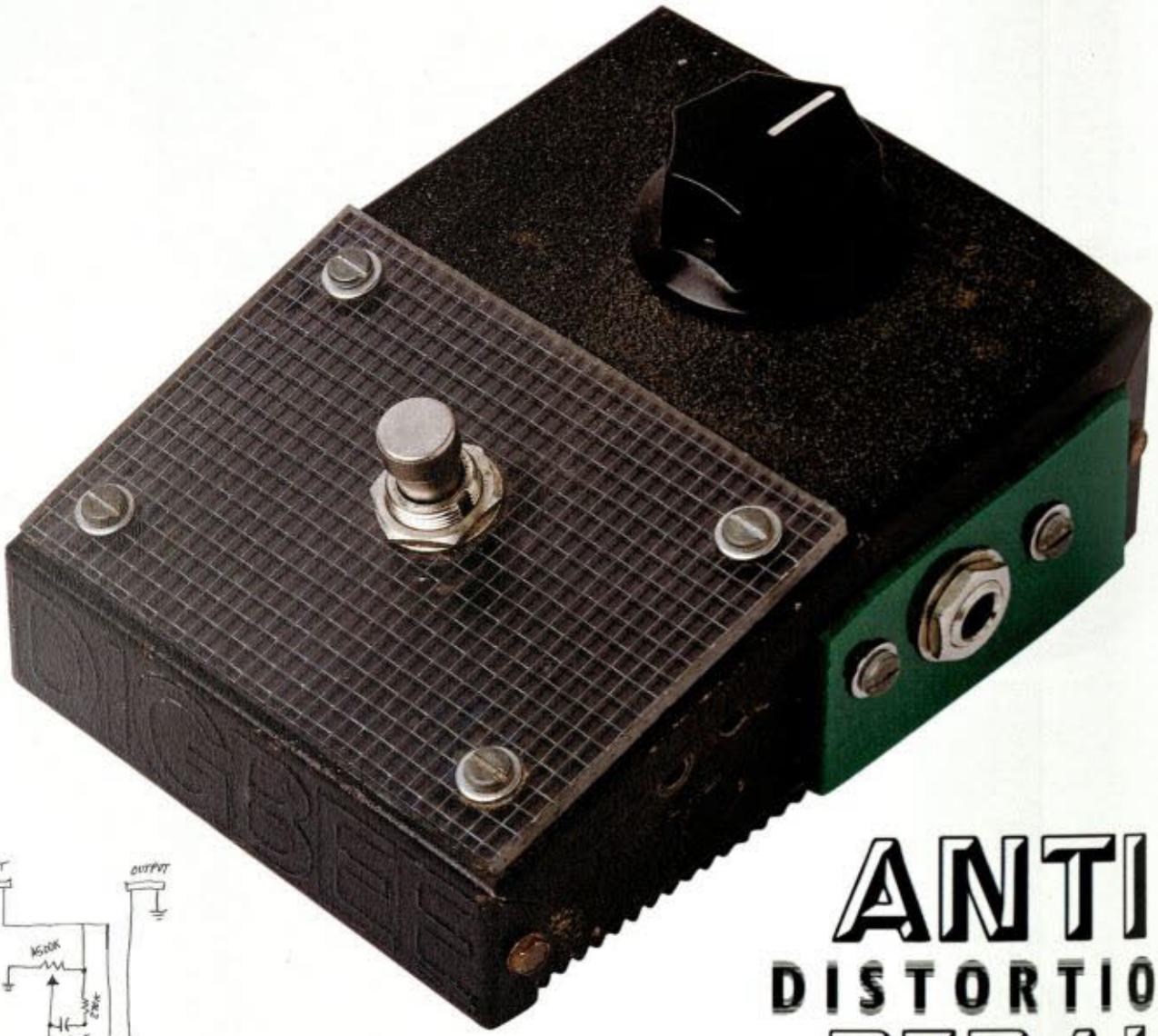
**MOBILE PS** - After experiencing the benefits of a devoted home power-supply I knew I would need one for the rare instances I leave my house and play gigs for the public. The Mobile PS contains the single/dual 9V power supply circuit that is found in the Voltage Farm. This small aluminum project box packs 1 AMP of power, and easily powers my typical mobile "Gig Rig". Its function is simple, so I kept its look simple. Two fuse holders on the case's side, one connected to the AC line, the other holder contains a spare for back up in case of a blown fuse.  $\frac{1}{4}$ " phono plugs again for voltage outs, and two convenience AC outlets to power other self-powered equipment or a lamp if I am playing in a dark venue.



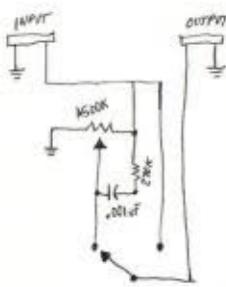
**PS.1** - Precise measurements were taken before hand to make sure everything would fit in this little case. A big tapered reamer bit was used to drill the big holes in the case to mount the AC sockets.



**PS.2** - Here is me playing live. The Mobile PS can be seen doing its job. I generally keep the Mobile PS in the wooden suitcase shown here. Like a case for camera equipment, bright green foam insulation was cut for the interior with wells cut out to hold secure the Mobile PS as well as a few of my favorite sound-making devices. It has its own removable top like a DJ set up. I show up like an exterminator, "What's the problem? Oh, you need strange music, OK I'll get right on it."



# ANTI DISTORTION PEDAL



**ANTI-DISTORTION PEDAL** - The Anti-Distortion Pedal I created as a commission for a friend of mine. He needed a device to use with his guitar that could simply switch between the guitar at full volume and a lower volume of his choosing. So that is all this device does, the knob setting the lower volume, and the stomp switch for selecting between the two. The resistor and capacitor in the schematic prevent tone loss when using the dial. I've included this device here as it was the first implementation of several ideas that were new at the time, but have since become staples of my builds; the use of skateboard grip tape, ribbed rubber no-slip mats, as well as big sticker letter labeling. The case is a model train speed controller. A wire mesh infused plexi was used beneath the switch, a material I'm looking to use more in the future. I built this years ago. It's the last device I finished before I had health issues that affected my hands, keeping me from my work for five years, when I began work again 2 1/2 years ago I picked up exactly where this box, stylistically, left me off.

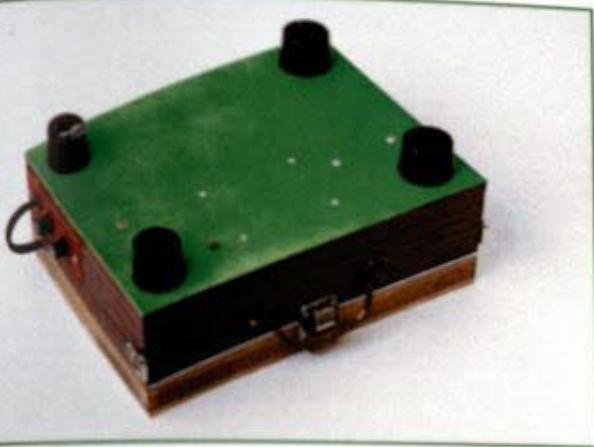


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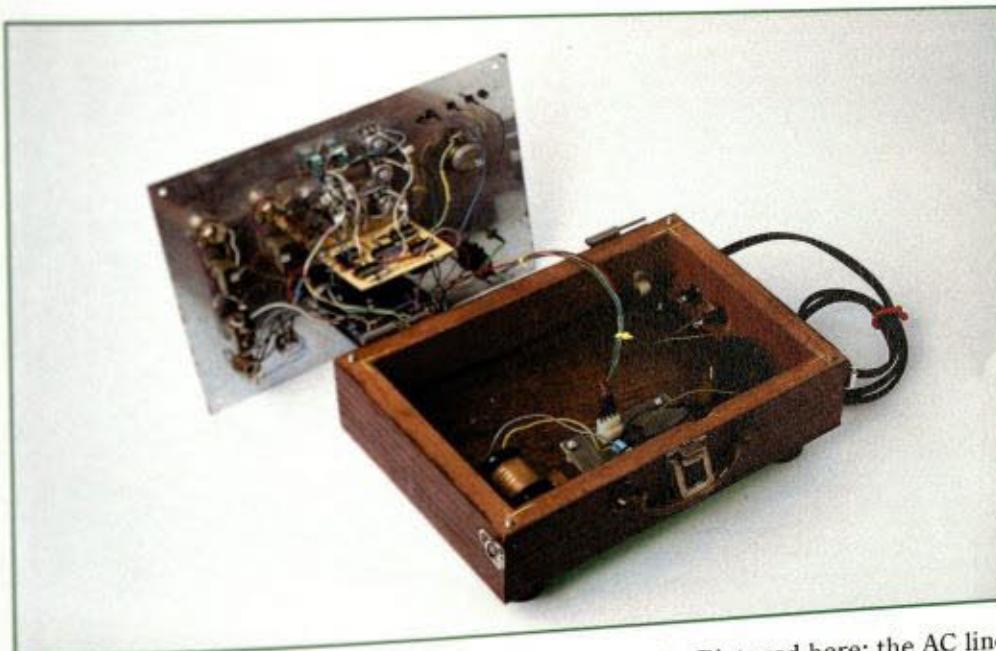


## RTL SPECIAL®

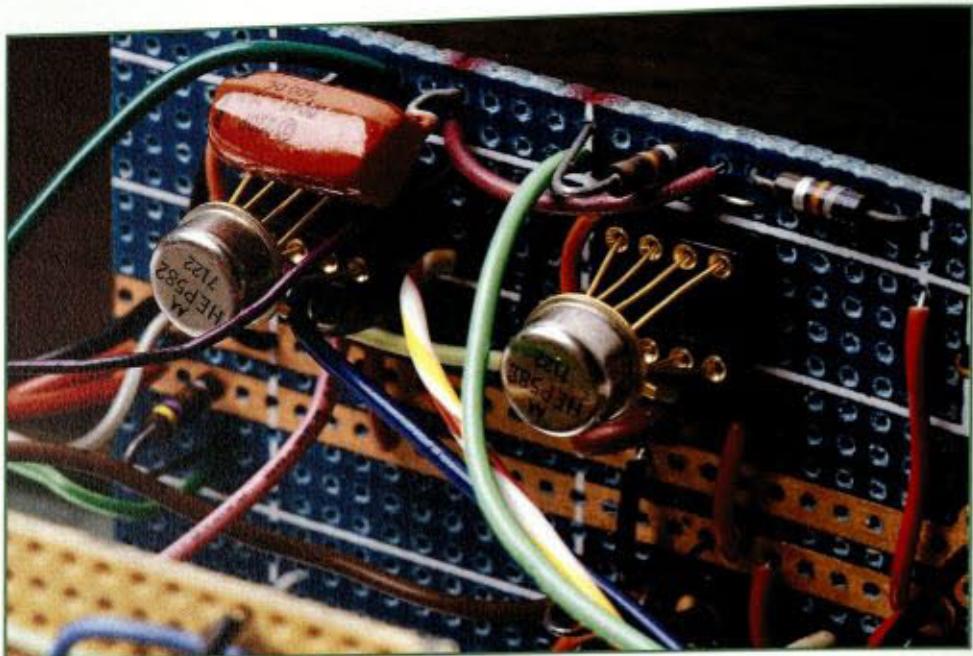
**RTL SPECIAL** - Charles Cohen was critical early on in helping to foster my interest in working with musical electronics. He helped me troubleshoot a lot of my first circuits, as well as giving me old electronic publications to encourage my pursuit. He also had this folder that contained Xeroxes of schematics from his own early days of instrument building. The folder contained a great deal of his friend and former bandmate Craig Anderton's early hand-drawn schematics, which dated back to the late 60s and very early 70s. The original schematic for Craig's Modulator was one of the bunch. (The third page following is the original schematic with some of my notes. For pictures of his two original Modulators see Anderton's Artist Feature). Despite the circuit's age and the obscurity of some of its parts, I was hell-bent on producing my own. The RTL Special is my own version of the Modulator. The moniker RTL is derived from the name used for the first digital ICs that comprise the heart of this instrument's circuit. The RTL Special is a very square oscillator with a bank of 5 mixable frequency divisions for producing a variety of oscillator tone combinations. An adjustable Vibrato control is included as well. The only addition I found to add was my three body contacts to better integrate The Special with my system.



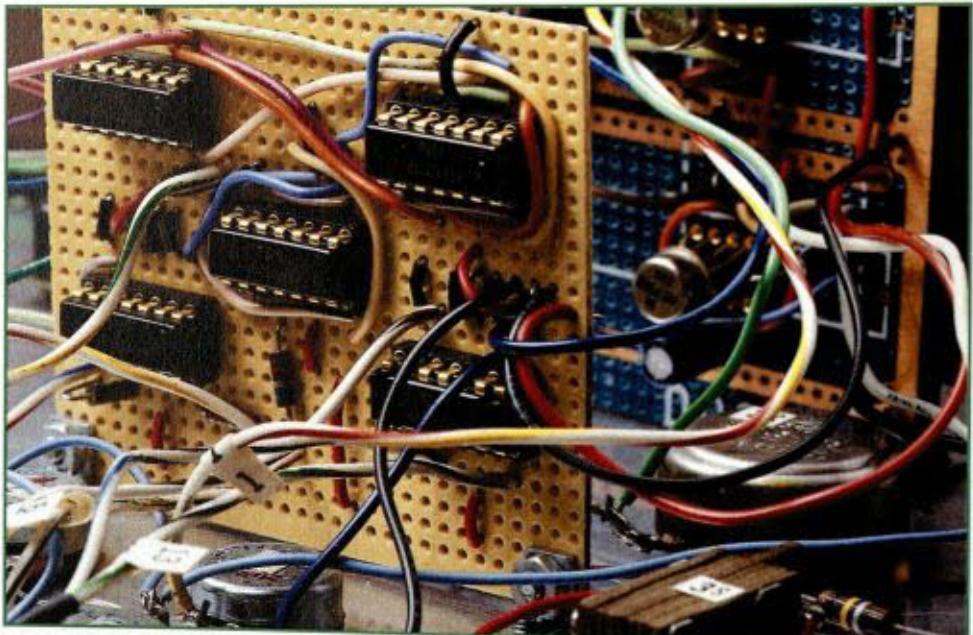
**TL1** - When I was envisioning this instrument I kept imagining something almost unnecessarily "chunky" in its aesthetic and ergonomics, as if to cater to a gorilla, or a ham-fisted train conductor - that meant huge dials and big pitches. I also wanted it to look like something you'd find in a barn in some strange rural future, a device that maybe operated a hay carrier or was an instrument in the local jug band. This red colored wood box I built did the trick. I spray painted the bottom neon green, so when the box is placed on light-colored tables with adequate sunlight it produces a glowing effect. Giant rubber feet I found that must have formerly been beneath a refrigerator put the whole look over. Removable latch top with a groove for securing the AC cord during transport make this an instrument ready for travel.



**RTL.2** - The very pretty interior of the RTL Special. Pictured here; the AC line fuse holder plus back up fuse holder, AC cord secured to the side walls and my home-brewed copper strap for ratcheting down that giant capacitor that provides all the filtering this power supply demands.



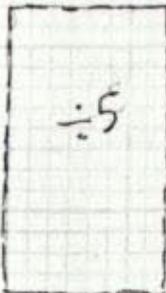
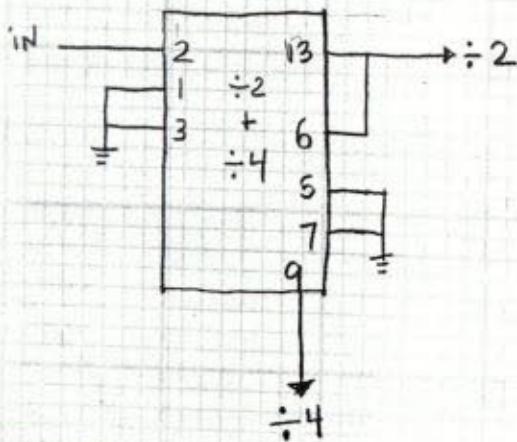
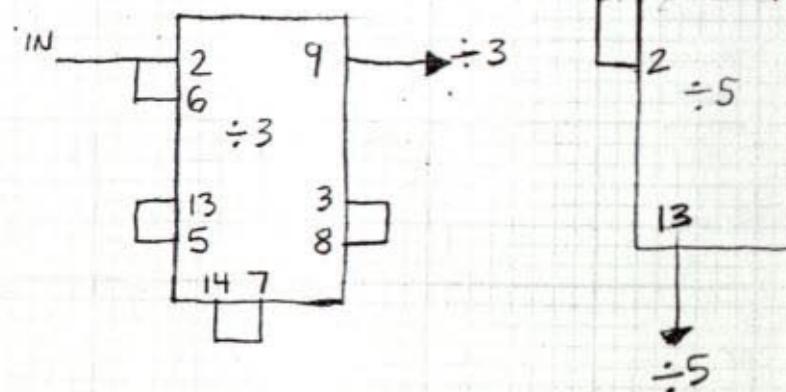
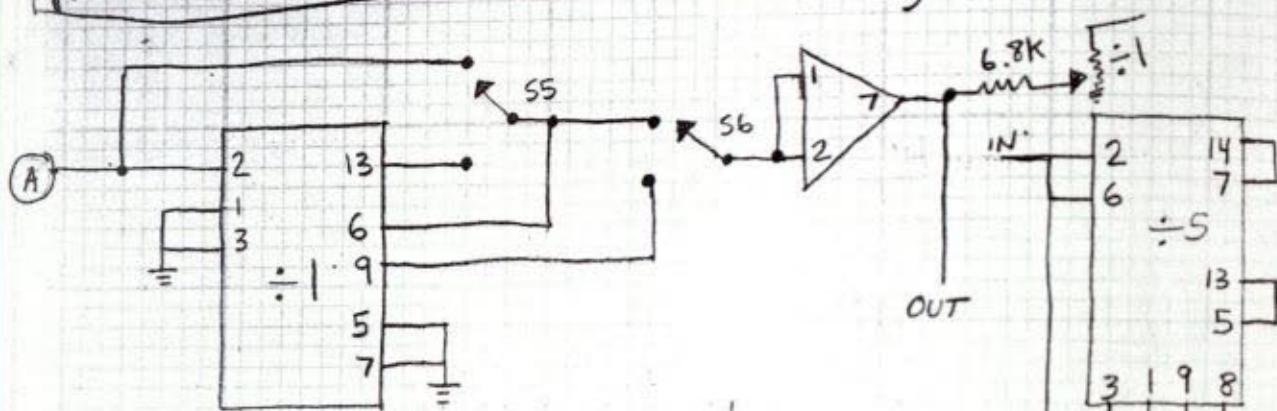
**RTL.3** - The control and audio-oscillator portion of the circuit pictured here. A square type IC socket used for these old round canners. A nice little trick. I call this "War of the Worlds socketing" after the look of the Martian fighting machines from the H.G. Wells novel.



**RTL.4** - Closer to camera here is the frequency division circuit board. A network of flip-flop ICs take the original audio oscillator frequency and divide it in order to produce what basically amounts to five different octaves, which can then be mixed into a very rich range of combinations.



RTL SPECIAL DIVISION CHIP WIRING 1/2 Hep 582 #3



\*  
 $P_{IN\ 11} = +3.6V$   
 $P_{IN\ 4} = -$

DCS = MC790P/MC791P

## **LINE OPERATION**

Ac-line operation requires immense electrolytic capacitors, a regulator, or both to obtain the low ripple at high current levels required for IC work. The elegance of the required supply increases with the current requirements and the complexity of the actual IC circuit.

For a circuit using IC's only and no indicators, with a total current drain of less than 500 mA, the brute-force filtered supply of Fig. 1-18 may be used. The circuit includes a conventional filament transformer, two silicon diodes, and a large-value electrolytic capacitor. This source capacitance is required in order to avoid low-frequency oscillations. The 1.0-microfarad capacitors shown in this size are placed in the input stage.

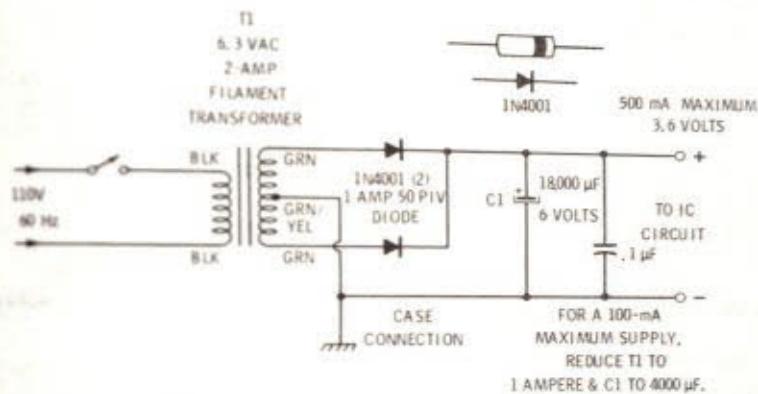
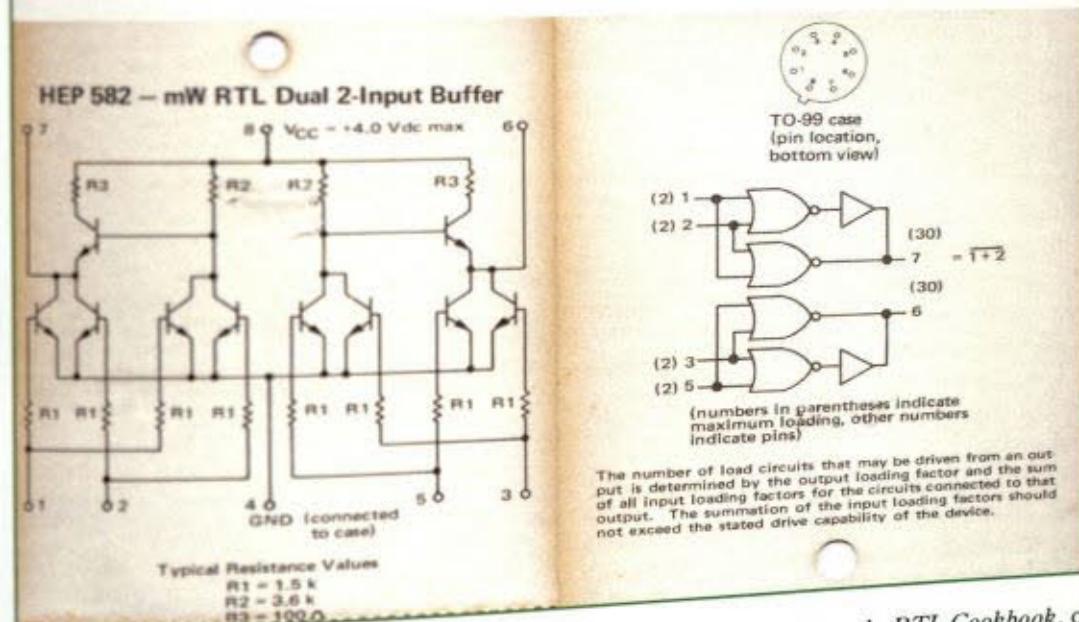


Fig. 1-18. Filtered dc power supply.

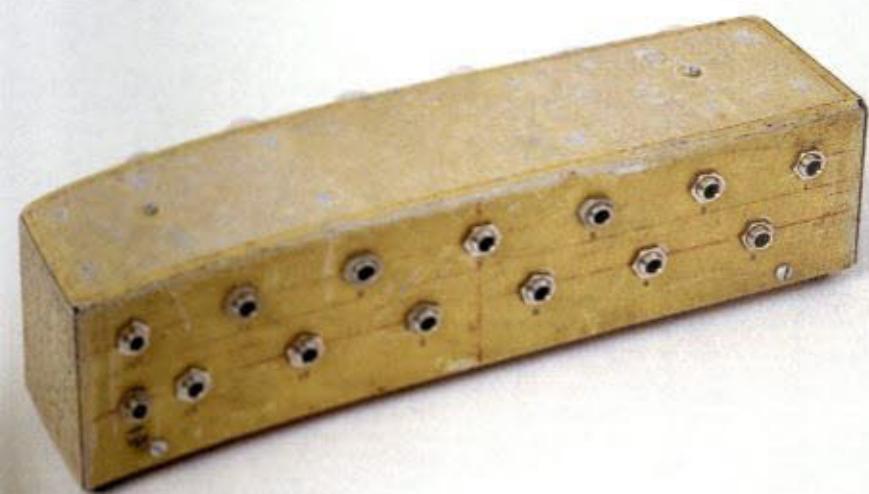


**RTL.4** - At top is the schematic, originally printed in Don Lancaster's *RTL Cookbook*, of the power supply in the RTL Special. Beneath that is the technical data from the back of the packaging of the round can HEP 582 ICs used in the circuit. A great deal of hunting was involved in tracking down these components. An updated version of the RTL Special's circuit with modern components I assume could be designed.



# JUMBO MIXER

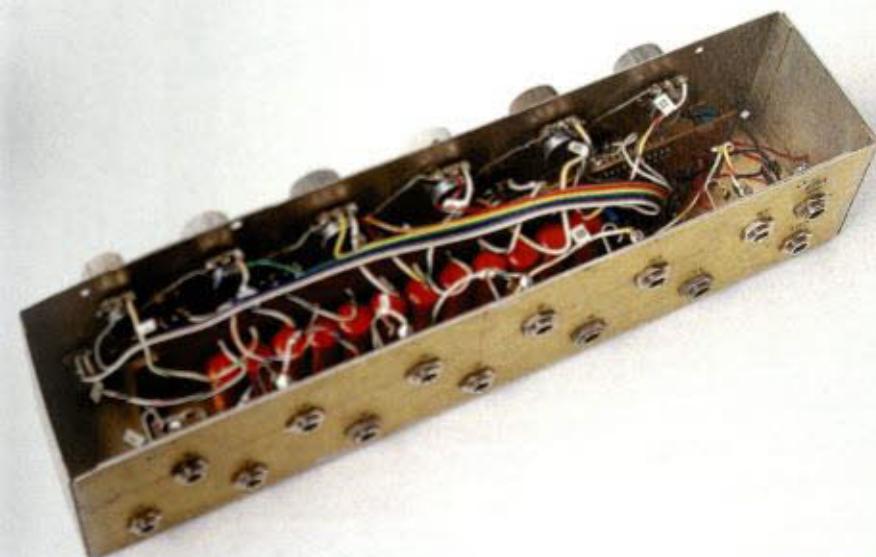
**JUMBO MIXER** - Two distinct problems arise as you make more music machines, one, is the distribution of power to all the devices, which was resolved by The Voltage Farm, two, is the mixing of all the audio signals, which is resolved by this box, the Jumbo Mixer. I needed the bare minimum when it came to a mixer, just a bank of twelve inputs with each channel having its' own volume control and a single output. All my other demands were physical, the dimensions for the case. I couldn't find anything commercially that matched, and seeing as my whole rig is built by my hands I figured so should be the mixer. So along came the Jumbo. Clear grip tape adorns the top and hides holes from the cases mysterious original use. The name Jumbo comes from a diner in my area called Jumboland, where one could find disco fries and a sprinkle cone.



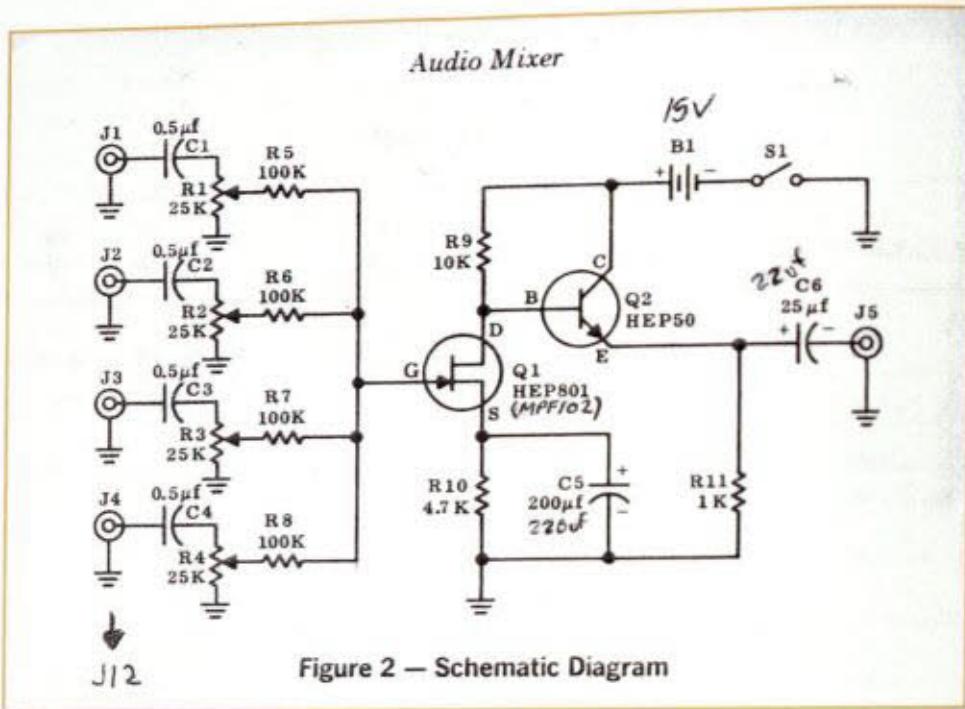
**JM.1** - The case is a strange piece of what looked like some military device that I carved up and drilled to fit the Jumbo. I found it in my favorite salvage shop Soundex Electronics (R.I.P.). The owner of the shop would do clean outs and have the booty in a giant pile in the front of the shop's garage bay until auction time. You just had to jack-knife dive into the pile and come out with whatever material inspired. This lemon lime aluminum case was an obvious purchase.

# BUILD YOUR OWN UNIVERSE

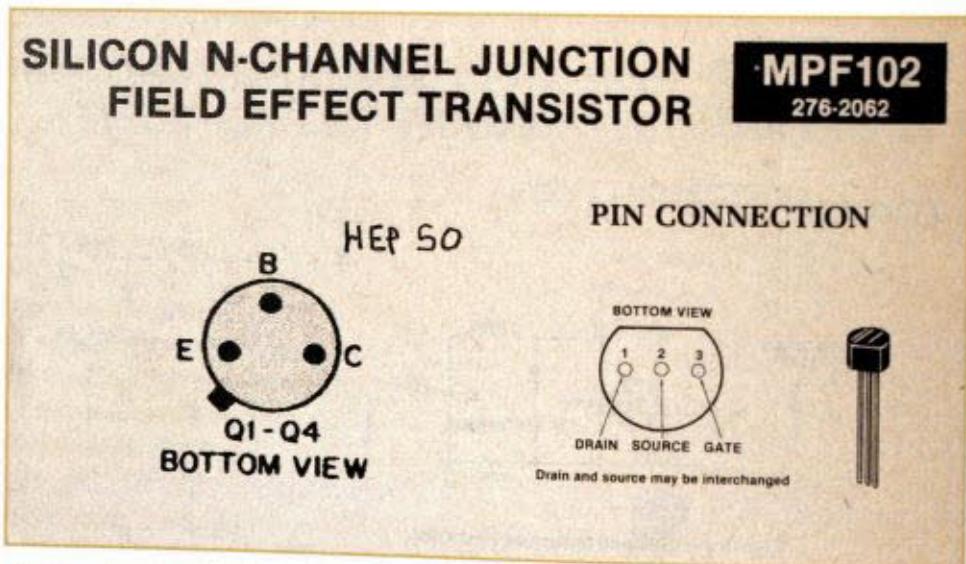
15



**JM.2** - I found most of these dials while in AZ at a great surplus shop called Apache. Racks upon racks, a dizzying amount of great old salvaged equipment and components, in the desert, hot as hell, and at one point I looked down and saw a cat struggling to relieve itself in the aisle, and I thought to myself "yeah, and of course you got that going on." The colored dials match the color of the device used in that particular channel, some colored as I found them, some painted for custom colors.



**JM.3** - This schematic was originally printed in the *Motorola HEP Field Effect Transistors Projects* book from 1966. The left side of the scheme was duplicated 12 times for my twelve channels. My other slight changes are written in pencil. The Jumbo Mixer didn't operate when I first built it, I shelved it for some time and then revisited it and tried running it off 15Vs instead of the 9vs called for in the original text, and bingo, it worked. These moments in electronics can be wildly frustrating, but persistence does pay off.



**JM.4** - Above are the lead orientations for the two transistors used in the Jumbo Mixer.



16



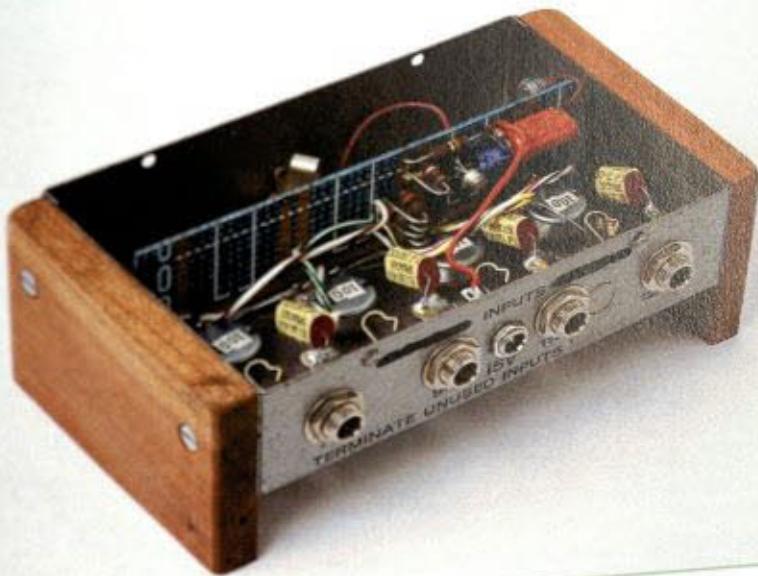


# Pixie mixer

**PIXIE MIXER** - The Pixie Mixer was originally planned as piece for my "Gig Rig", a mixer I'd use for performing live. I couldn't find a mixer circuit that would run effectively off of a single 9V supply, the same issue I'd had developing the Jumbo Mixer. What I ended up building worked great off 15Vs, once again like the Jumbo Mixer, but it therefore wouldn't interface with the output of the Mobile PS. I decided I'd keep the mixer I'd finished as is, but changed its intended purpose. The Pixie Mixer now acts as an auxiliary mixer to my main studio rig, so in the almost impossible chance that someone comes to my remote rural town to jam, they can use the Pixie Mixer for their gear and their rig will then be patched easily through my system. Consider the Pixie a mini-Jumbo. A rubber stamped neon price sticker provides its name tag.



**PM.1** - Anticipating mobile use, I created a removable cover. I bolted wooden side panels to the case and countersunk magnets into the top. I mounted matching magnets on a wooden lid, leather punched holes in the foam for the knobs and adhered it to the wood top. Here is the Pixie with its top on.

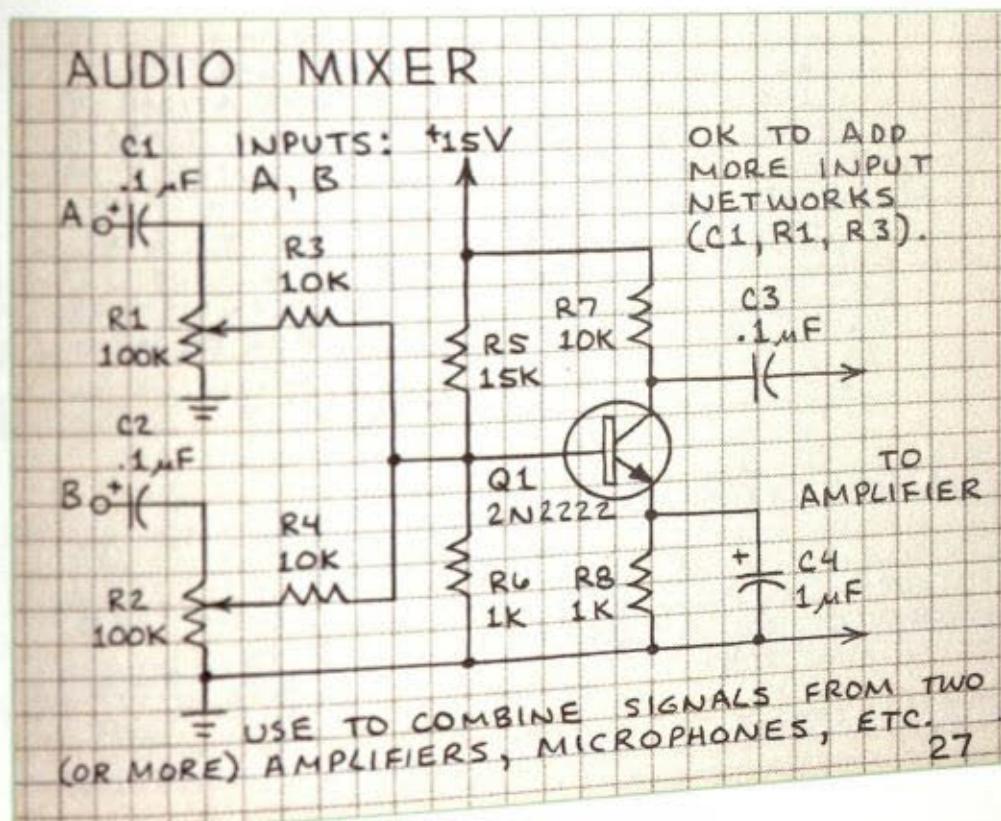


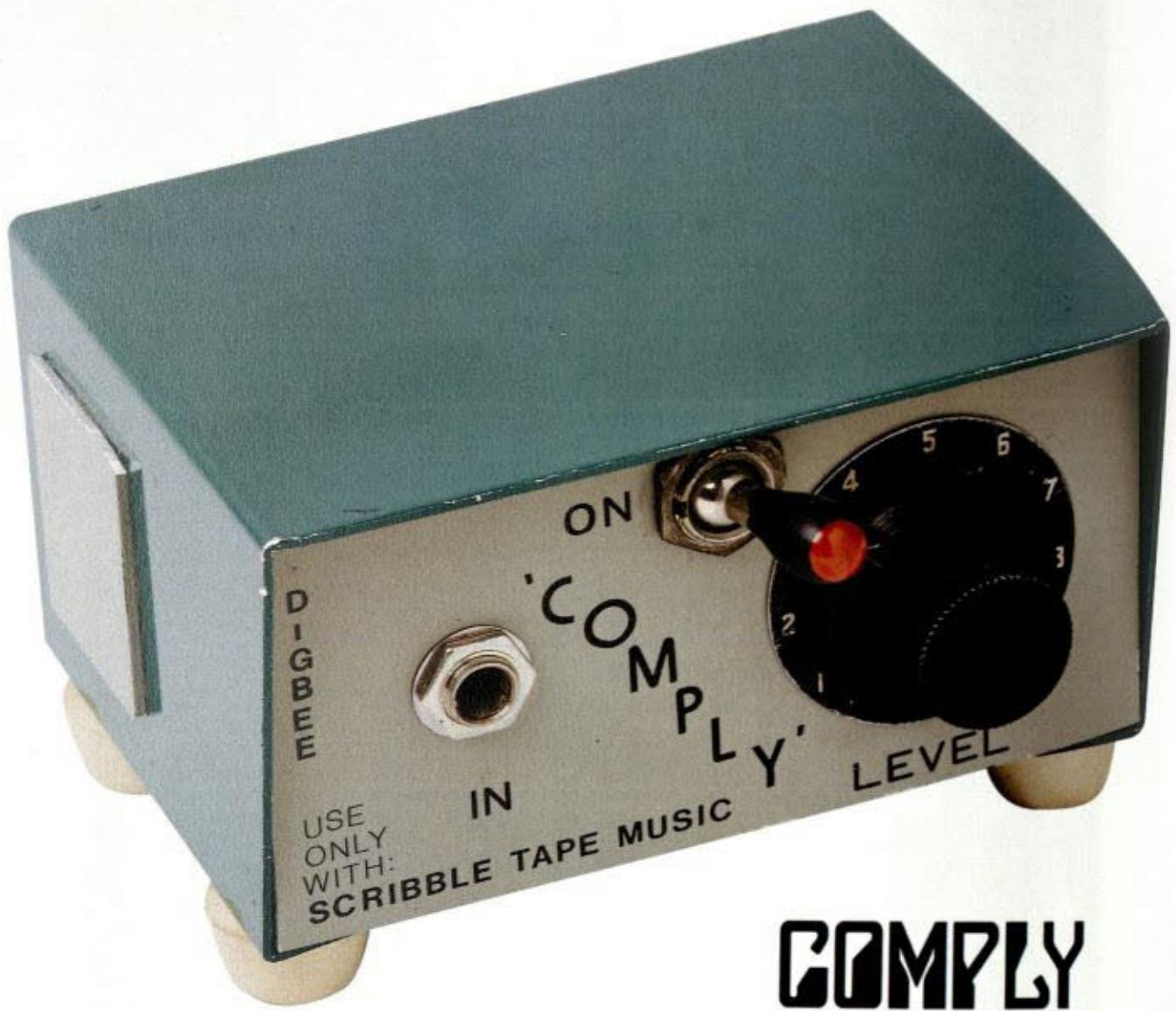
**PM.2** - I bought this case from the same man the Gooch was named after. I believe it was some cable-TV related box made by a company called Jerrold. I gutted it, and made some slight alterations for it to serve my purpose.





**PM.3** - The printed lines from the jack to the dials and the word "output" were already printed on this case which made my job designing much easier. I substituted my name in place of the manufacturer's original name, leaving the Philadelphia address below, as I once lived there, so this detail isn't without meaning. Below is the original schematic as printed in Forrest Mims' *Engineer's Mini-Notebook - Basic Semiconductor Circuits*. The only change here is 15V instead of 9V for the supply voltage.



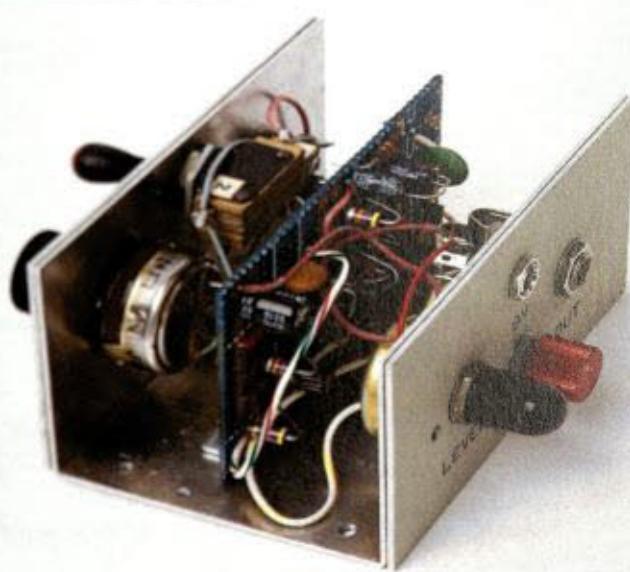


## COMPLY COMPRESSOR

**COMPLY COMPRESSOR** - The Comply Compressor acts as a recording aid. Many people use this effect with guitars as well. For my purposes it is beneficial between the final output of all my combined instruments and my recorder. The Comply lifts the volume of weak sound signals and provides a ceiling, a prescribed level which the Compressor won't let signals go above. Both these settings are independently adjustable. The Comply schematic was first printed in the February 1968 issue of *Popular Electronics* with an addendum article for using the circuit with guitars by Craig Anderton in the May 1969 issue. I actually had a case in my collection that looked identical to the one built in the original article. I, of course, added some of my personalized Letraset lettering. I haven't fully explored this device's use, but I see it potentially in a live arrangement, more like the Compression used in country music, a style I'm being pulled increasingly towards.



**CC.1** - The output trimmer dial is adjusted with a screw driver, and once set is covered with the black cap shown. This prevents it from getting toyed with. The Comply tends to get a bit bassy so the red dial controls the level of the bass tone.



**CC.2** - My circuit was built as the original article instructed, but I redrew the portion at the bottom of the following page, fusing the bass-cut filter with Anderton's guitar pedal version.

\* COMPLY PERFECT CRKT

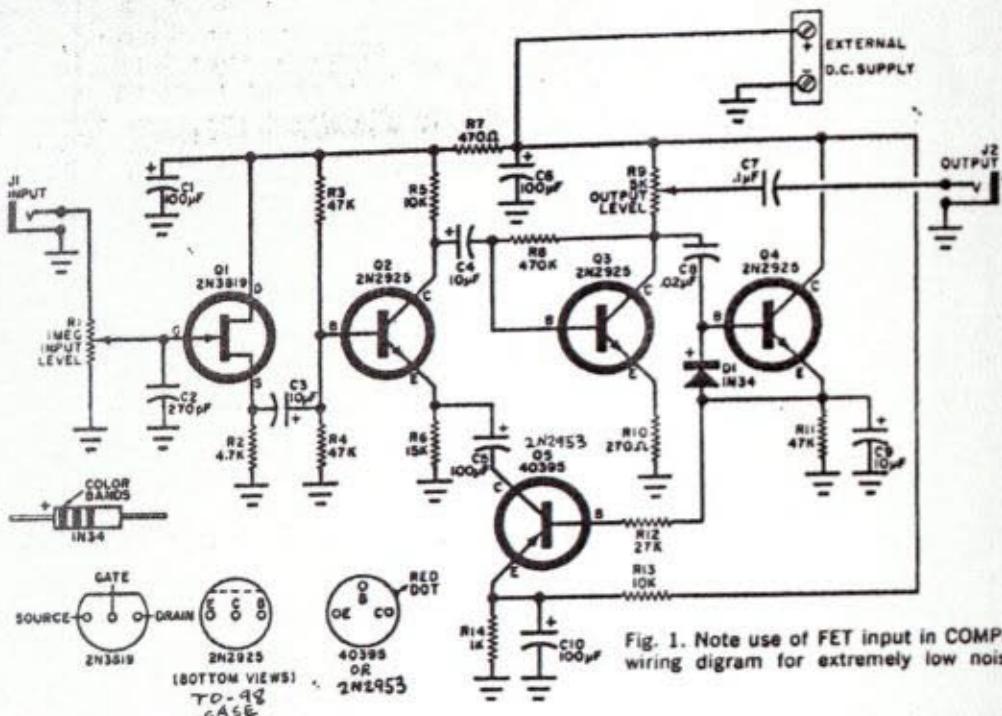


Fig. 1. Note use of FET input in COMPLY wiring diagram for extremely low noise.

### PARTS LIST

B1—9-volt battery  
 C1, C5, C6, C10—100- $\mu$ F, 15-volt electrolytic capacitor  
 C2—270-pF ceramic capacitor  
 C3, C4, C9—10- $\mu$ F, 15-volt electrolytic capacitor  
 C7—0.1- $\mu$ F ceramic capacitor  
 C8—0.02- $\mu$ F ceramic capacitor  
 D1—1N34 germanium diode or similar  
 J1, J2—Standard open-circuit phone jack  
 Q1—2N3819 n-channel field-effect transistor (Texas Instruments)  
 Q2, Q3, Q4—2N2925 silicon npn transistor (General Electric)  
 Q5—40395 germanium pnp transistor (RCA)  
 R1—1-megohm, linear taper potentiometer with s.p.s.t. switch S1  
 R2—4700 ohms  
 R3, R4, R11—47,000 ohms  
 R5, R13—10,000 ohms  
 R6—15,000 ohms

All resistors  
 1/2 watt carbon

R7—470 ohms  
 R8—470,000 ohms  
 R9—5000-ohm linear taper potentiometer (screwdriver adj.)  
 R10—270 ohms  
 R12—27,000 ohms  
 R14—1000 ohms  
 S1—S.p.s.t. switch (part of R1)  
 1—2" x 3" printed circuit board\*  
 1—3" x 4 1/4" x 2 3/8" aluminum cabinet (LMB 342 or similar)  
 Misc.—Knob, battery holder, 1/8" spacers, terminal strip, battery clip, rubber feet, screws, hookup wire, solder, etc.  
 \*Etched and drilled printed circuit board is available for \$2.50 postpaid from Caringella Electronics, Inc., P.O. Box 327, Upland, Calif. 91786; a complete kit of parts (including circuit board, pre-punched cabinet, all components, hardware, wire and solder, but less battery) for \$16 postpaid. California residents should add 5% sales tax to all orders.

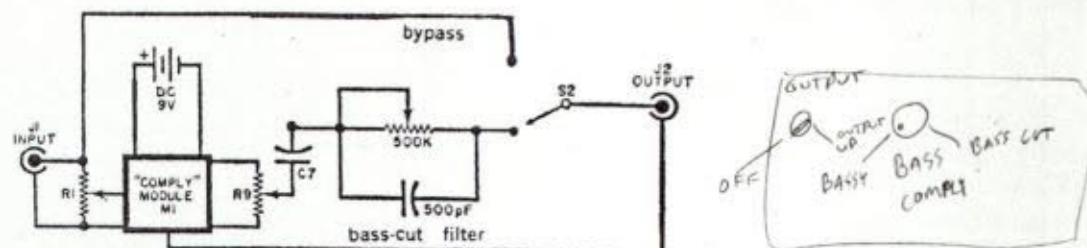
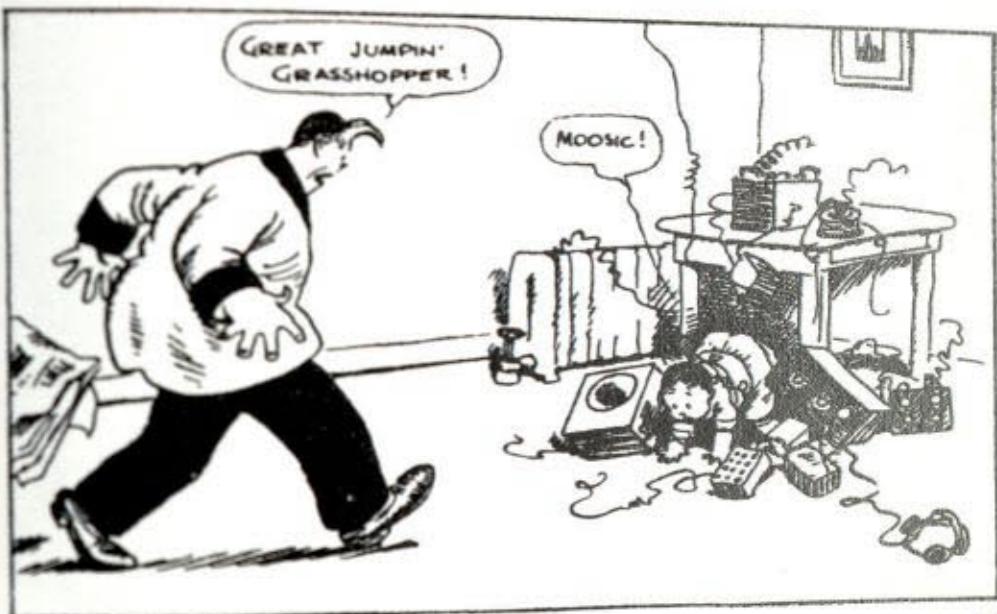


Fig. 1. Compressor circuit is built around Comply module, and aside from foot-operated switch, uses same components. One position of S2 bypasses the Comply, and the other position introduces sustain.



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## OPTIMUM FUZZ

**OPTIMUM FUZZ** - I was never a guitar player and was never drawn to guitar pedals. After seeing my machines I am frequently asked if I'd build a custom pedal. I explored the idea a while ago, me as a custom pedal manufacturer, for a very brief moment, a very frustrating moment. It was much the same way I felt when I was studying Illustration in college. I was being asked to make common ideas interesting, or recycled ideas new. Guitar pedals are everywhere, and guitar music is absolutely everywhere. It's no knock on the field, it just isn't where I express myself. I hear new worlds of music, and my time needs to be devoted to their creation and promotion. If you've got a vision, one that involves something unique to you, you owe it to yourself to pursue it, because only you can create it. I gave up the idea the same way I left college, I had something to say and I didn't want my voice being used to speak for others. So it was strange finding myself creating the Optimum Fuzz, but I built it for fun, with my devices in mind. I thought the effect could get a new lease on life effecting some of my unusual sounds. The Optimum Fuzz makes any device plugged into it have a buzzy distorting "fuzzy" sound. I enjoyed the build. I engraved the face panel and "Sunkist fade" spray painted some clear grip tape for the top, and painted the edge with red neon lacquer paint.



**OF.1** - I bought an old Heathkit IT-10 Transistor-Diode Checker at a HAM radio fest I went to. I bought it with the Optimum Fuzz in mind. The two worked out to be a great pairing. These coiled wires are created by wrapping a stranded wire around something like a pencil. Coils like this keep the wires neater and provide some play if the board needs to be worked on later.

OPTIMUM  
FUZZ-CA  
PE 7 '72

THIS "TRIGGERED FUZZ" FOR YOUR GUITAR BY CRAIG ANDERTON  
REPRESENTS A BRAND NEW APPROACH

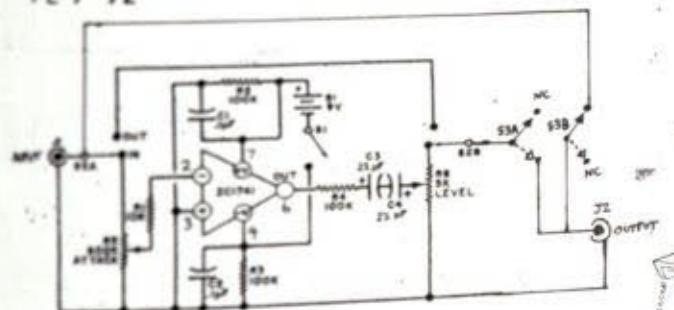
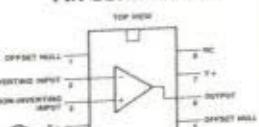


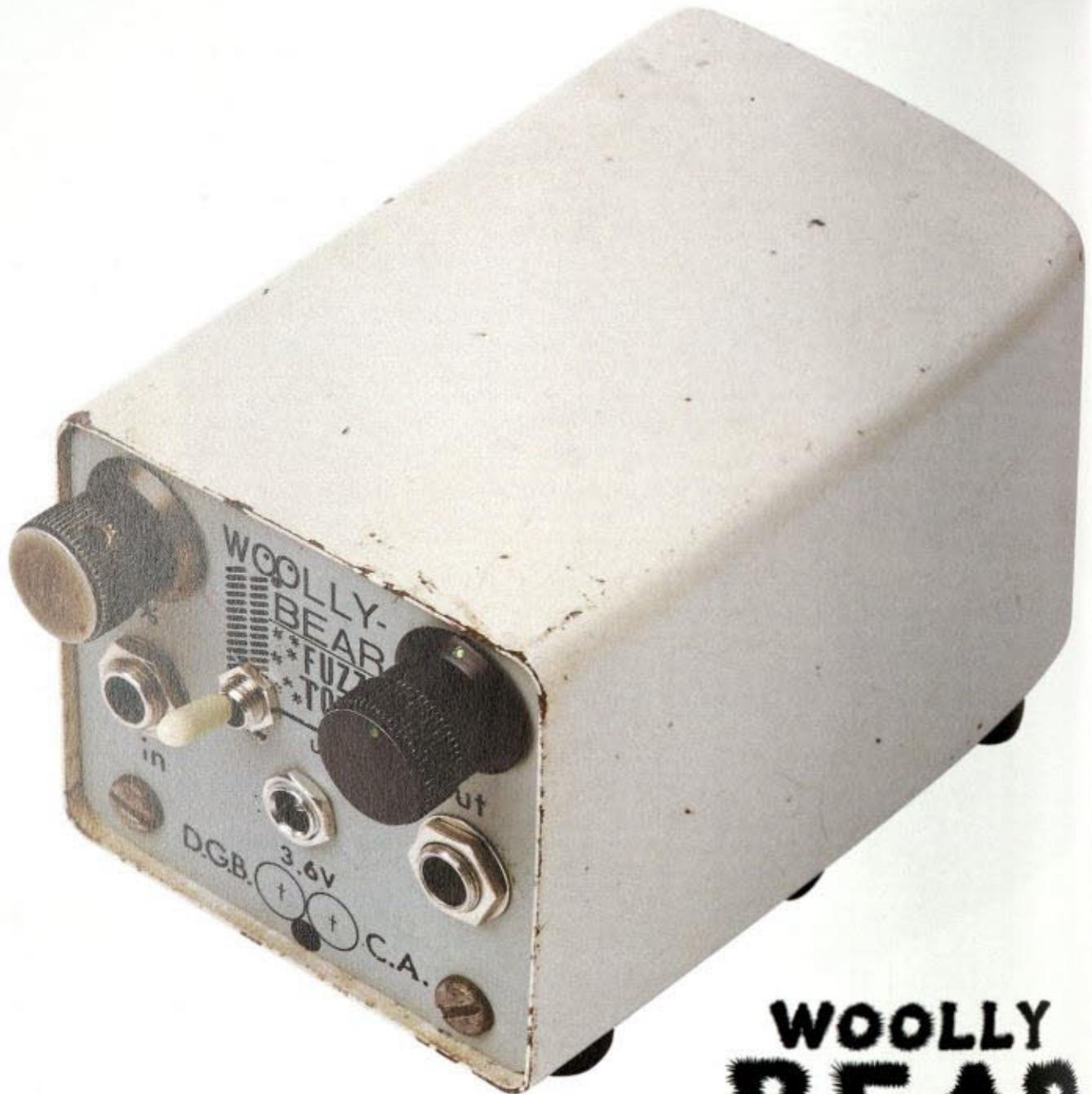
Fig. 1. Triggered square-wave output of op amp provides good fuzzy sounds.

OPERATIONAL AMPLIFIER 741

PIN CONNECTION

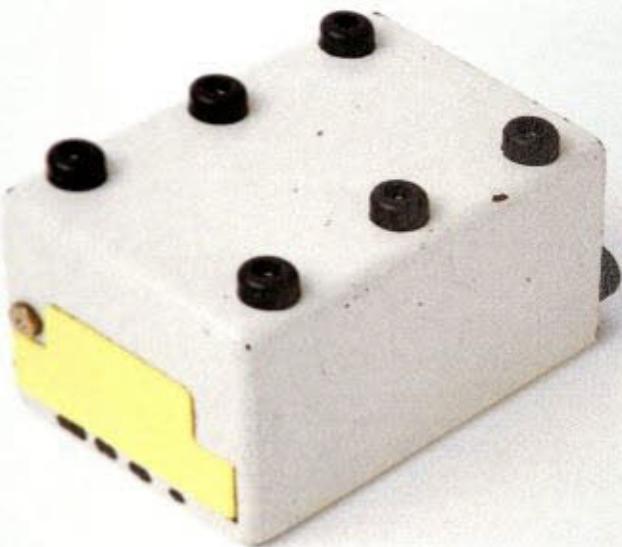


**OF.2** - The original circuit was featured in an article by Craig Anderton in the July 1972 issue of *Popular Electronics* (see his artist feature for a picture of the device he produced for the article). Any small changes I made are pictured here, with the main being my provisions to make the Fuzz toggle switch controlled if the device is incorporated in my table rig or stomp switch controlled if used on the floor like a typical pedal.

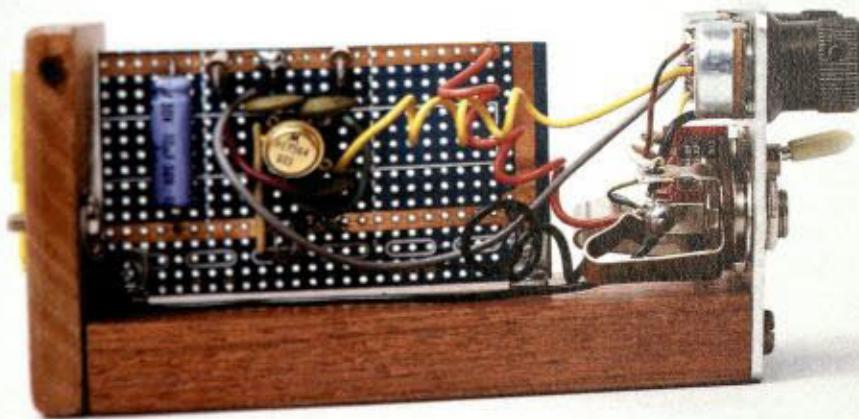


# WOOLLY BEAR

**WOOLLY BEAR** - The Woolly Bear was developed at around the same time as the Optimum Fuzz. I usually don't get into hand ringing about slight differences in sound, but for an effect with a similar name they sonically have a good deal of difference. The Woolly Bear takes the sound it receives and amplifies it to a distorting degree that you can control and then clips the signal if it goes beyond a threshold. The threshold is also controllable. The result is basically that the source you feed it sounds as if it is coming out of an amplifier with the gain too loud causing the amp to begin dying. This description sounds objectionable, but used well the effect is very exciting, an overloaded crumbling fuzzy sound. The white metal shell of the box was taken from something called a Compreamp Model 359. Everything else besides that shell was designed and built for my specifications.



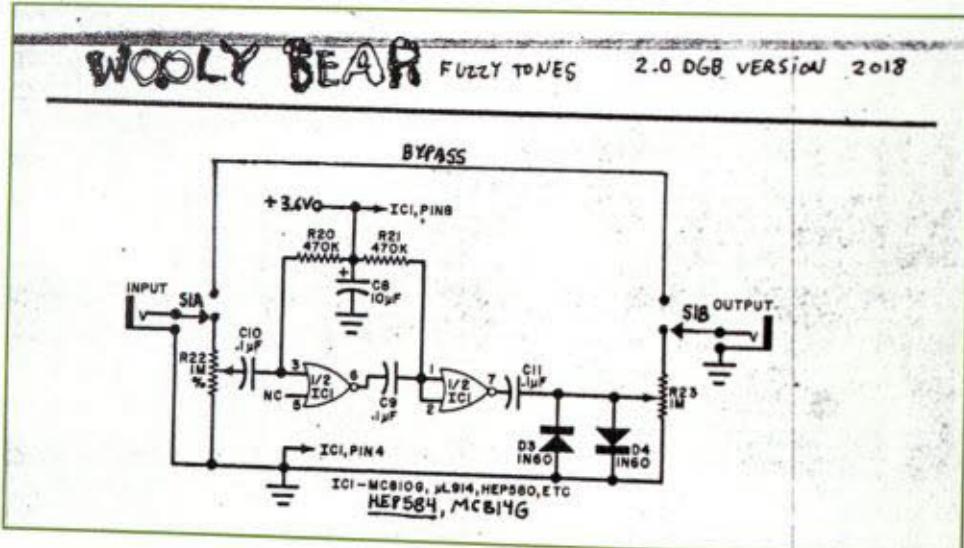
**WB.1** - It was Autumn when I built this device and the "Woolly Bear" caterpillars were out and about. So nature gave me the perfect name. I added the six rubber "feet" to really make sure the connection was made. The yellow back-end is some strange foam I bought in Japan at a shop called Tokyu Hands. There was a hole in the back of the case this shape, so this foam glued to the back of the wood carrier provides a cute little treatment.



**WB.2** - A profile view of the wooden circuit carrier. You can see the bolt going through the back end of the carrier which acts as both the common ground for the circuit as well as the means to lock the whole business to the white metal shell, just thread the brass nut shown above.



**WB.3** - What a great face! The white toggle switch I added after I had finished the whole box. I realized I had no way to switch the effect off. I had just enough room on the front panel to make the addition and didn't have to ruin my transfer lettering.

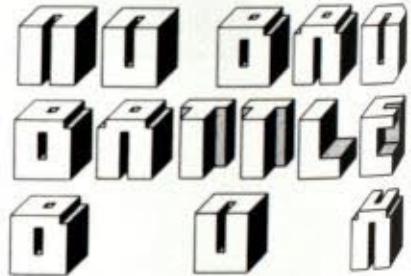


**WB.4** - This schematic was originally printed within Craig Anderton's "Build a Timbre Gate" article in the April 1971 issue of *Popular Electronics*. The original version offered a way to power it with 9V or 24V supplies. I developed mine to be powered by 3.6Vs, which I tap off J&K's Musical Bopper.

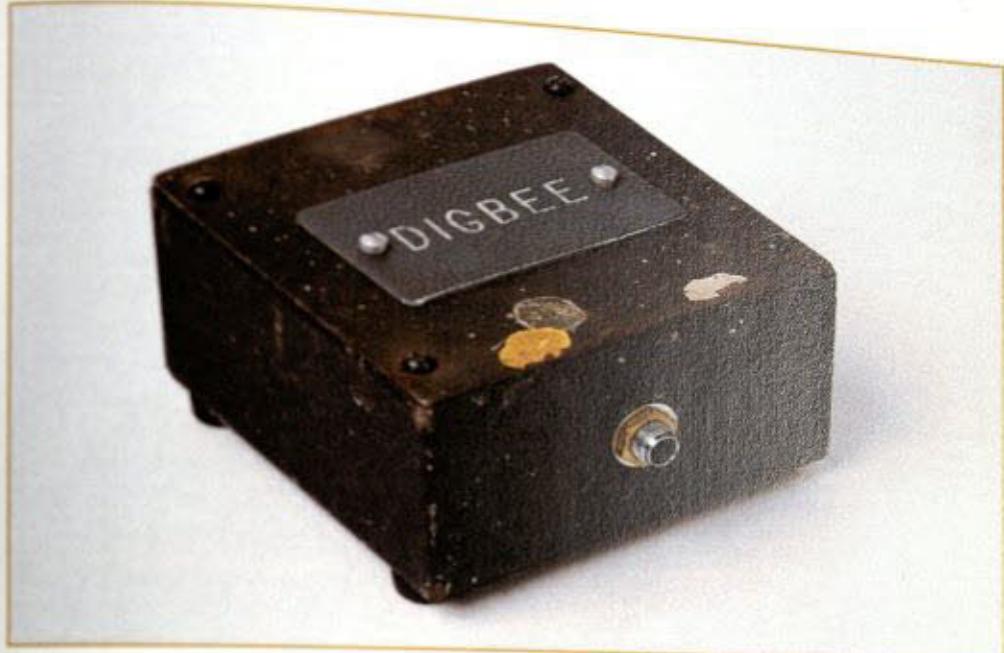


**A**fter plenty of hassles, this dude managed to get in touch with us so we could listen to the weird instrument he had invented.

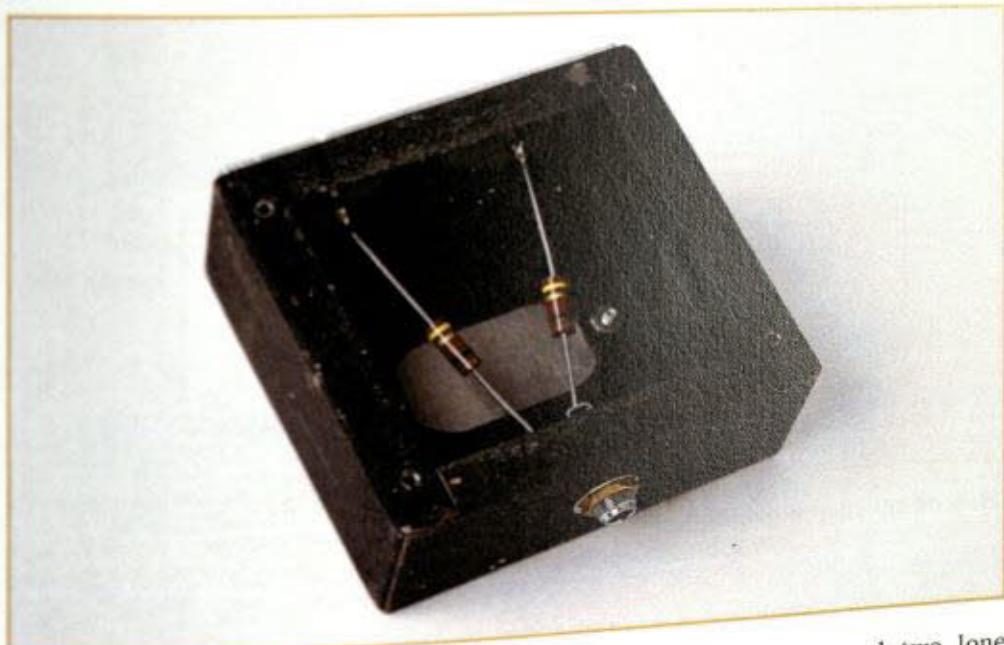




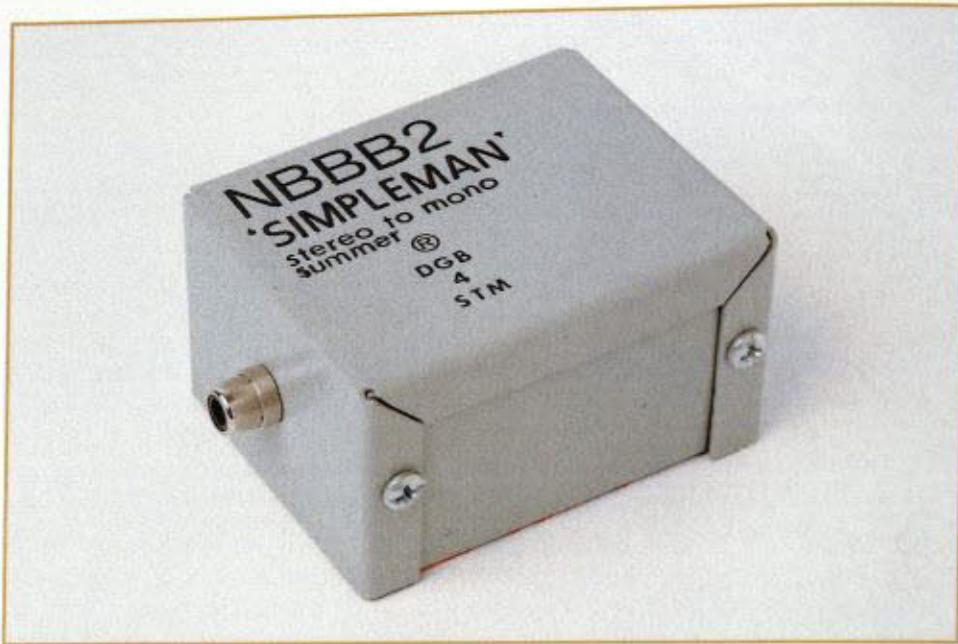
**NO BAD BATTLE BOX** - This is as absolutely simple as it gets, but I couldn't help but to include it here. The No Battle Box sums two stereo signals to a single mono output. If you just connect two stereo signals together some electronic issues can arise, this box prevents these issues. Two RCA inputs receive the signal from my 4-track recorder line output, the inputs are summed and the mono output is sent to an old mono disc recorder. The term "battling" is one I use when two or more mixer signals aren't properly isolated and there is a strange "battle" that arises, where (to me) it sounds like each of the individual sound sources are "battling" for sonic supremacy, one rises and the other falls, and then the fallen can "battle" back and suppress the other. I've used the technique intentionally before to great effect, in fact, I'd like to develop a mixer in the future that encourages this interaction, but for the sake of reliable monitoring I don't want any of this "bad battling" going on.



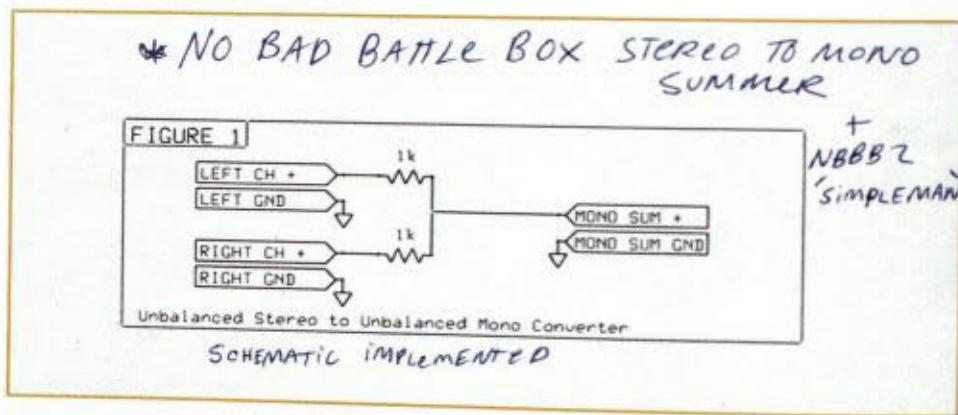
**NB.1** - This box was some filthy AC outlet switching box, but I liked its crackle finish, so as usual I gutted it of its former parts and put it in my "project box locker" until I found a use for it. It didn't take much to transform it for this simple use- an engraved manufacturers' mark, a new labeled panel, and some fresh rubber feet.



**NB.2** - An inside shot reveals the simple story, three jacks and two lone resistors prevent war from breaking out.



**NB.3** - A duplicate version, the NBBB2 "Simpleman" serves the same purpose as the original, but handles the summing I need for sending my 4-track recorder's stereo monitor out to my studio monitor which happens to be a single speaker German Blaupunkt radio with an auxiliary input jack added so the radio's amp and speaker can be hijacked and used by my external system. This box makes this connection possible.



**NB.4** - This simple device in circuit diagram form.



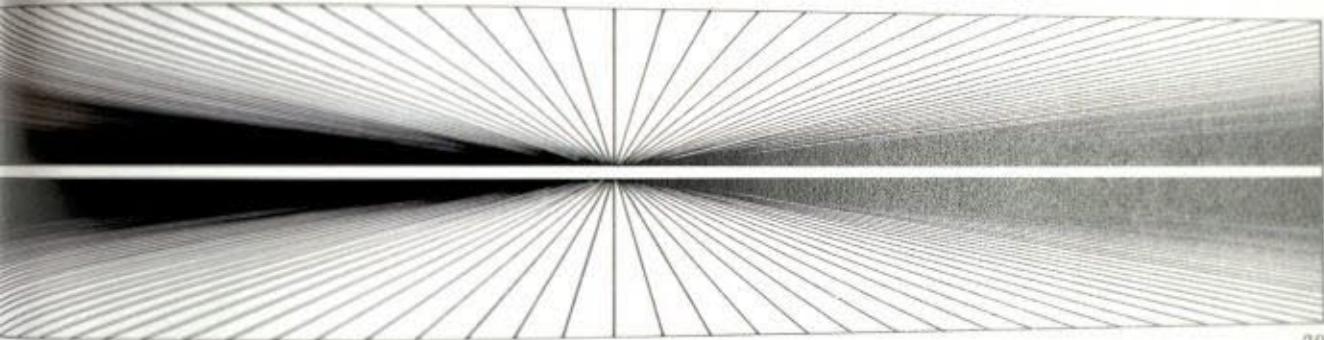
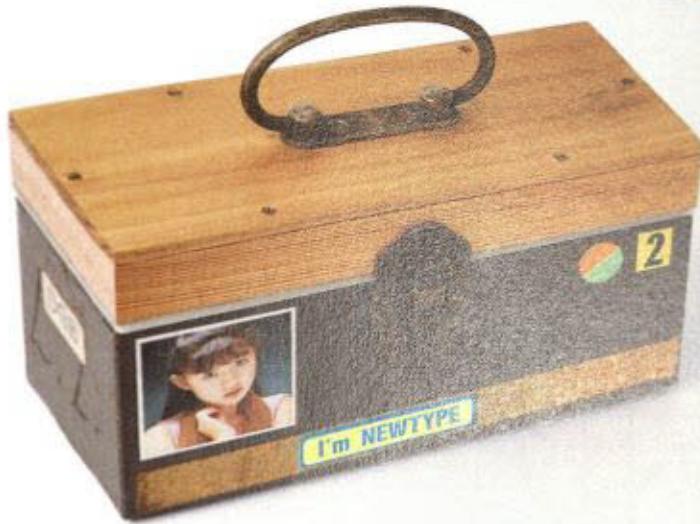
19



# T&T BOX

**T&T BOX** - The T&T Box is my own rendition of "The Thumpa-Thumpa Box" from the John S. Simonton article in the February 1970 issue of *Popular Electronics*. This same circuit was developed as a kit for the synth company PAIA. The circuit was also included as the "Automatic Percussion Circuit" in the book *Experimenting with Electronic Music* by Robert Brown & Mark Olsen. The T&T Box produces wonderful rhythms with two ringing drum oscillators. The drum sounds can have their respective volumes panned between, emphasizing one over the other if desired. The rate the drums fire can also be controlled individually making for a wide variety of rhythms. Lastly, the rate of the rhythms can be changed dramatically. At their fastest they can provide what approaches a constant tone, like a rapid fluttering. The metal case is from an Eico Model 1180 capacitor decade box I bought from Soundex Electronics (R.I.P.).

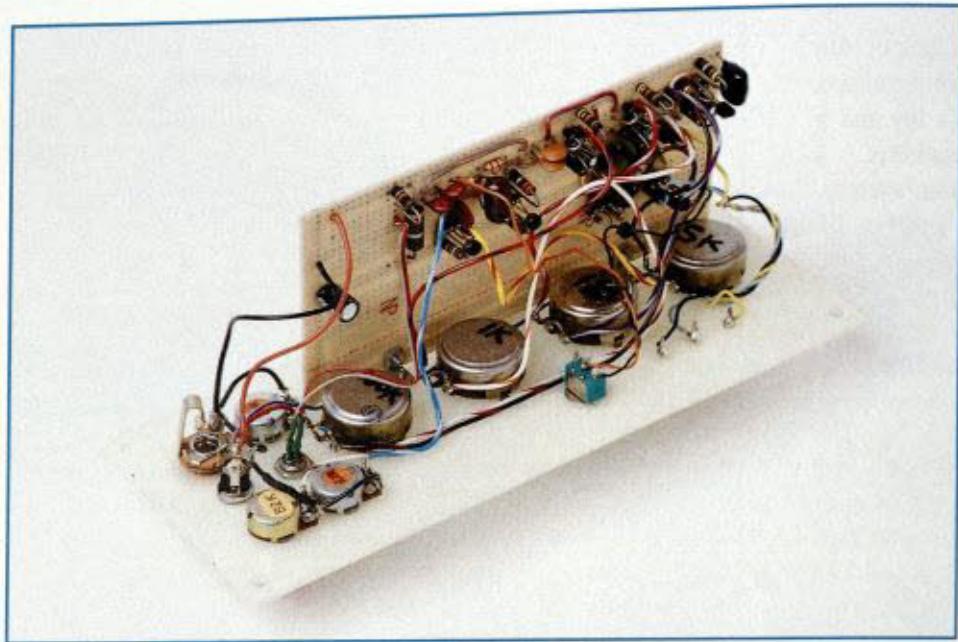
TT.1 - I wanted the look of this instrument to be an amalgam of Japanese child's toy and a coal miner's lunchbox. I modified a latching system, fit a removable wooden lid and added a handle for carrying. The picture of the Japanese girl is from a Japanese anime magazine from the 80s and the "Newtype" sticker is from a similar publication and refers to the TV series *Gundam*. The split sticker is simply two Benji prize stickers sliced and glued together.



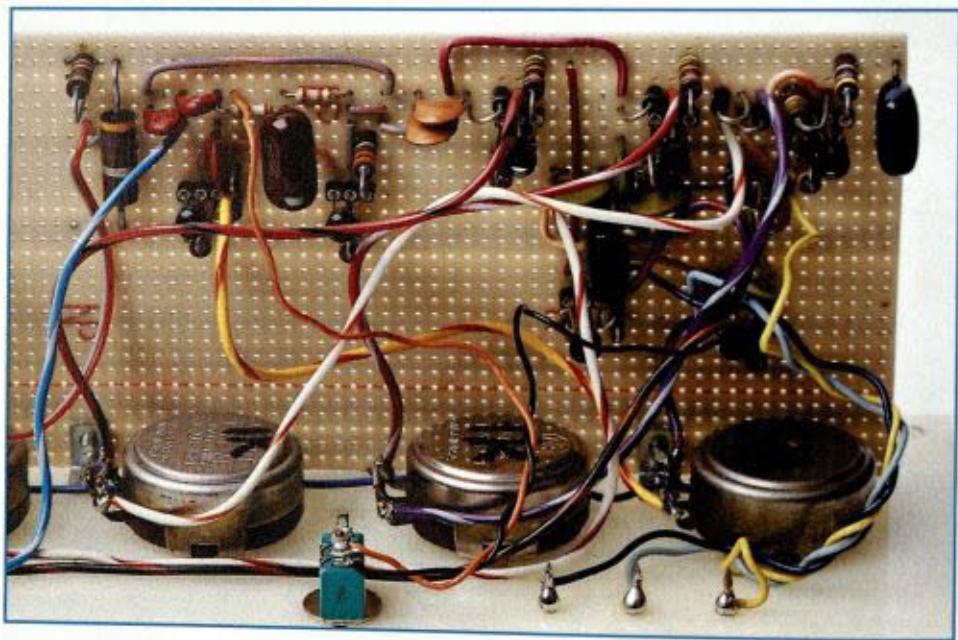
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TT.2 - A detail shot of some of the unique dry transfer lettering I did atop the glow-in-the-dark plexi panel. The body contacts shown here work most uniquely in conjunction with the Pollywog from earlier. Touching both instruments body contacts in tandem produces some wild results, basically 'clocking' the two instruments together, locking them into rhythmic grooves. The body contact panel has its edge painted fluorescent yellow with Mr. Hobby Japanese model lacquer paint.



**TT.3** - I try to have the circuits I build follow an arrangement that makes logical sense, and mirrors the schematic. This makes things easier, both while building initially, as well as future trouble shooting, repairs, or modification.



**TT.4** - This shot gives a look at the big old Allen Bradley USA made potentiometers I like to use where space permits. Besides the body contacts, the other modification I made to the schematic on the following page is a switch that changes the T&Ts' typical bell like drum sound to a more hard hitting wood block sound. It's been a worthwhile addition, musically speaking.

# T&T BOX DIGBEE

REP 5VDC Ni-Br CLEAR SKU 2302

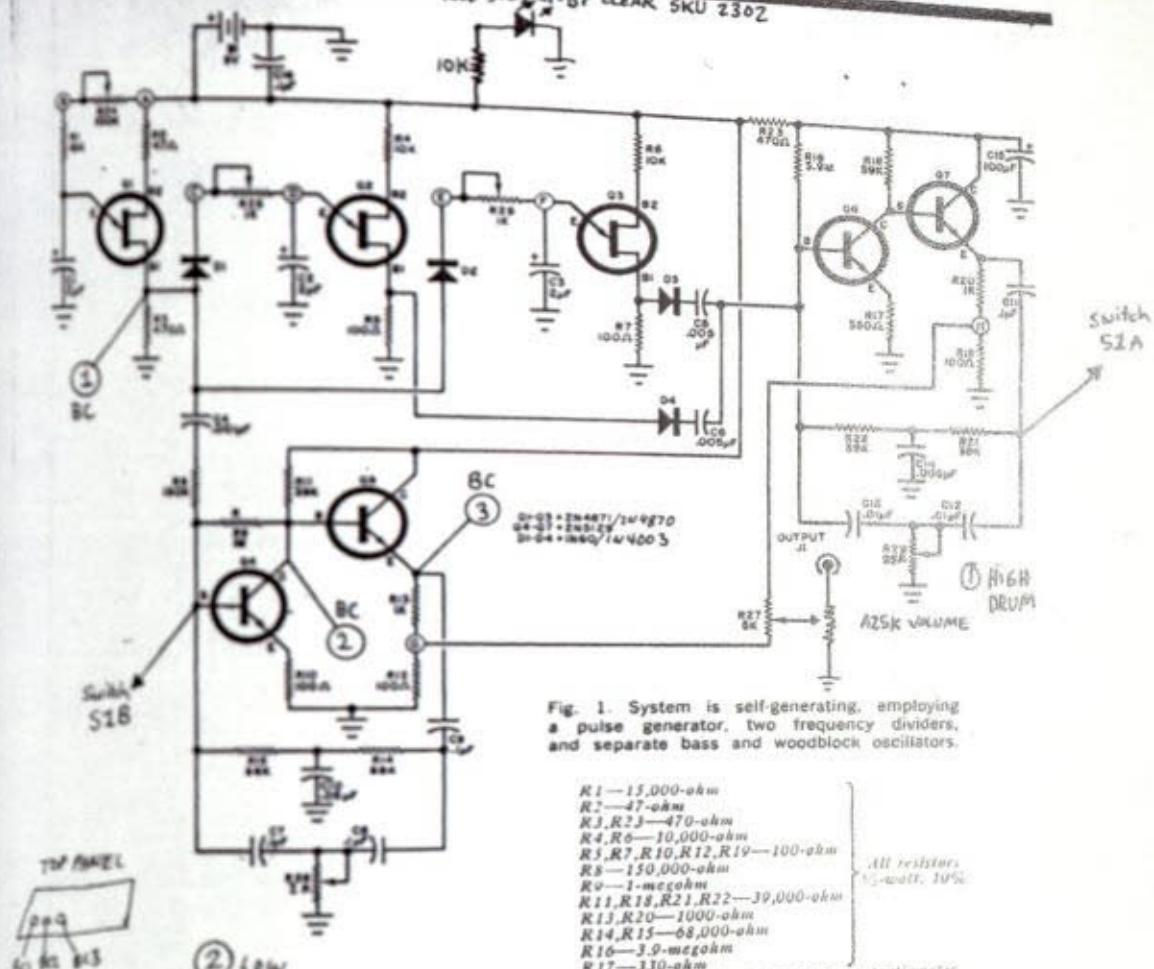


Fig. 1. System is self-generating, employing a pulse generator, two frequency dividers, and separate bass and woodblock oscillators.

R1—15,000- $\Omega$   
 R2—47- $\Omega$   
 R3, R7, R10, R12, R19—100- $\Omega$   
 R5—150,000- $\Omega$   
 R9—1-megohm  
 R11, R18, R21, R22—39,000- $\Omega$   
 R13, R20—1000- $\Omega$   
 R14, R15—68,000- $\Omega$   
 R16—3.9-megohm  
 R17—330- $\Omega$   
 R24—100,000- $\Omega$ , linear-taper potentiometer  
 R25, R26—1000- $\Omega$ , linear-taper potentiometer  
 R27—5000- $\Omega$ , linear-taper potentiometer  
 R28, R29—25,000- $\Omega$ , linear-taper potentiometer

All resistors  
 1/2-watt, 10%

2K potentiometer — R28, R29—25,000- $\Omega$ , linear-taper potentiometer

## PARTS LIST

R1—9-volt transistor battery  
 C1,C3—2- $\mu$ F, 6-volt electrolytic capacitor  
 C4—0.001- $\mu$ F ceramic disc capacitor  
 C5,C6,C14—0.003- $\mu$ F ceramic disc capacitor  
 C7,C8,C11,C18—0.3- $\mu$ F ceramic disc capacitor  
 D1  
 C10—0.03- $\mu$ F ceramic disc capacitor  
 C12, C13—0.01- $\mu$ F ceramic disc capacitor  
 C15—200- $\mu$ F, 10-volt electrolytic capacitor  
 D1-D4—1N400 diode/Reverse  
 J1—Miniatone phone or standard phone jack  
 Q1-Q3—2N4871 unijunction transistor/2N4870/2N2846  
 Q4-Q7—2N5502 bipolar transistor

Misc.—Metal chassis case; printed circuit board; battery holder; battery connector; control knobs (4); rubber feet; #8 machine hardware; hookup wire; solder; etc.

Note—The following items are available from PAIA Electronics, Inc., P.O. Box 1433V, Oklahoma City, OK 73114: etched and drilled printed circuit board for \$3.50 postpaid (specify #8690); complete kit of parts, including pre-punched, unpainted case, but less battery, hookup wire, and solder for \$16.75 plus postage for 2 lb. Oklahoma residents add 3% sales tax.

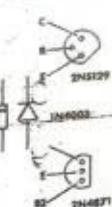
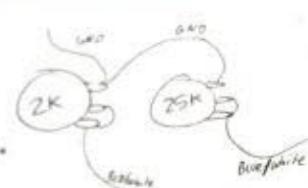
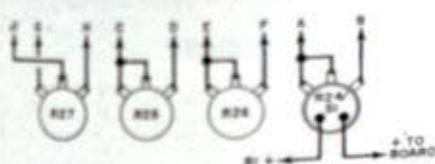


Fig. 4. Diagram shows the connections between pots and S1 legs to lettered holes on circuit board.





## J&K MUSICAL BOPPER

**J&K MUSICAL BOPPER** - Having bread-boarded a sequencer circuit that just wasn't cutting the mustard, I began searching the computer to see if any info was available to enhance what I had. In the search I stumbled on a website ([www.sdiy.org/richardc64/primitive/prseq.html](http://www.sdiy.org/richardc64/primitive/prseq.html)) that had info on primitive sequencer made from RTL chips like the ones used in the RTL Special. I contacted the sequencer's creator, and what ensued was a great collaboration, revisiting, refining, and improving his original early 70s design. The result is the J&K Musical Bopper, a "tune computer" that produces musical sequences that can be "programmed" by patching cables between the various jacks. The "song" possibilities are nearly limitless as J&K can produce sequences of up to 128 steps. Dials provide the ability to change the sound of the individual notes dramatically or mix in and out steps however you'd like. Stutter or freeze the sequence with the Hold button/switch, change the rate of the tune with the Speed dial, and vary the duty cycle of the VCO notes with the two Tuner dials, creating wild and sometimes squirrelly pitch combinations. Provisions for clocking J&K with an external source are included as well as power output jacks for aux. equipment, and body contacts to make J&K "bug out" or "communicate" with my other machines. Heavy decaling on the front, including an old Fist of the North Star anime sticker, really gives this case, a Jerrold cable box I found one garbage night city stroll, the vintage toy computer feel I wanted.

The latex grips I added to banana plugs cinch the wires vertically to the plug and provide a better grip and "strain relief" when patching. Of course, look very pretty. Had a wild time trying to find necessary 3/8" LD. tubing I did. I ended up ordering it through a tackle shop, since fisherman actually use stuff for making lures, the bright colors attracting certain fish. I've also used tubing of the same size for some resistance wire bands.



# WORLD of the WEIRD

21

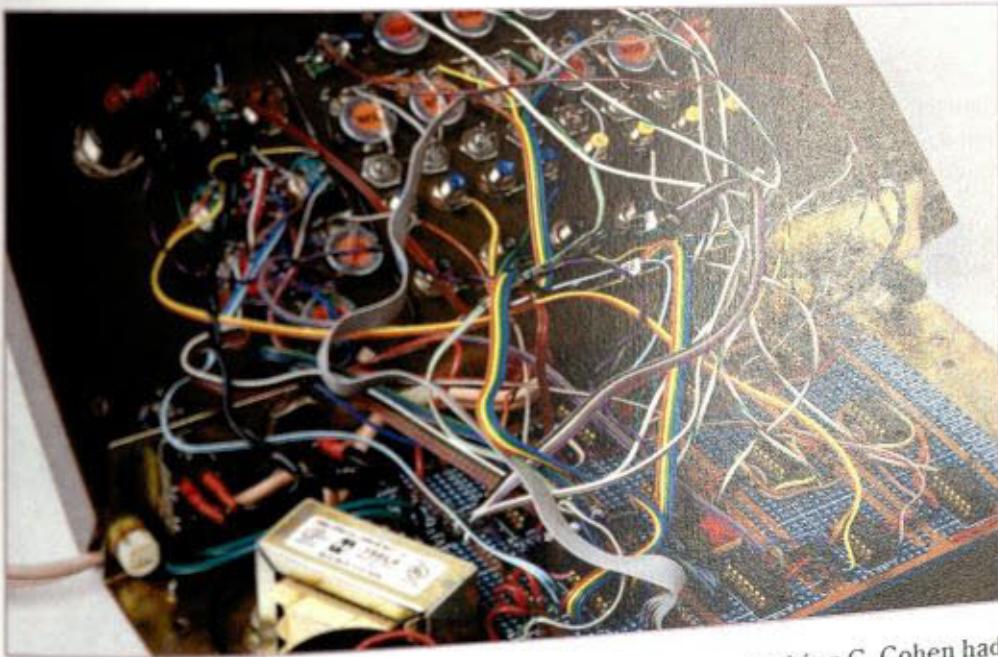


JK.2 - On dark-colored cases, if I don't have white Letraset of the correct size I have to resort to my box of gold Walsco Tekni-Label Decals water-transfer decals, like the type used for model-making. Cut out the label you want, soak it in water for a moment, place on your panel, allow to dry, and then spray a protective coat of clear acrylic. The clear-coat also helps merge the appearance of the decal with the panel, reducing the "ghosting" look, as I call it, surrounding the label.





**JK.3** - A regular green cap switch amongst my custom Plasti-Dip'd and painted switches. A technique I developed where the switches' lever is dipped in liquid plastic, the kind used on tool handles, as many times as necessary to make the switches as bulbous as you like, then a drop of paint is applied to the top. For a fogger look, dip a final time in clear Plasti-Dip. The Plasti-Dip itself can be made various colors as well, a style I want to explore in the future.

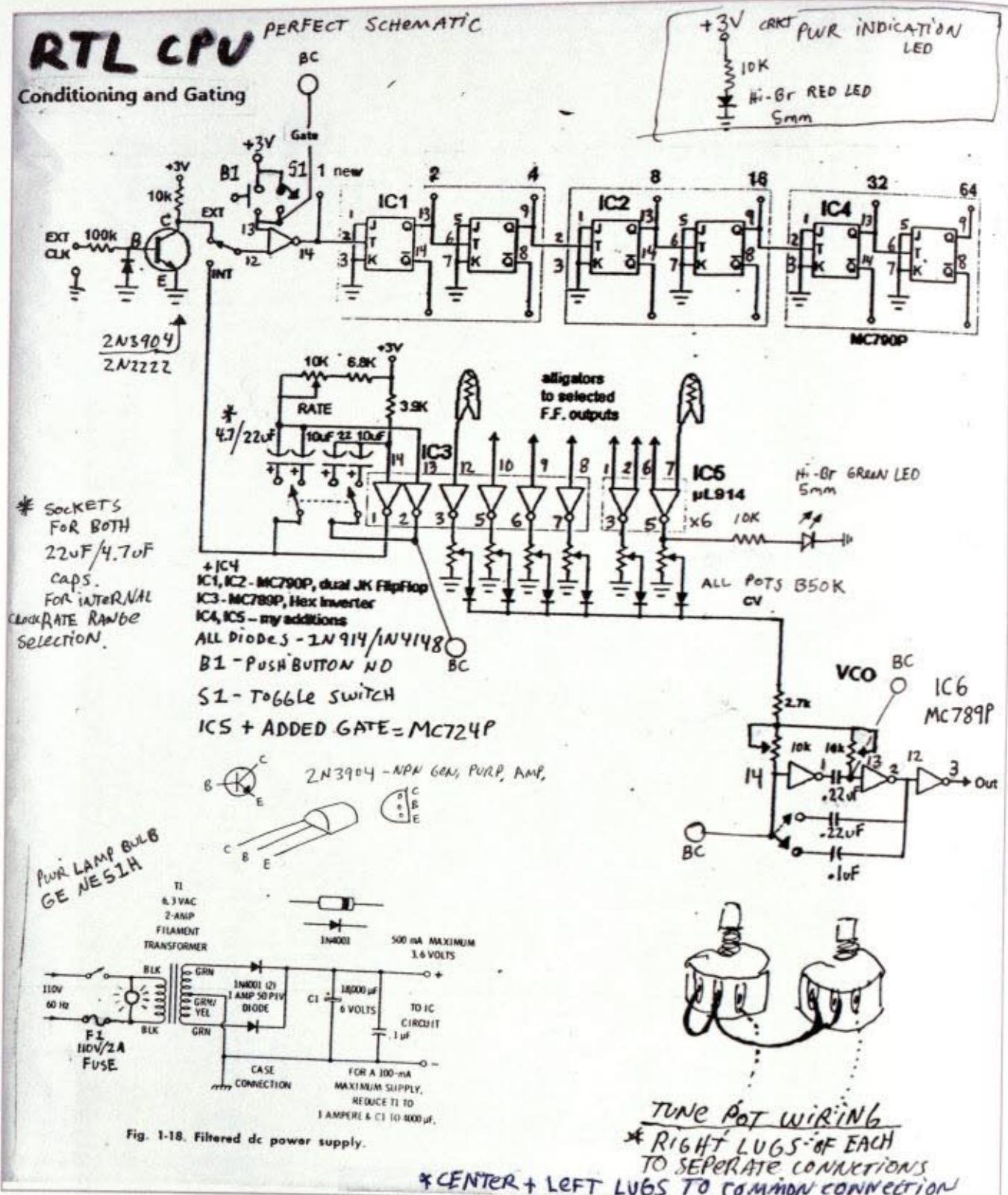


**JK.4** - I had bread-boarded a proto-type of the circuit on something C. Cohen had given me called the RTL Microlab. This eliminated much of the feeling of risk later on. I knew I had a circuit that worked. For my redneck-tech skill level, this was a very complex circuit. For all the musical possibilities the J&K offers, it was worth the time involved.

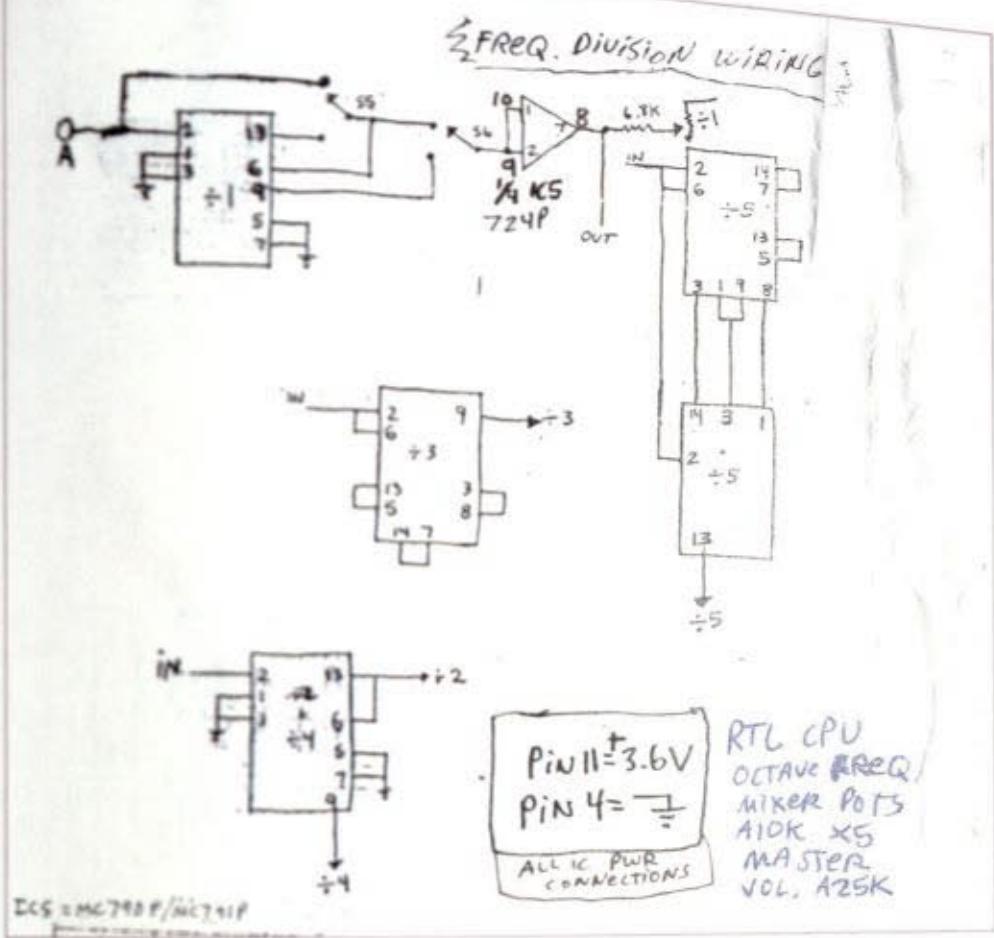
# RTL CPU

PERFECT SCHEMATIC

## Conditioning and Gating



**JK.5** - There was a good deal of back and forth between myself and the circuit's original creator before we developed a circuit without issues, besides the impurities that come with a circuit of this kind of steam-powered simplicity. From out of the past this musical tune computer was wrenched and given life again.



**JK.6** - The flip-flop wiring diagram above is virtually the same as the one used in the RTL Special, with the pin-outs at the top being changed to use the ICs already involved in the circuitry from the previous page. This system provides the same type of frequency division and mixing as the RTL Special. Below an illustration from a September 1970 article in *Popular Electronics*.

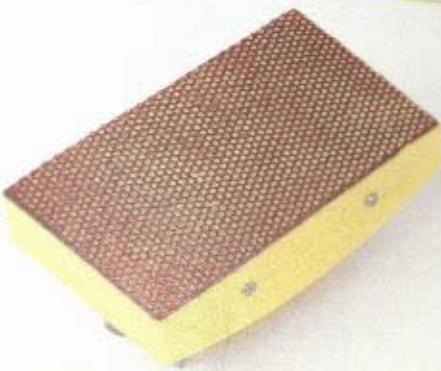


BETTER UNDERSTANDING OF A MISUNDERSTOOD CIRCUIT

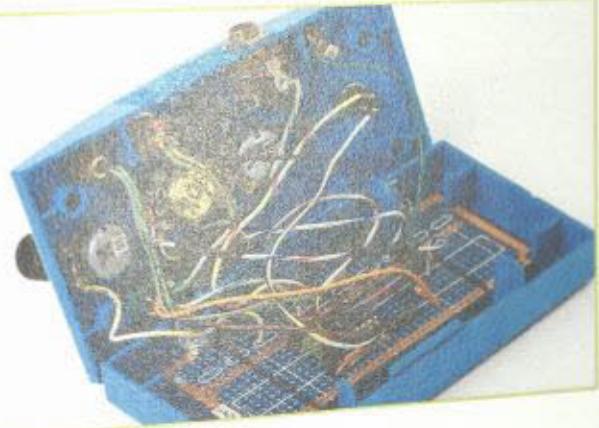
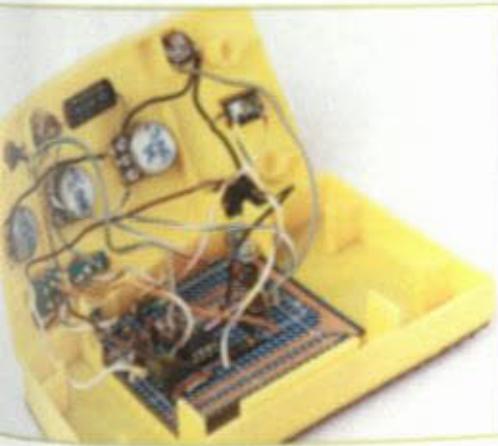


# GROUP MOTION MACHINE #1

**GROUP MOTION MACHINE #1** - The Group Motion Machines are sound-controllers, providing timbre and filter control to any signal inputted. The ability to control the attack and decay, the time it takes for a sound to rise and fall, is incredibly beneficial in changing what might be a sterile electronic tone or sound into a much more animated musical instrument. The attack and decay are both controlled by dials offering smooth calibration. The sound source can now have a soft and slow rise in volume and an abrupt short decay, or a sharp fast attack and a long gradual decay, and of course any variation in between. The amplitude is governed by a pushbutton, for single-shot operation, or a toggle switch to have the tone remain on when necessary. The filter in the GMM#1 also alters the input signal dramatically, it filters out all tones except those of a certain band, which you set by the turn of the dial. A switch allows this filter to be bypassed, and the unfiltered signal is sent directly to the envelope control. Dry-transfer lettering provides the labeling, and unique X-Acto cut and spray-painted grip tape provide the décor.

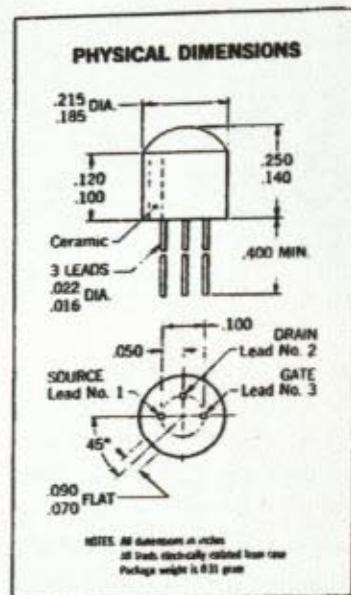
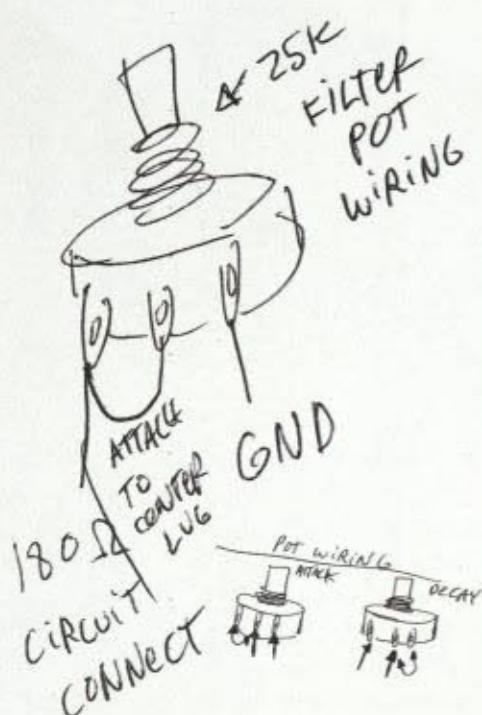


These are actually home-brewed no-slip grips I made by JB Welding the rubber from two old ping-pong  
the bottom of the cases. The instruments I build have seemed to serve a secondary role, apart from the  
produce, they've become "instruments" of awareness and sensitivity to objects around me, always a  
new material to enhance my work. Heightening my awareness of objects in the way skateboarding  
enhanced my awareness of the world around me, making everywhere that had the barest of criteria to make  
surfing possible a chance for transformative play. With instrument building, any empty vessel a possible shell  
for my material a possible new ergonomic or decorative touch. It's a beautiful world of cross-pollination,  
the development of hybrid technology by merging the disparate worlds around yourself; true synthesis. The same  
spirit is developed towards the musical approach, the broadening of what one considers "musical" sounds.  
A chance to make sense of the world, and all things a chance to make fun of it.

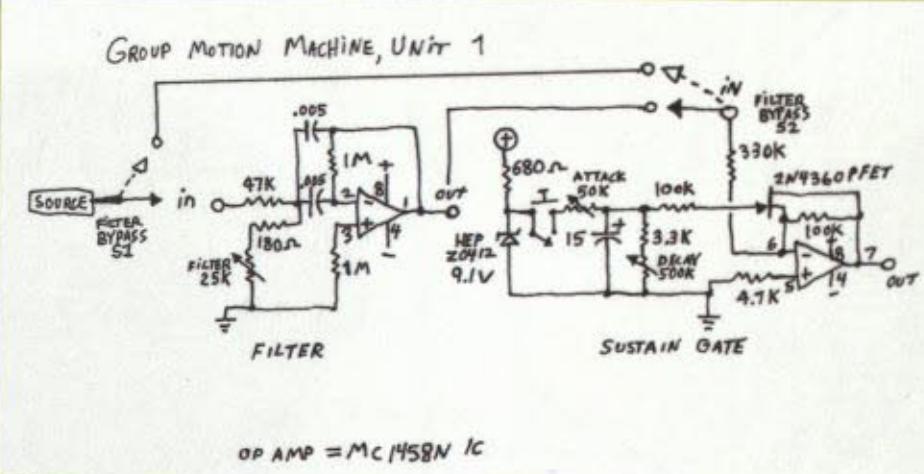


These cases are actually plastic sanding-blocks, used for gripping sand-paper. The blue one I bought at a  
dollar store, and it previously contained my rewired electronic toy telephone which could radically affect AM  
radios if you listened to them too much, killing the toy. When I decided to build the GMM#1 into the case, I applied the  
blue tape to hide the holes made for the previous device. I liked the resulting look so much that I made my  
yellow lime clear spray painted grip-tape version for the yellow one. The two devices have their circuitry  
identically, the closest I may ever come to producing a commercial product.

2N4360



**GM1.3** - A wiring diagram for a rising of the bandpass frequency with a clock-wise rotation of the filter dial. Also a pin-out for the transistor involved. I am sure a modern work-alike for this old guy must exist.



**GM1.4** - The original version of this circuit was amongst Craig Andertons' other schematics found in Charles Cohen's old data folder. In the 70s Craig had developed this circuit and the more elaborate version, the GMM#2, for performing with the Philadelphia dance/theater company called Group Motion. Both he and Charles had performed with them. Pictured here is my redrawn version with my filter bypass switch and controllable attack added.

I FIGURE WE'LL GET  
A COOL MILLION  
FOR THIS INVENTION!

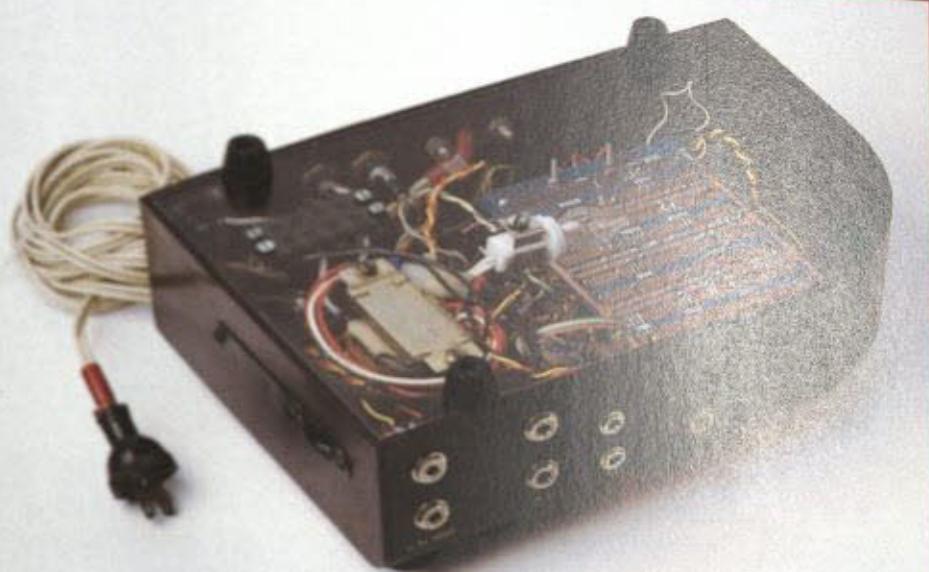
I WONDER WHAT USE  
THEY'LL PUT IT TO?  
MAYBE AS A MILITARY  
WEAPON OF SOME  
SORT--



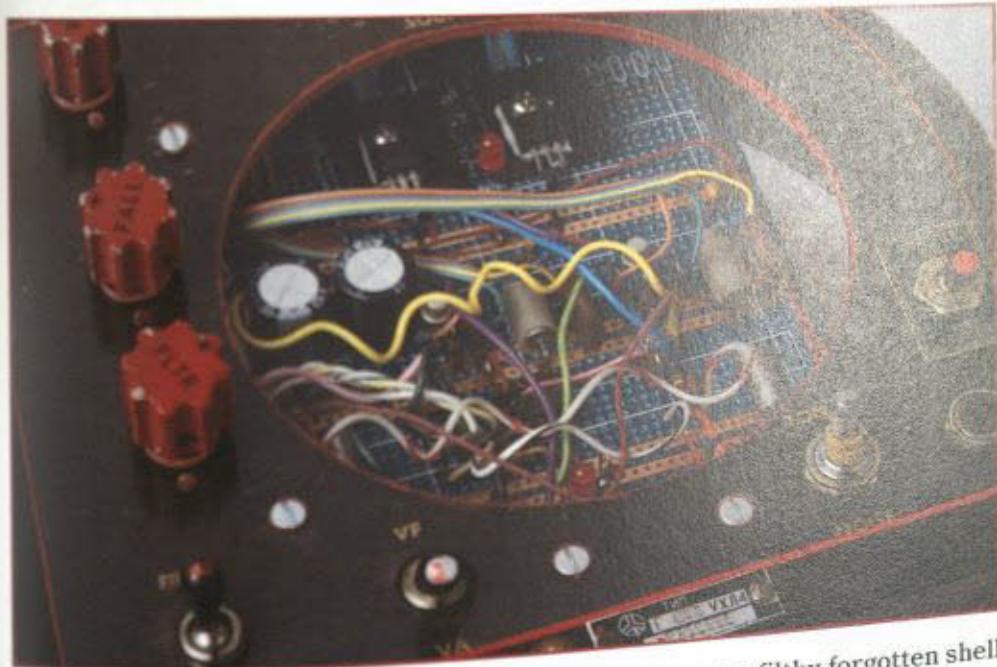


## GROUP MOTION MACHINE #2

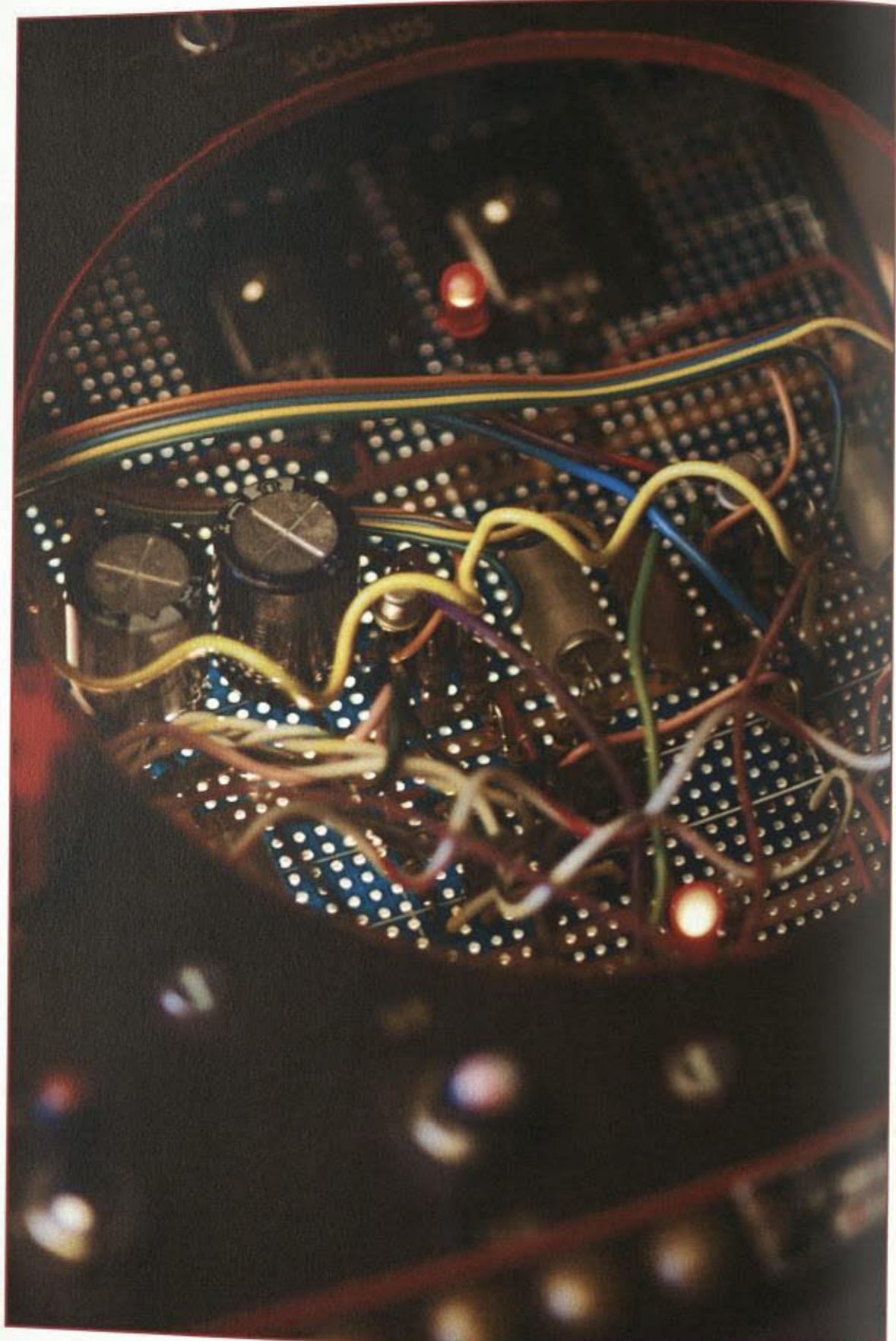
**GROUP MOTION MACHINE #2** - The Group Motion Machine #2 is a powerful pair of wide-range saw-tooth oscillators. One of the oscillators remains an audio-oscillator while the other can change roles, switching between an audio oscillator, a modulator, or a voltage controller. In voltage control mode, vibrato effects and filter sweeps are produced. The vibrato's speed is adjustable and a switch is included for extra low rates. When both are in audio mode, a duet of oscillator tones is created. The GMM#2 makes pulsing, surging, and fluttering sounds, tones merge and expand as the two oscillators pass in and out of each other. Many heterodyning sounds are possible too. All the timbre and filter controls found in the GMM#1 are here as well. A white noise source is also included. For great surf and steam sounds, all the voltage control and filter effects described above can be applied to the noise source. AC convenience-outlet, single/dual 12V output jacks for powering additional gear, and of course sound-modifying body contacts.



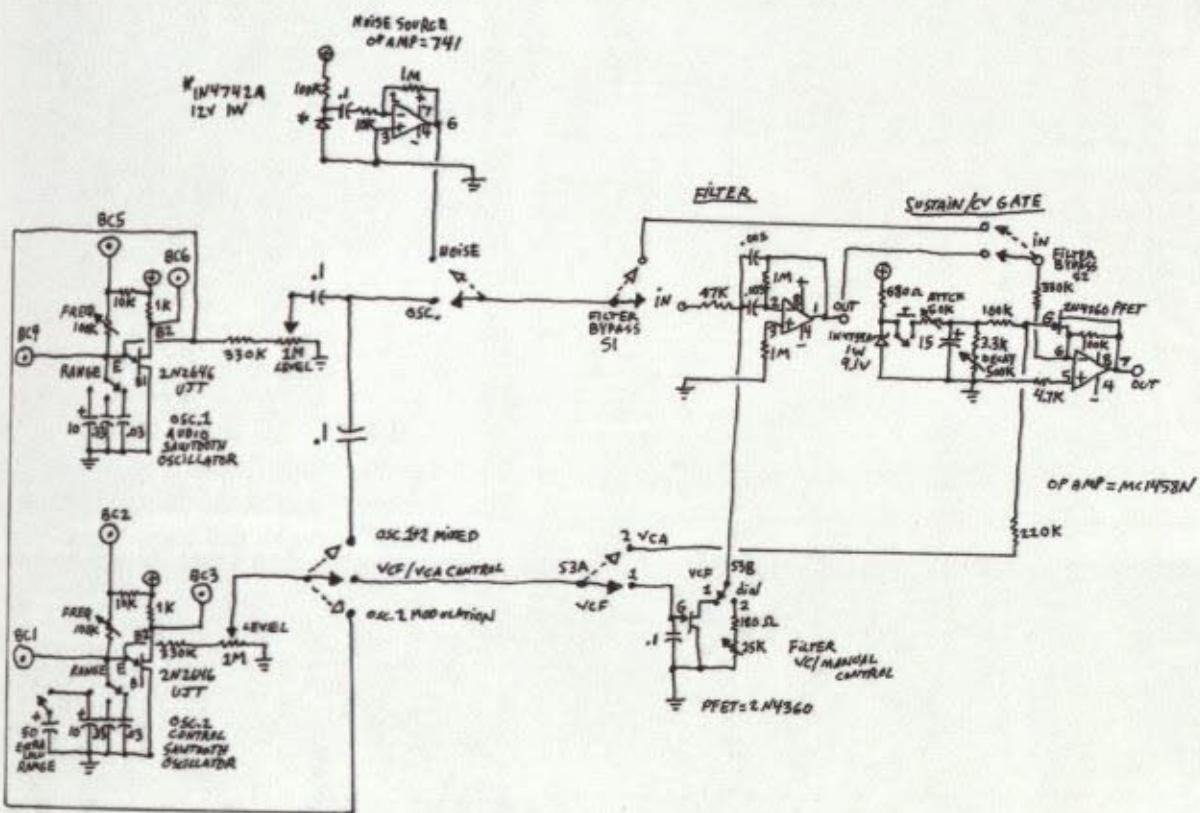
GM2.1 - For the underside of the case I used thick clear plexi-glass. I installed a night-light that is hooked up to the AC line, so when the instrument is turned on the underside glows like the "ground effects" of a "tricked out" sports car.



GM2.2 - This Bakelite case, formerly a record player, was a filthy forgotten shell when I found it, but I saw potential in it. The hole here was where the motor would have been. I cut a clear piece of plexi to turn it into a porthole for watching the circuit work. At the picture's bottom you can see the metal tag from a Russian wire recorder. I ground off the serial numbers and screwed it on. Gold water-decals for labeling and some lacquer swirl paint for the switch tops to finish this off. The circuit board standoff spacers are chops from a blue striped "sippy" straw.

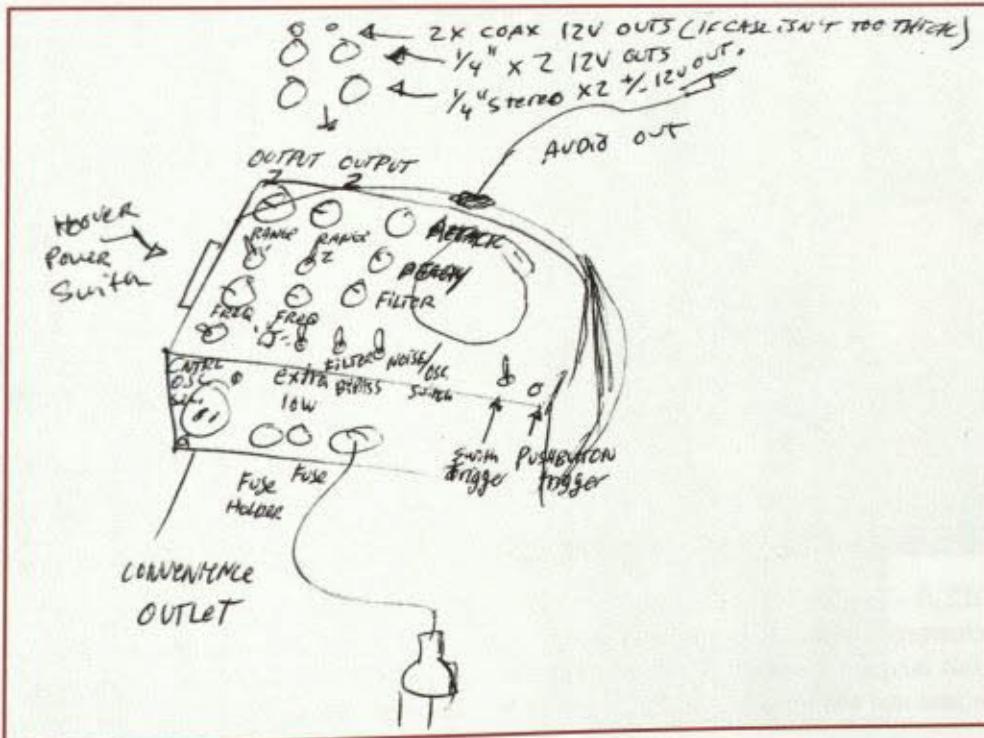


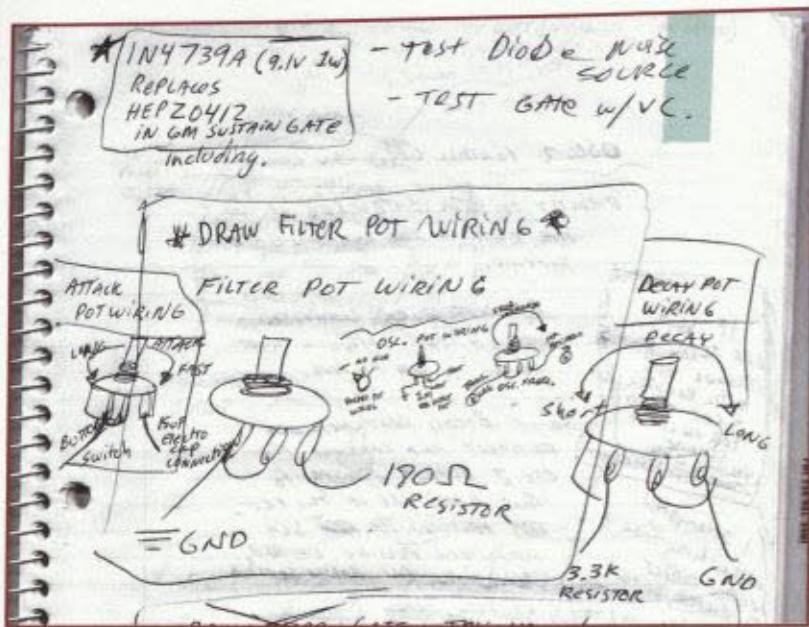
~ GROUP MOTION MACHINE UNIT 2 ~  
PERFECT SCHEME



**GM2.3** - Pictured above is my re-drawn version of the schematic. My GMM#2 became a hybrid of pieces from various material from Charles Cohen's data folder, but at its heart is the original GMM#2 by Craig Anderton.

**GM2.4** - Before I begin drilling holes for any hardware I generally have to make a sketch like the one at right to be sure I have all the functions accounted for. A case like this one didn't leave much room for error, I had just enough space for all the parts involved.





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**GM2.4** - At left, some of my notebook doodles that illustrate wiring the pots correctly and substituting for modern diodes.



**GM2.5** - This is a view of *THE* premier electronics event, Renningers Radio show, held in Kutztown PA. This is almost exclusively where I find components now. Tons of old electronic treasure and detritus mix twice a year on the grounds of this farmer's market. This is where I found the GMM#2s lifeless body. So many of the parts and pieces I've used in the past and will be using in the future have come from Renningers.

WILD AREA! ZOOMWAY! HABITAT! OUTSIDERS! STRANGE NAMES IN A STRANGE WORLD WHICH WAS EVOLVED IN A GREAT NATURAL CAVERN BENEATH MODERN AMERICA! THIS IS THE WORLD OF THE "PROJECT"-- WHERE THE SECRET OF THE CENTURY HAS BEEN KEPT! THE HARNESSING OF THE DNA MOLECULE!!!! THE BREAKING OF THE GENETIC CODE!! MAN EXPERIMENTING WITH LIFE!!

# JIMMY OLSEN

IS THERE!  
AND SO IS--

HIS PAL  
Superman

THEY'RE ALIVE AND WELL AMONG THE WONDROUS DNA DENIZENS! BUT WHO CAN SAY FOR HOW LONG?-- FOR A MIGHTY, LIVING JUGGERNAUT IS FAST APPROACHING!

WOW! WHEN THE HAIRIES INVITED US TO THEIR DANCE, I NEVER IMAGINED THEY'D LET ME OFFICIATE LIKE THIS, SUPERMAN!

THE SOLAR-PHONE IS THEIR LATEST INVENTION, JIMMY!

ALSO FEATURED IN THIS SUPER SAGA IS THE NEW AND EVER POPULAR NEWSBOY LEGION!

**A**MONG THE VARIETY OF LIVING SPECIES PRODUCED IN THE "PROJECT", THE "HAIRIES" ARE AMAZINGLY PRODUCTIVE! THEY ARE MECHANICAL GENIUSES!--AND THE SOLAR-PHONE IS NEW EVIDENCE OF THEIR STRANGE LIFE-STYLE! IT GATHERS IN THE RADIO-SIGNALS FROM THE STARS AND CONVERT THEM INTO MENTAL MUSICAL IMAGES!

MAN! THIS IS COOL! IT'S LIKE A MOVIE MUSICAL--AND EVERYBODY'S IN IT! INCLUDIN' ME, FLIPPA-DIPPA!

OUR MINDS RECEIVE! THE "DANCE" BEGINS!

WE ARE ALL TOGETHER--WE HEAR AS ONE! WE SEE AS ONE! WE SMAR AS ONE!

WHAT AN EXPERIENCE FOR THE NEWSBOY LEGION!

KEEP PLAYING, JIMMY! YOU CAN'T DO ANYTHING WRONG! THE SOLAR-PHONE ARRANGES ALL INCOMING SIGNALS INTO PATTERNS OF HARMONY!

WHAT THE DANCERS SEE IS A NEW AND  
WONDROUS UNIVERSE OF SHIFTING, KALEIDOSCOPIC  
GEOMETRIC FORMS...

WOW! THIS IS  
GREAT! IT'S LIKE  
WE'RE 'FLOATIN'  
FREE IN  
WUNDERLAND!

IT'S A  
NUTTY  
HOLLYWOOD  
SET WIT'  
SYMPHONY  
MUSIC ALL  
AROUND  
US!

THAT'S NOT  
THE MUSIC  
I HEAR!

EACH OF US  
HEARS THE  
MUSIC IN THE  
WAY IT PLEASES  
HIM MOST!

THE SCENE  
IS CHANGING!  
WHAT LIES  
AHEAD?

GROOVY!  
THIS IS A REAL  
GAS!

CONTINUED ON 2nd PAGE FOLLOWING.



## ARTIST FEATURES





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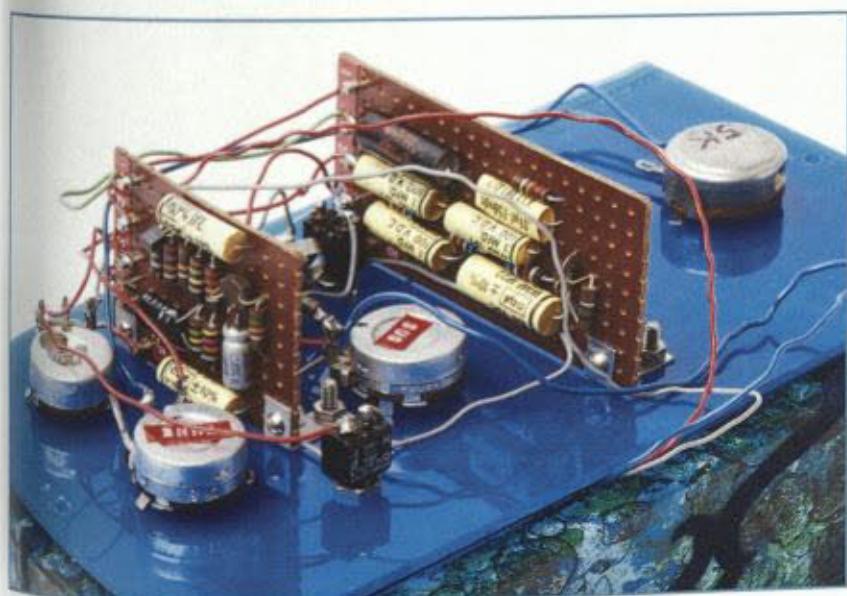
# CRAIG ANDERTON

**Craig Anderton** is one of the greatest advocates for musical self-sufficiency and independence. He has had a long career in the musical-tech industry. He was very much at the sharp end of the spear during the late 60s and early 70s when home electronic musical experimentalism was first beginning. His early work in musical electronics, both writing and circuit design, not to mention his promotion of home-recording, has had a huge impact on the field. He was also one of the first to apply many of these new ideas on stage and on record. Charles Cohen had in his possession some of Craig's first instruments. This is how I was first exposed to Anderton's work. I ended up seeking out his great book *Electronic Projects for Musicians* and then hunted down tons of his old articles written throughout many early electronic hobbyist magazines. In his writing Craig has an incredible ability to make simple, and exciting, very complex engineering ideas; which to me, is the mark of a true genius. Most of my instruments, more than any other source, come from his early circuit designs. As will be seen throughout this feature, his early instruments were as innovative as they are beautiful. I still feel that there is a good deal left un-mined amongst the ground he broke. Below is an ad promoting his book *Home Recording for Musicians*. (*Contemporary Keyboard* July 1978). I tried to approach *Cyber Folk* with the same spirit of creative generosity that Craig has shown.

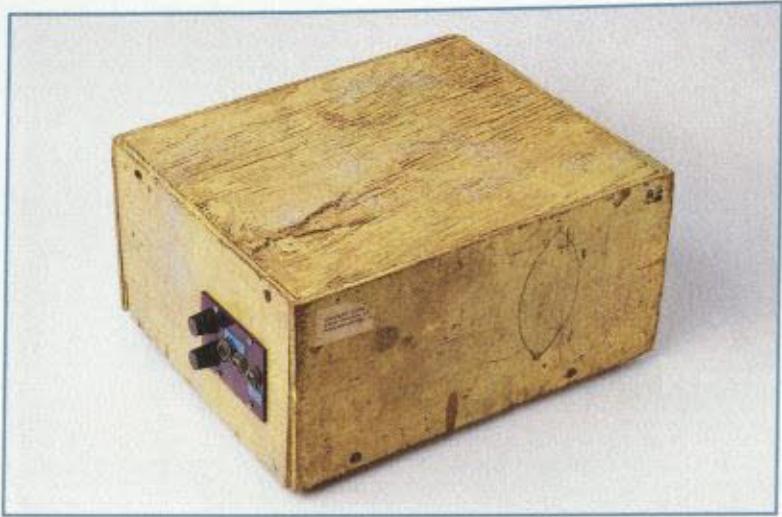
Record it  
at home!



CA.1 - Pictured here and below is Craig Anderton's Zoombass. *"I loved that instrument! Blew my mind years later when I was talking to Wendy Carlos, and one of her favorite instruments was something she made with a big, continuous dial, like the Zoombass, but covering a different frequency range."* (C. Anderton) When Craig moved to California he left the Zoombass to Charles Cohen. When Charles first showed me this instrument I was mesmerized. Whatever world this instrument was from, was the world I wanted to find. Aesthetically it has all the classic, future-funkiness that I love.



CA.2 - A Zoombass Special did exist. The Zoombass Special was a hybrid of the instrument shown here and the circuitry designed for the April 1971 *Popular Electronics* article "Build a Timbre Gate". The only Zoombass Special I know to have existed was severely damaged in a home flooding incident. Its remains were disposed of. The other very early instruments of Craig's that remain a mystery are the Light Saxony and his Penny Drums. The Penny Drums was apparently an instrument that was triggered by touching copper pennies that were wired to produced electronic drum sounds.



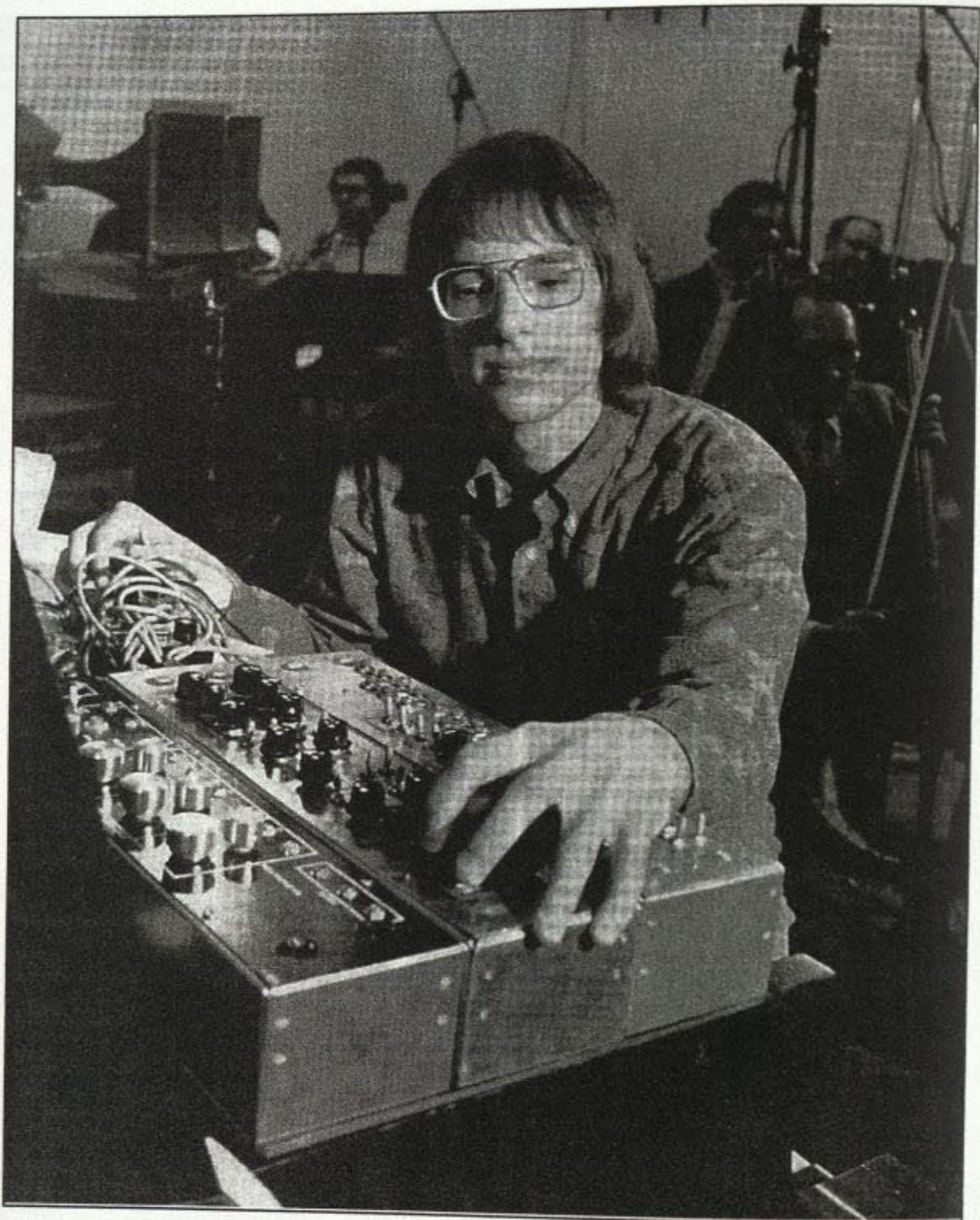
**CA.3** - For those wondering why I use phono jacks (the kind typically used to connect audio signals) to connect power to my instruments, this is why. I saw this power supply early on and figured that is how you do it. Where Craig's instruments don't have their own power supply and cord, you can see the phono input jacks for power connection. I was under some impression that this power supply was a joint effort between Charles and Craig. Charles may have needed it for his own rig, which at the time would have consisted of some of his and Craig's home-made instruments. This yellow box produces a dual, variable 15-30 DC volts.



**CA.4** - Here is an excerpt of a piece written regarding an early album of Craig's. "About a month ago we got the first copies of the new *Craig Anderton Music Tape*. We had a lot of fun listening to it, picking out special effects, figuring out how he got certain sounds, and all the usual fun things you do when you listen to a new album or tape. But, as we listened to it more, we began to speak of the music/concept/accomplishment in strange terms. We were searching for a way to summarize the unique experience we were having. Then John happened to say something about "new folk music". Huh? Hey, that's what it is. It suddenly dawned on us that we were on the front edge of a new wave of music—tomorrow's folk music." (Marvin Jones *Polyphony* November 1977)

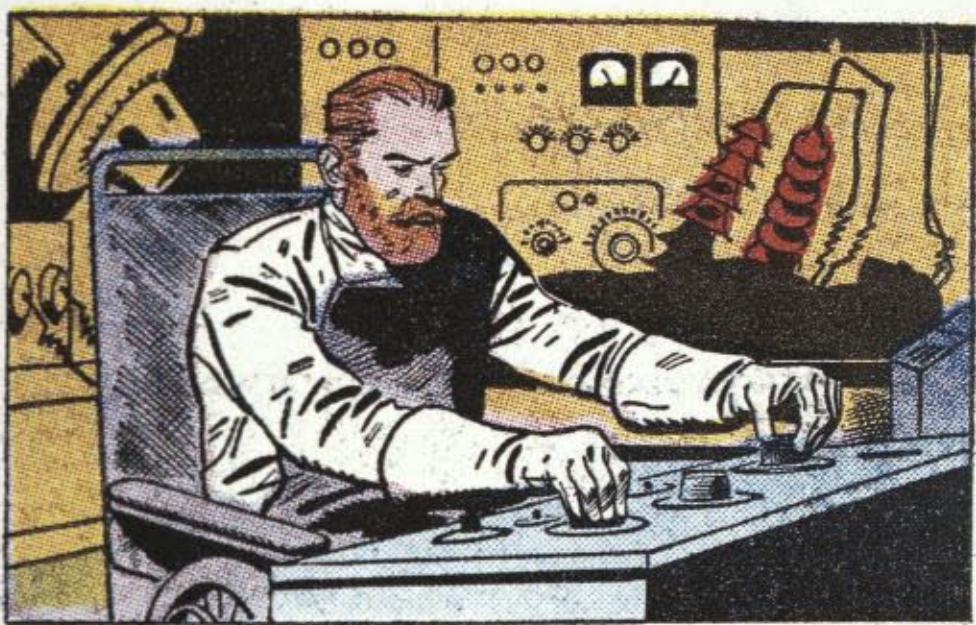


CA.5 - The Silver Modulator. Craig used this on the records of his early band Mandrake Memorial. "By this time another element was increasingly defining their sound: electronics. According to a contemporary Poppy press release, Anderton was 'striving constantly to combine his interest in electronics with his interest in popular music. Much of the unique sound of the Mandrake Memorial emanates from his wires, tubes, and transistors. He has devised a modulator which has two distinct sections; one, the drone section, has an Indian tamboura-type sound, and the other has two octaves which can produce either a woodwind or very baroque brass sound, with a range lower than the lowest note on a piano to about the highest note on a piccolo.' From the same article, "The band turned up at IBC Studios to set up their gear and meet US expat Talmy. But, by Anderton's account, the producer 'hated the synthesizer. I unpacked it and he looked at me and said, 'What's that box?' I said, 'It's a musical instrument.' He just kind of walked away, like 'God, what's wrong with these people?'" (Richard Morton Jack Flashback #4, Winter 2013)

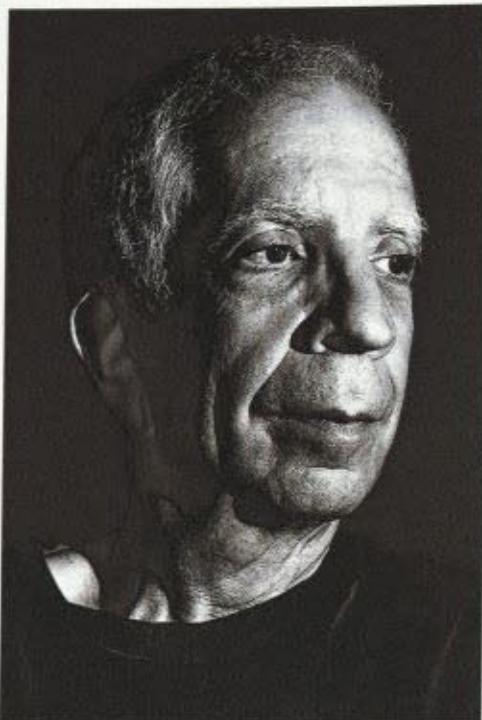


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**CA.11** - "He can also be seen operating the modulator for the group. Craig is given credit for the electronic instrument that synthesizes sounds and creates new sounds. The instrument is the modulator. Craig put down an English major from the University of Pennsylvania for a new bag." (Go, January 24th 1969) Craig clarifies in a more recent interview: "I went to the University of Pennsylvania to major in electrical engineering and I wanted to minor in music. They said that wasn't possible. I said that in order to pay for college, I needed to live off-campus to store my instruments because I played gigs every weekend. They said that wasn't possible. So, I decided it wasn't possible for me to go to college. I took a leave of absence to tour with the rock band Mandrake, and never went back. I think technically, I'm still on a leave of absence." (C. Anderton One Louder Magazine 2/9/13)

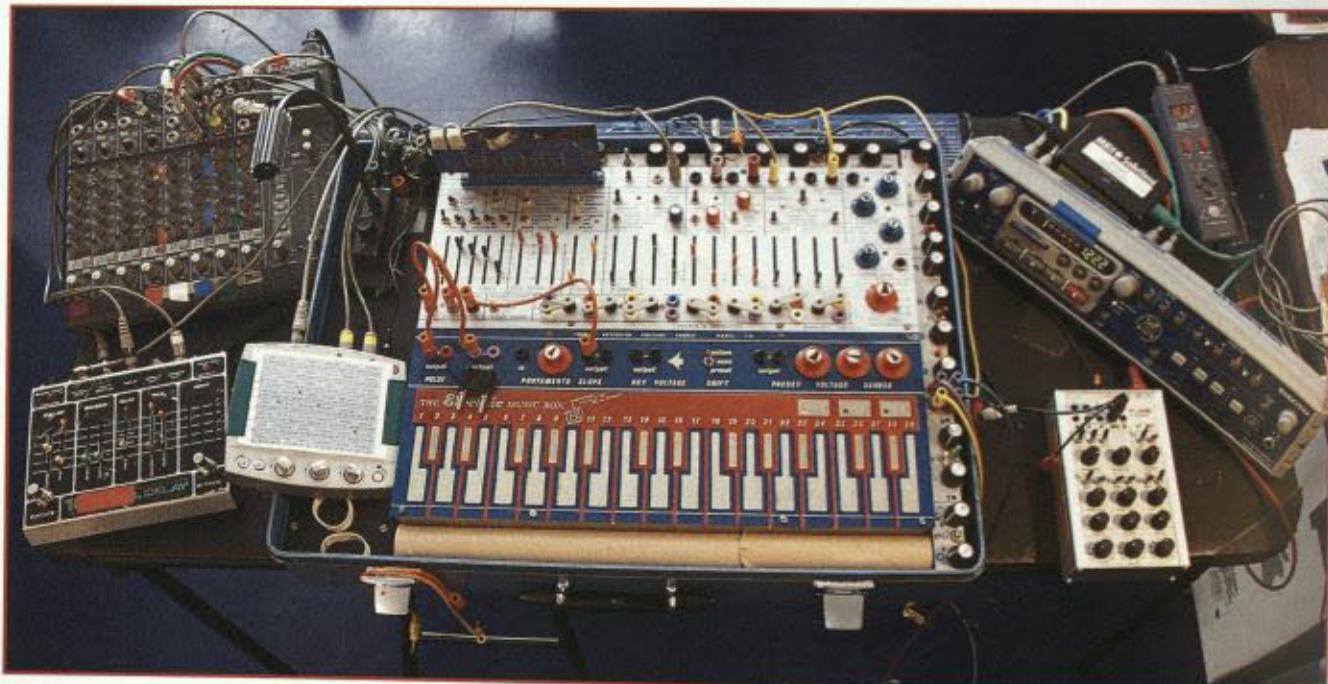


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# CHARLES COHEN

Charles Cohen is synonymous with a unique and rare instrument, The Buchla Music Easel. Only 20 or 30 of the original were made. Though he is regarded as a master of the Easel, he did not invent the synth himself. Its creator, Don Buchla, an early pioneer and innovator in the field of musical electronics, was both unique for how he designed his instruments and how he distributed them. His efforts were towards serving the experimental, rather than the popular market. Charles was one of those experimental musicians who procured one of his Buchla synths in the 70s. Charles early days of electronics were during the heyday of home electronic experimentalism, the early 1970s. The knowledge he had from his work during those early days he passed on to me, and also influenced what became my 'retro-futuro' style. In the following pages is some documentation from those early days. Don Buchla, his instrument's creator, died in 2016, the same month the following year Charles Cohen passed away. Both photos on this page shot by Jason Rusnock.



**CC.1** - "Cohen built his own, packing the required modules into a suitcase himself to make his performance set-up." (Jennifer Lucy Allan, *THE WIRE* October 2013) He called his Easel "The Blue Box" after the custom powder coated blue Halliburton suitcase that housed the synth. Decade's worth of refinement went into developing what would become this: his ultimate live performance rig. "They (Buchla's synths) had an organic quality which was lacking in all the other instruments I had played with up to that point," / "I don't want to get all cosmic, but there's a magical quality to the instruments. I can't really tell you what it is, but everybody seems to feel it." / "The response is instantaneous, there's no lag whatsoever. Your body becomes part of the circuit, so you really have the sense that you are touching the sound." (C.Cohen, *THE WIRE* October 2013)

**PROGRAMMING AND META-PROGRAMMING IN THE ELECTRO ORGANISM**  
**AN OPERATING DIRECTIVE FOR THE MUSIC EASEL**



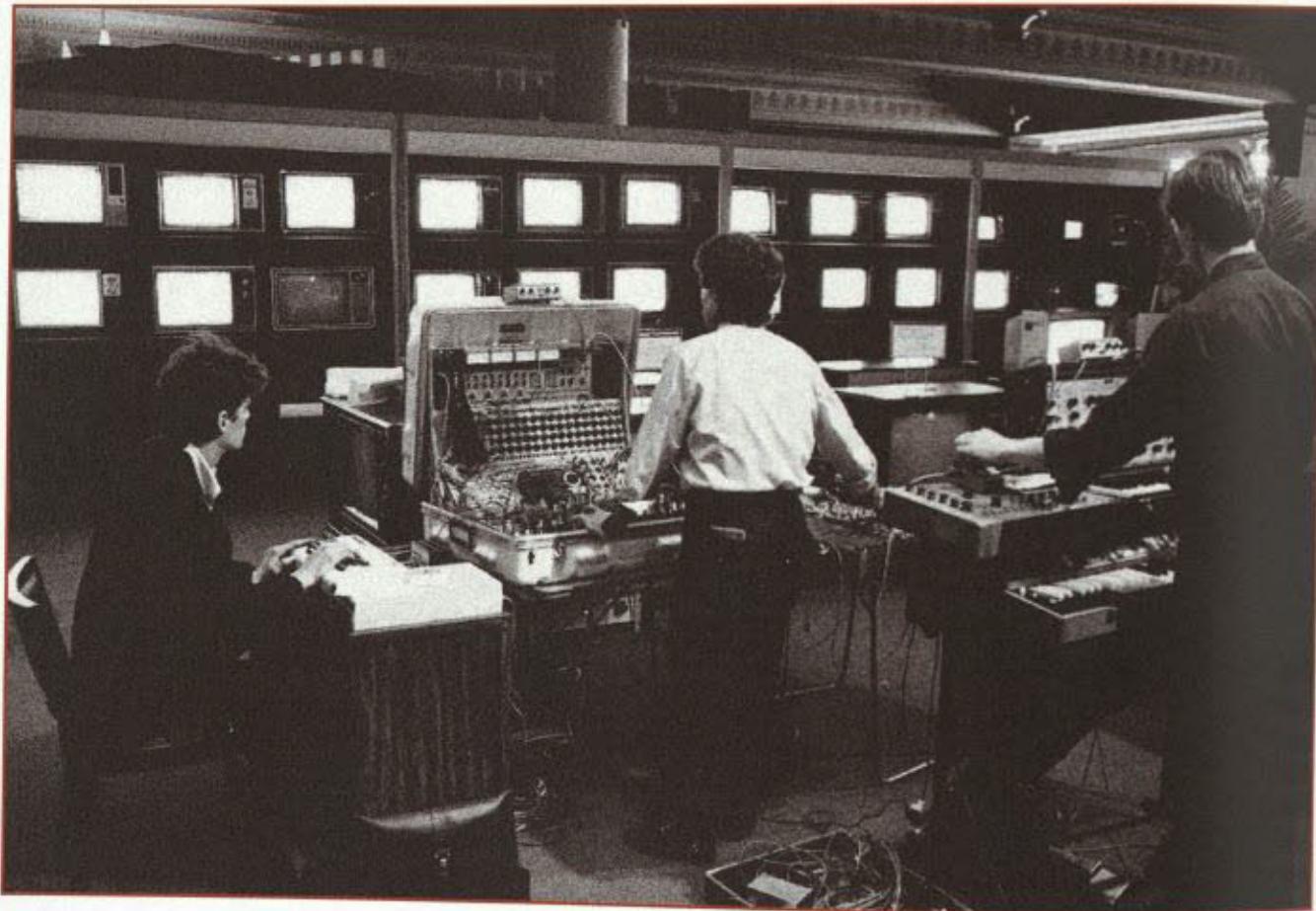
	Box	Box	Box	Box
1 Simple beat	5.5	ITEM # 108		
2 SPACY Wunker	28.4	4e5 @ 120	1/2	
3 Gooey Beets	7.1	4e5 @ 127		
4 Space beats	29.1	2e5 @ 127		
5 BIG AIRLES	7.9	2e5 @ 120		
6 Barknose Weasel	7.2	2e5	127	
7 Big Fat Shit Weasel	3.1	4e5	127	
8 Wacky Fast Beets	19.2	4e5	127	1/4
9				
10 Party Blower	11.2	2e5	126	
11 De Best	13	2e5	127	
12				
13 Thrill & Spots	11.9	4e5	121	1/2
14 Space Beat	3.4	4e5	129	1/2
15				
16 Big Space Drums	5.3	4e5	126.7	
17 De Best II	18.3	2e5	126.7	
18 Farkle Punkt	13.2	3eM	127.5	
19 Rigid Copt	4.4	4eM	126	
20 Trills (w/ Best)	6.3	4e5	126.7	1/4
21 Clap (Space) + Best	47.1	4e5	126.6	
22 GLLCOT	19.3	2eM	126.7	
23 Wacky Fast (w/ Best)	1.3	4e5	120.2	
24 Party /	126.2	1eM	120	
25 Gooey /	53.3	-	-	
26	29.3	-	-	
27	53.39	-	-	
28				
29				
30				

**CC.2** - The front cover for the Buchla Easel manual. Charles after a certain point, preferring collaborative improvisation, only performed live. For those looking to hear his music, his early band with Jeff Cain, Ghostwriters, produced two excellent records. A record label called Morphine more recently released several records of his previous unreleased material, as well as a new, and what would be his final album - *Brother I Prove You Wrong*.

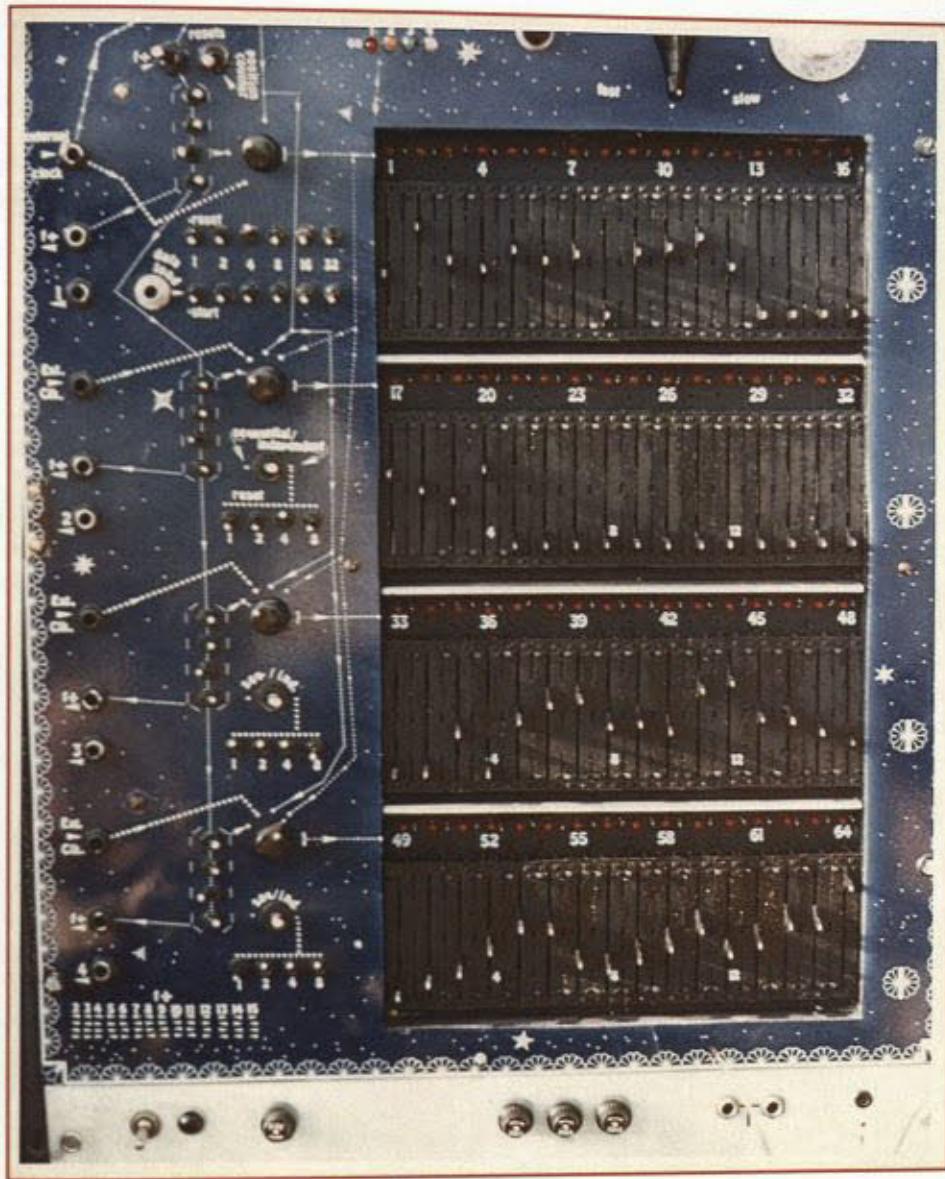
**CC.3** - To this day there is still no agreed upon way to notate electronic music. This keeps its frontier "lawless" in many regards. At left a page of Charles' own notation, describing, to the best of his ability, his own sounds. As I have mentioned throughout this book, Charles helped and greatly encouraged me on the actual production of my early circuits. As important as his help electronically, was the influence he had on me sonically. His live performances were riveting, in a way I have rarely, if ever, seen in the performance of live electronic music. He had a calm, meditative focus, a humility, and a very evident mastery of his instrument.



**CC.4** - "I assembled a second voice from Electro Comp circuit boards and built them into the Music Easel. I use gear from various eras and technologies, and I have spent much time getting all these things to interface. The biggest challenge is just keeping everything working." (C. Cohen Sound Collector #3 1999)



**CC.5** - "Craig Anderton and I and Jeff Cain had an all-electronic group called Anomaly playing Craig's instruments in Philly in the early 70s. I was into making my own instruments in the 70s but gave it up because I realized I was evolving much faster as a player than a builder, and either one needed to be a life's work." / "We were experimenting with the use of a master electronic clock to synchronize the rhythmic elements at each musician's station. Quite innovative for its time" (circa 1971). (C. Cohen Sound Collector #3 1999). The picture here does not feature Craig. Charles is the man in center, Jeff Cain on the right. The two of them playing a whole host of equipment; commercial, musical, laboratory, and most notably Jeff can be seen playing Craig Anderton's Red Modulator (featured earlier).



CC.6 - "Influenced by friend and collaborator Craig Anderton, he also started to build his own instruments, the pinnacle of which was a four channel analogue sequencer." (Jennifer Lucy Allan THE WIRE 10/13) The story of this sequencer is part tragic and part magic. As Charles had recounted to me, in the 70s he had built a few instruments including a bank of several oscillators that were all mixed to a single output. This ambitious project, a complex musical sequencer, he made later. He said, if memory serves me right, he'd worked on it for something like a full year. He said Craig Anderton gave him a tremendous amount of help on the design. The results of all that work are shown here. This picture, taken by Charles, is the only known documentation of the instrument; a giant space-age monolith. A short time after the instrument was completed, while living in Cinnaminson, New Jersey, Charles' home was burglarized and the sequencer stolen. At the time of the burglary, his Buchla synth laid nearby. The thief had stolen the finished sequencer and spared the only partially constructed Buchla synth. Charles would end up dedicating the rest of his life to that Buchla easel. Charles described how affected he was by the break-in and the loss of his achievement, but also recognized that if the thief had stolen the Buchla instead that the trajectory of his life would have changed completely. Charles would continue to use the skills he acquired from this early period to repair and augment the Buchla easel, as well as make small complementary pieces for his synth. This sequencer is the last significant instrument he built before committing his life to the sequencer's surviving sibling, the Buchla Music Easel, "The Blue Box".

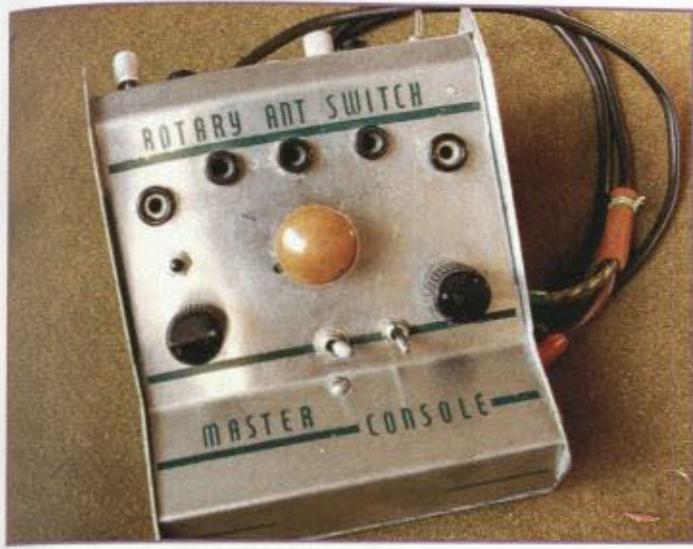


# MICHAEL JOHNSEN

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I have only actually seen **Michael Johnsen** perform live once. It was years ago, when he came to Philadelphia and shared a bill with Charles Cohen. Charles assured me that I had to see what Michael was doing. Seeing Michael's work that evening gave me, at the time only a short distance into my own work, an idea of how expansive and deep musical electronics could get. What he creates may be better appreciated as a form of 'world building' as his numerous electronics are all connected by various patch-cables, creating a dense self-contained electronic ecosystem. Despite an electronic instrument's housing having the ability to obscure the nature of its sounds, I have found that almost always, a home-made instrument finds a way to look the way it sounds. Beneath, a picture of Michael's performance network; that sounds very much the way it looks, like an exotic menagerie teeming with unique electronic organisms. I've been able to stay in touch with Michael since I first saw him perform so long ago. Electronic engineering always being my weakest point, Michael has been critical in getting me out of many technical binds, and so many of my instruments in this book reached completion only by the grace of his technical knowledge and the generosity he's shown with it. Preferring live performance, there is very little in the way of recordings of Michael, but many videos of his performances can be seen on the web. All the captions in this section are from answers Michael gave to questions I had regarding his work, and all photos are provided by Michael too.

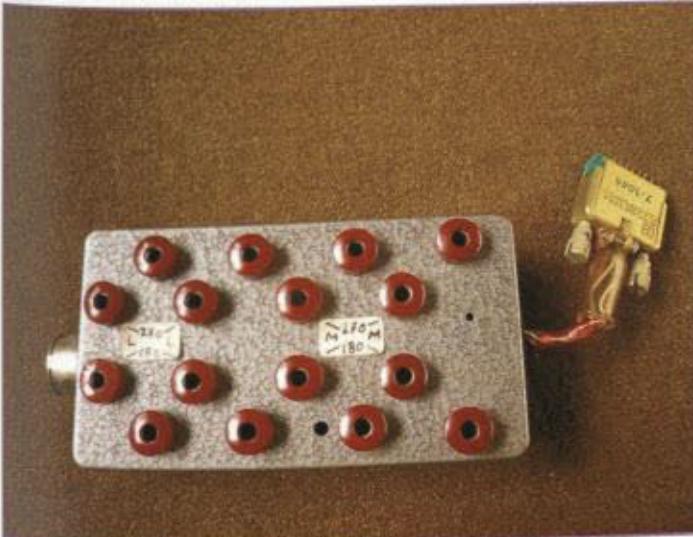




**MJ.1** - "None of what I build is digital. I often use very old and salvaged parts, occasionally rare ones. I love the actual parts of electronics, which makes sense. They're the true material of electronics, like how drawings are made of graphite and ink. Schematics represent circuit elements as idealized abstractions, but the components themselves are made of dirt and rocks and metals and plastics which suffer real non-idealized stresses."



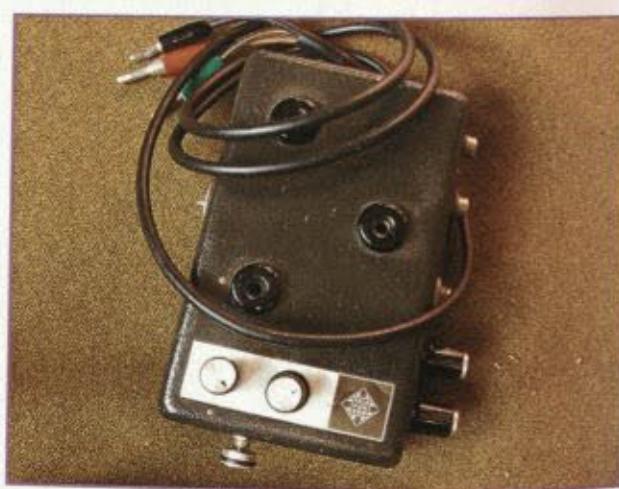
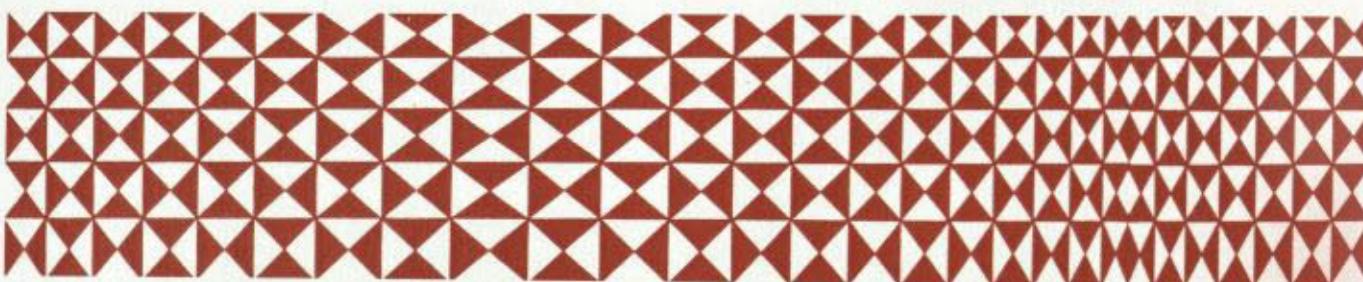
**MJ.2** - On the amount of control he has on the sounds his instruments produce: "I like a lively situation, which is the opposite of a thing which behaves the same way every time. After a long time working with a particular configuration I do come to recognize certain families of behavior that I might try to encourage in a performance, and my encouragement sometimes seems effective, so I foolishly think like a shepherd might — that I caused it to happen, but the sheep were probably heading that way anyway, with or without me."



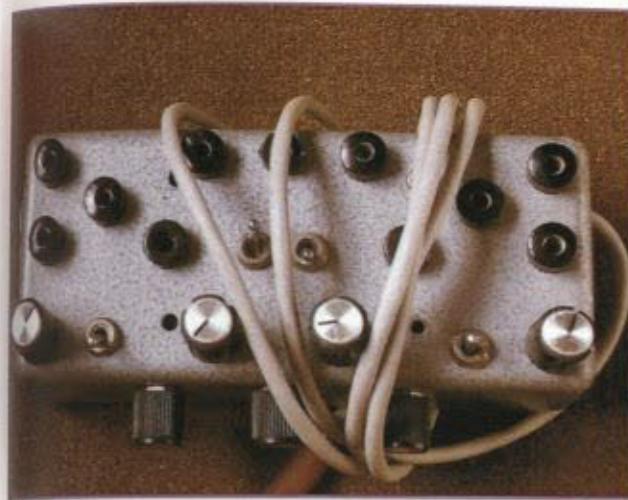
**MJ.3** - On his earlier electronic approach around 1999: "I'd been tinkering intently for several years, and I was modifying the stuff I built so often that it occurred to me that I should just make a kind of playable breadboard. It was just a single strip of socketboard mounted on the surface of a tilted chassis box, with pots and switches mounted but reconfigurable. I never abandoned the flexibility of breadboards. I still sometimes build semi-permanent versions of devices I'm working on with a chopped-down breadboard inside a hard enclosure with jacks, etc. This enables me to tune up parts of the circuit over time before freezing it in solder. I've got a few devices that still have breadboards in them after years."



**MJ.4** - "None of my devices make sound by themselves. Instead I generate sound with feedback between devices, many of them in dense networks. I don't use any dedicated oscillators. Instead I generate sound with feedback between varieties of modifying devices which were designed with feedback in mind. The network of connections is as important as the boxes themselves. A very social situation. This method has a long history. See especially the work of David Tudor and Ralph Jones."



**MJ.5** - "Everybody's made feedback in air, maybe accidentally, with microphones too close to speakers. That's a kind of oscillator. You can control the character of the sound by putting things in the feedback's path like filters (electrical or mechanical, like cardboard tubes), limiters, and other modifiers. Complex paths will make complex sounds. I make feedback directly through wires, not the air. Incidentally, dedicated oscillators also work by way of feedback, but those paths are very short and controlled so they produce well-defined waveforms: sine, square, and so on. Almost all electronic sounds are produced by feedback and they're differentiated by the shapes and sizes of the feedback networks that produce them."



MJ.6 - "It's an old idea that started for me with Gordon Mumma's article 'Witchcraft, cybernetics, and folkloric virtuosity'. The idea is that the skills and knowledge necessary to build electronics yourself can be passed on informally in a folk tradition. Hand-making instruments according to your own needs with available materials and a cheerful independence from (even an ignorance of) conventions and proper training is just as appropriate in an urban world glutted by electronic garbage as making flutes from reeds in rural places. Recently I've been working on restoring some early live-electronic instruments made by Mumma, David Tudor, and David Behrman in the 60's. They're excellent examples of folk electronics from the years when transistors got cheap and IC's had just appeared, making it possible to roll your own devices without joining an engineering fraternity. By bypassing official channels, a lot of odd and wonderful instruments took shape that straight engineers would have stopped dead."



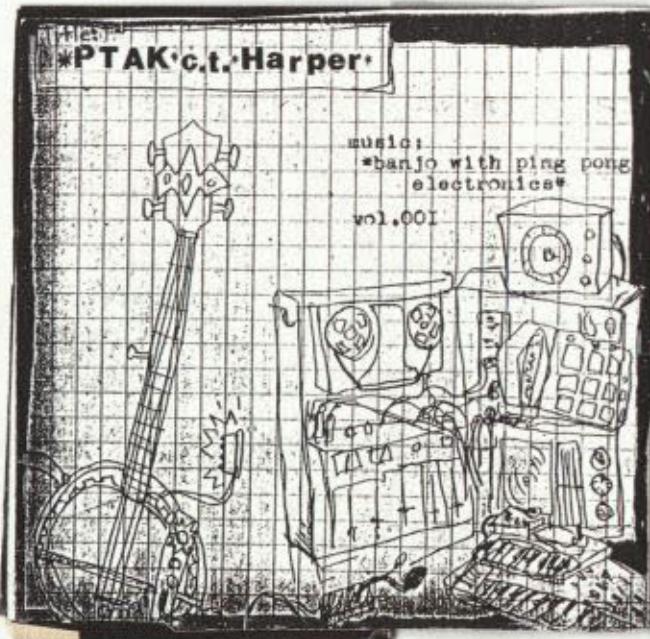


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# NAUTICAL ALMANAC

**Twig Harper and Carly Ptak** began playing music together in the mid-90s. Twig and his friends, unaware of any precedence, had begun explorations into opening battery-powered toys and cheap electronic instruments, and then re-wiring their circuits to produce completely strange new sounds. Twig exposed Carly to this new technique, and the two began an over two decade long partnership. They ran a record label called HERESSEE, from which they released a slew of music on every format under the sun: cassette tapes, CDs, and records. Some formats they even invented themselves. Using an old record cutting lathe they produced small runs of 'lathe cuts'; records produced by cutting grooves into everything including old lacquer discs, sheets of plastic, CDs, and laser discs. They also toured extensively. The band live had qualities unique in experimental music; sweetness, sincerity, and playfulness. During their time as a band they made a ton of various original electronic instruments, by adding various new controls to commercial equipment and toys, or tearing out these sound producing circuits and re-housing them in fascinating new bodies. The pages that follow contain pictures of some of the instruments of theirs that have survived - a small glimpse into their work.



music:  
\*banjo with ping pong  
electronics\*

vol.001



**NA.1** - Pictured above, the cover art of one of their early releases from 1997, an edition of 25. The music is on record grooves cut into the bottom of a CD. The CD is played on a phonograph. They also produced CD/record hybrids, where part of the CD was burnt, to be listened on a CD player, and record grooves were also cut on the outer rim of the same CD, allowing it to double as a record to be played on a phonograph.

- |                    |                        |                       |
|--------------------|------------------------|-----------------------|
| a. beatbox*        | b. rapmaster*          | c. starboard*         |
| d. griddle*        | e. red bullit*         | f. white keyboard*    |
| g. beeper*         | h. onemanjam*          | i. warper*            |
| j. fred*           | k. patchtar*           | l. dd-9*              |
| m. muse            | u. dd-3*               | o. brain bend casio*  |
| p. hot lixx*       | q. vocalizer *         | r. viola              |
| s. prepared casio* | t. dd-5*               | u. pss-70             |
| v. drum gizmo*     | w. paia oz             | x. paia 4700          |
| y. paia 9700       | z. maestro rhythm king | aa. mu ant organ syat |
| bb. speak n' read* | cc. wurlitzer drum*    | dd. rec to reel*      |
| ee. Cz 101^        | ff. maestro woodwind^  |                       |

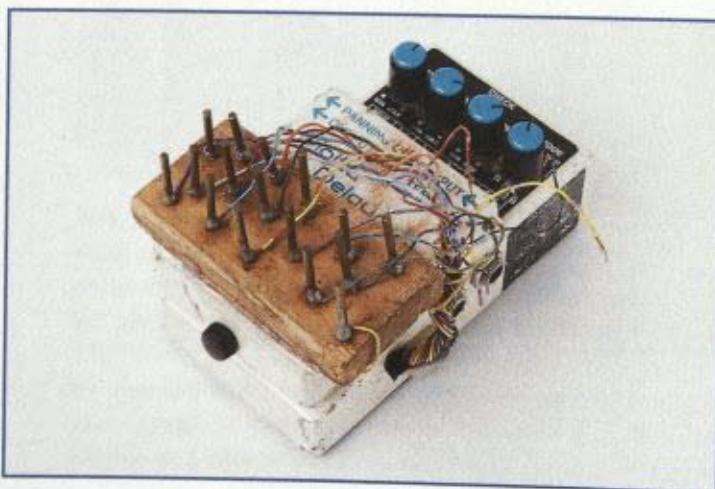
(\* = modified) (^ = not pictured)



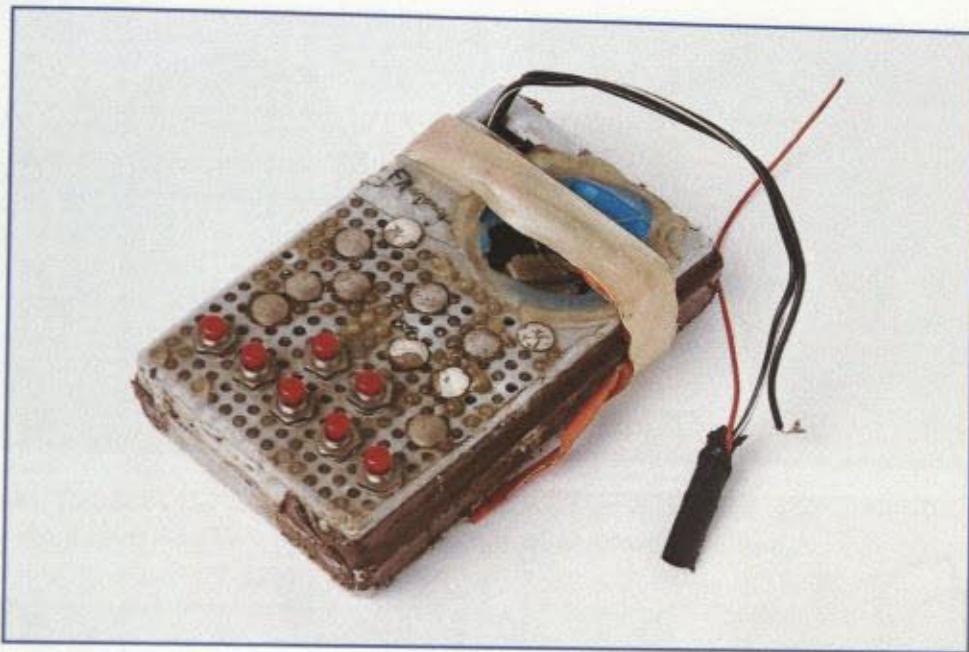
NA.2 - This pile of instruments was photographed by Suzy Poling for the cover of Nautical Almanac's record album *Transcribedivisions*. The key with instrument names is on the page opposite. A few of the instruments amongst the pile appear later in this feature.



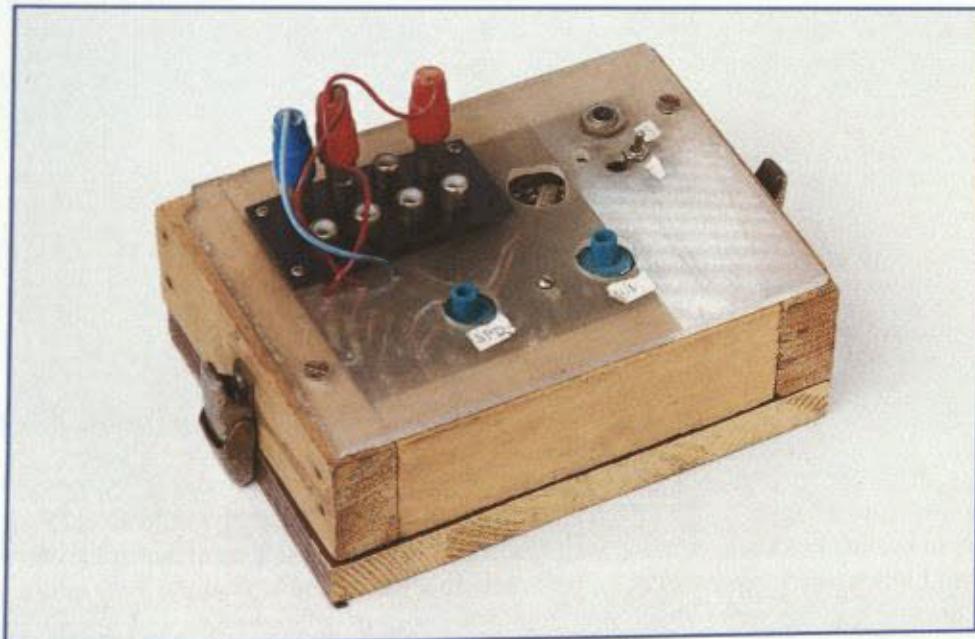
**NA.3** - I call this Twig's Orange Oscillator. This beautiful looking machine, perhaps more than anything else, was responsible for me initially getting into electronics. It was years ago when I first heard of Nautical Almanac. I found their website, which had a section with photos of Twig's instruments. The pictures on the website were not particularly clear, but this may have actually contributed to their aura. Some evidence of an engrossing mystery was revealed. I saw in the painted and hot-glued surface of this instrument's face a way into a domain I thought was open only to technicians and engineers. Electronics turned into a medium for play. I think the primitive look of Twig's builds did a great deal to inspire because his approach makes it conceivable that someone like myself, with no background in engineering, could find a way to work with this material.



**NA.4** - A hacked Boss DD-5 Digital Delay pedal. A big wooden block with wired brass posts, and of course a good deal of hot glue. His instruments all have a fearless, folksy, and even comedic quality to them, and, as I've mentioned earlier, in what seems to be a general principle of homemade instruments, Nautical Almanac's music sounds very much like these instruments look.



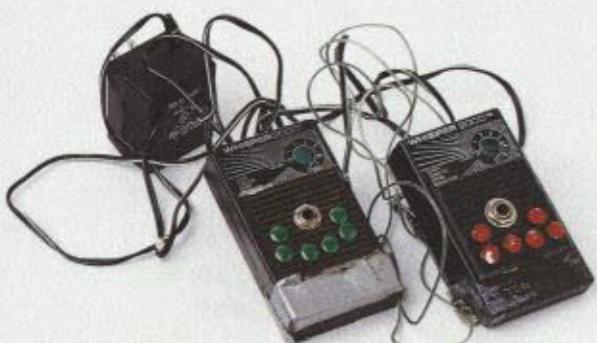
**NA.5** - Some kind of drastically Twig-altered radio. Several red push-buttons have been added and a host of thumb tacks provide the instruments body contacts. The whole affair surrounded by hot glue and brown duct tape. I recall this device on the same webpage that featured the orange oscillator. My recollection is of a black dial where the masking-tape covered hole now resides.



**NA.6** - A circuit re-housed in a latched wooden box. Twig has made the circuit's original blue dials accessible through the clear plexi cover and outfitted it with a patch panel.



**NA.7** - Stenciled with the Nautical Almanac logo, this suitcase held some of Twig's instruments while on tour. Nautical Almanac influenced a definite look and style of music amongst the scene they were involved. Suitcase enclosed "gig-rigs" containing "garbage-electronics" became ubiquitous amongst other artists during the time they were most active.



**NA.8** - Pictured here, covered in red and green sound altering thumb tacks, a pair of Twig-modified Whisper 2000 Sound Modulators.



**NA.9** - Pictured here is Twig's early Infra Dictaphone, dictation machine, intended to cut on clear plastic records. I believe this machine was the one used to cut the CD from the previous page. I've made some mention here of Nautical Almanac's innovation in the field of audio disc-recording. A more in-depth piece on these achievements is beyond the scope of this book, but I felt it worth mentioning, as it is clear that the vision that made Twig conceive of opening and re-wiring electronic devices was the same vision that compelled him to discover new and unique applications for the technology involved with record-cutting. Many of these ideas are very much in the public sphere today. I hope by his inclusion here, his art and innovation, both aesthetically and technically are better recognized. His work has greatly impacted a number of later musicians, myself included, and helped create whole new ways in which music is reproduced and distributed.

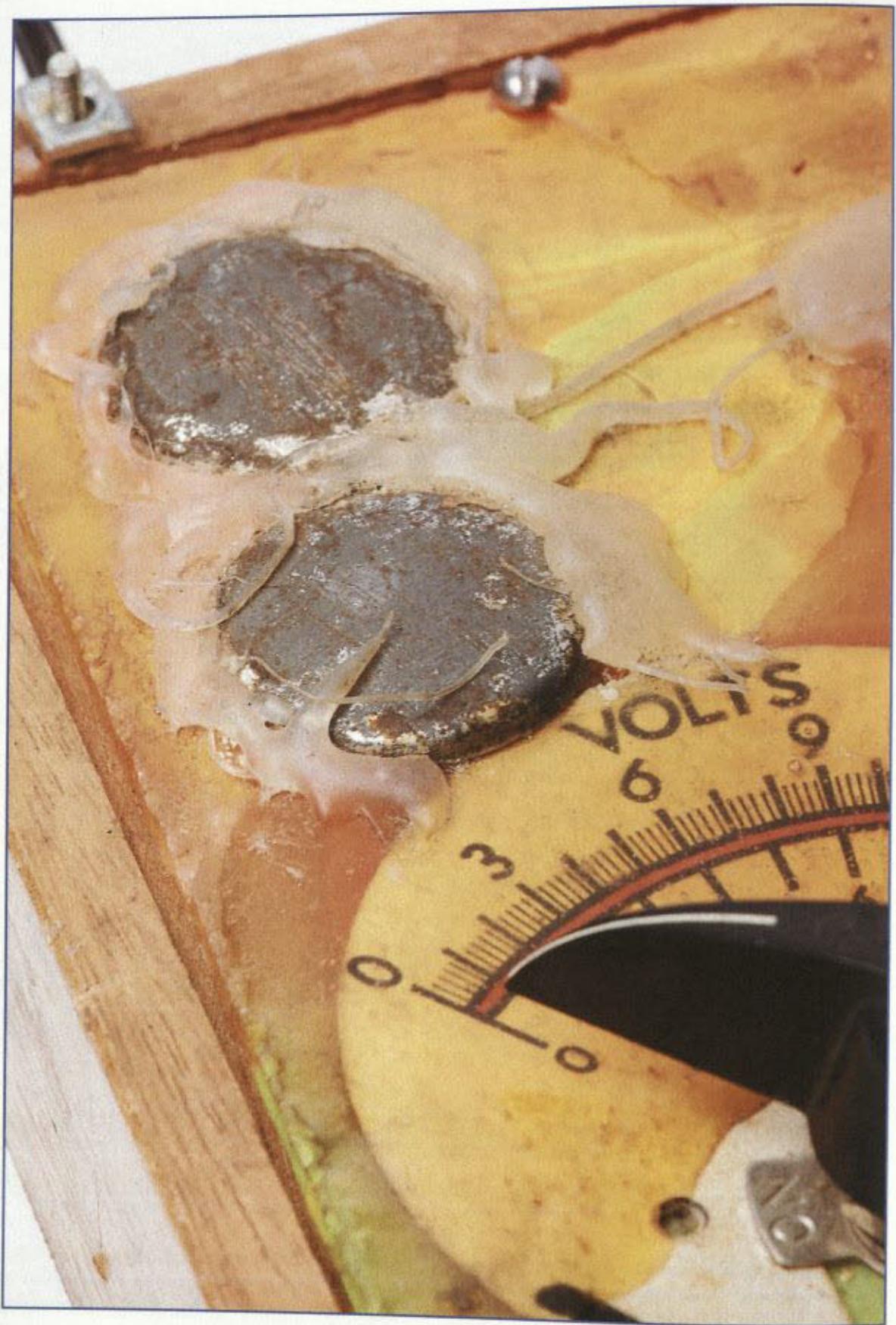


NA.10 - On the left, Yamaha DD-7 Digital Percussion with big toggle switches, and rocker switch bracket added by Twig. On the right is a mysterious Twig pedal, decorated in unique "wallpapering".

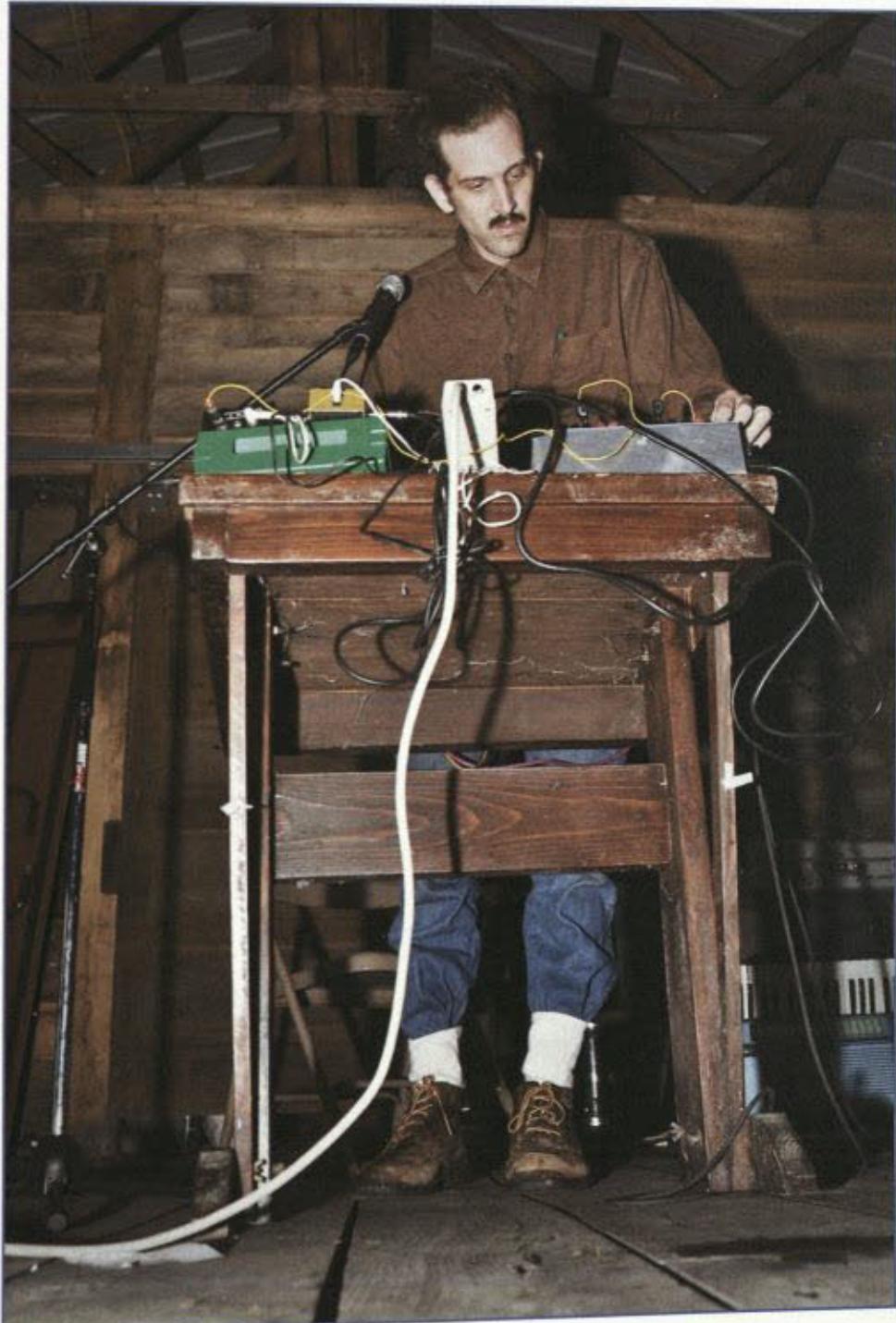


NA.11 - A Yamaha Portasound VSS-30 Digital Voice Sampler outfitted with a flock of toggle switches, a push button, and a pair of brass body-contacts.

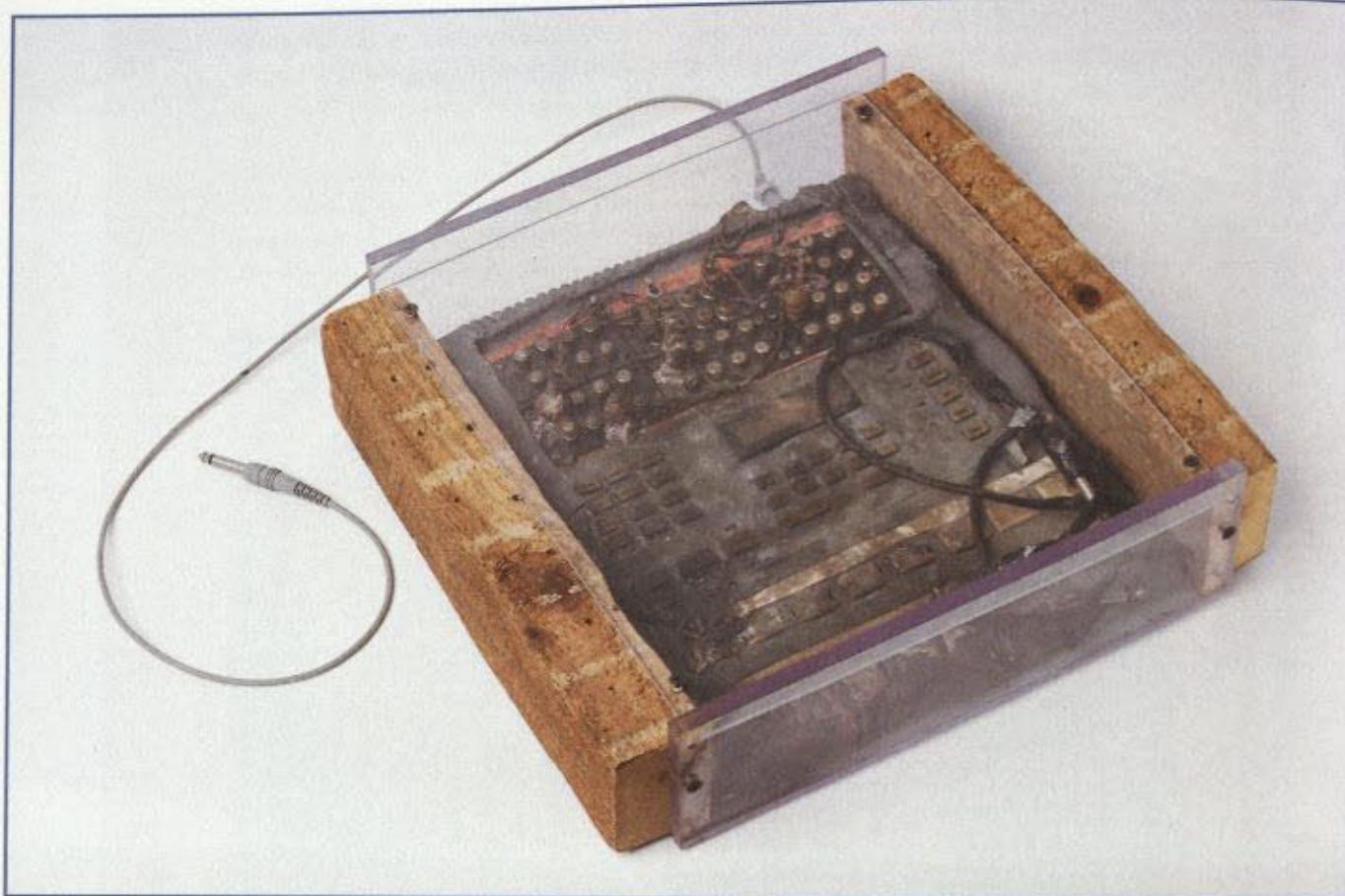
*"My stuff is really temperamental and always breaks, and all the functions that I make always die out and mutate. The last couple things I have been playing for a while and they haven't really died, but I never really make one thing and say it's done. I'll always go back into it, rip it out and put it into other things." (Twig Harper Dusted Magazine)*



**NA.12** - In the same way Twig's quest led him to explore new vistas for audio electronics and record-cutting, Twig's exploration has continued, leading him to sustained studies into the therapeutic applications of *Salvia divinorum* and sensory deprivation float tanks. At the time of this writing, after some time away, Twig has begun regularly performing music again. I encourage folks to pursue any of Twig and Carly's music as Nautical Almanac and any of Twig Harper's and Carly Ptak's solo material. With much respect to his work I also want to say a major thank you for the instruments he donated to Selfish 60 Studio.



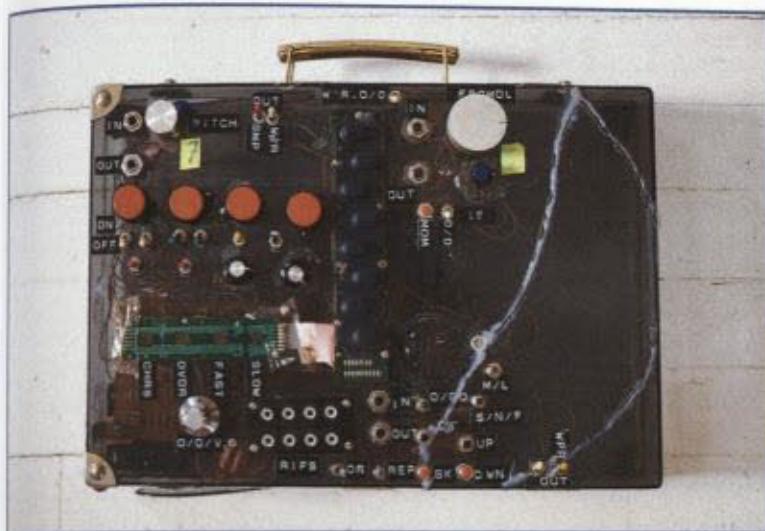
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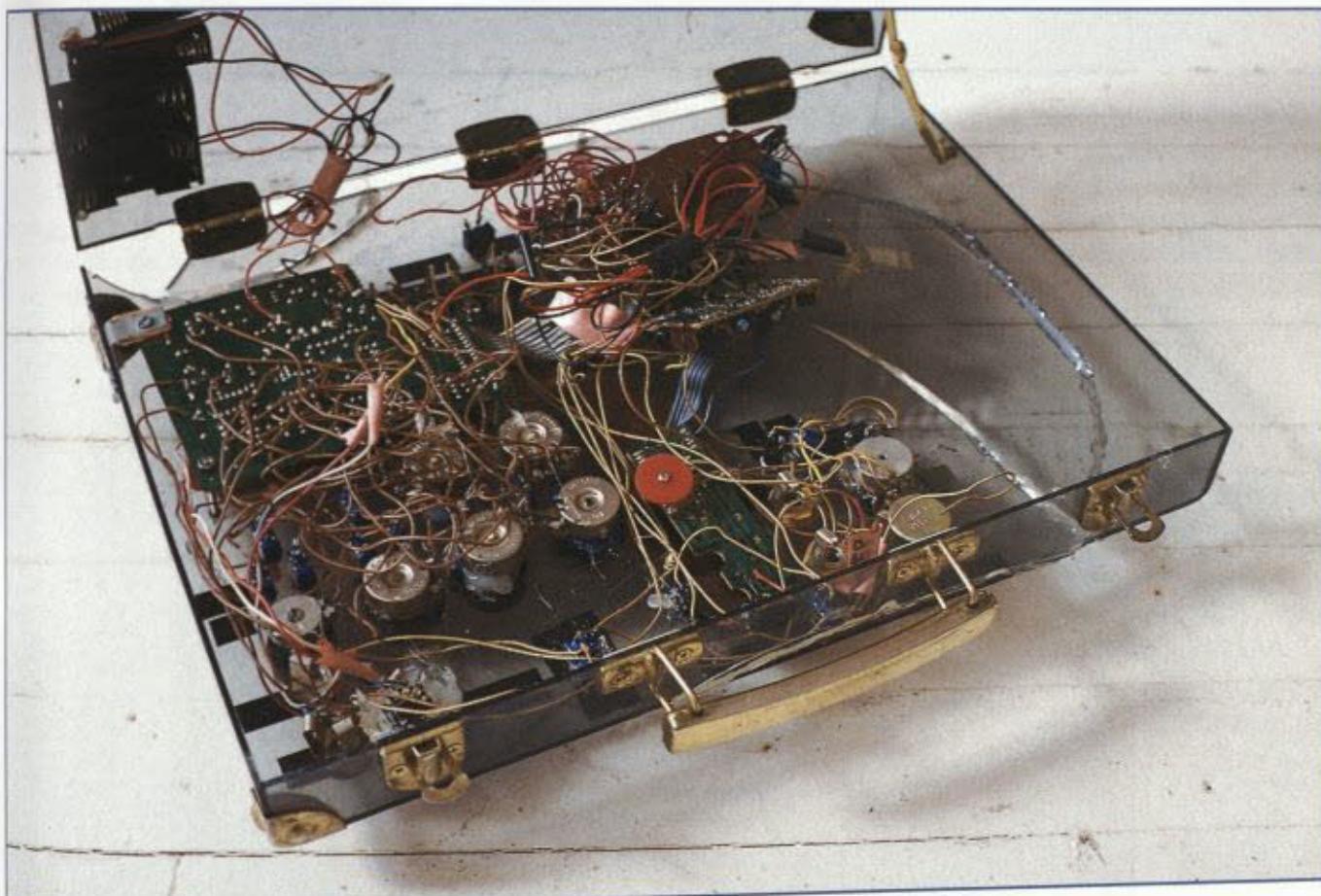
**NA.13** - In March 2006 Twig and Carly's Baltimore home, known as Tarantula Hill, caught fire. The house was able to be repaired, but they lost a good deal of their possessions. Pictured here is a causality of the event, the Nfinit Drum, an Alesis HR-16 drum machine; heavily modified by Carly with an array of RCA jack patch panels. Carly built this vitrine to entomb her instrument. An audio cable remains plugged into its output jack, suggesting the machine may still live.



**NA.14** - As a child my own family's home caught fire in the middle of the night. Everyone, excluding one of our cats, made it out alive, but the old wooden house burnt to the ground. When I met Carly, as she was moving out of Tarantula Hill, the topic of our respective home fires came up. Based on the connection, she kindly gave me this artifact of her personal mythology. Carly's melted drum machine now resides permanently on display in Selfish 60 Studio.



**NA.15** - I asked Carly what her favorite instrument was, and she said probably this one, The Clear Box, a wildly customized grey fogged plexi-glass electronic suitcase.



**NA.16** - This instrument is the combination of several separate modified circuits all assembled into one suitcase. It contains, amongst others, the Warper circuit, which was the first device of its kind Carly had ever seen. Sometime during the first half of the 1990s Twig Harper began exploring the new dimension of re-wiring electronic audio gadgets. He shared one of his early works, the Warper, with Carly. She described thinking it was magic, that some trick was being performed. Twig let her in on how he'd created the piece, and Carly began investigating herself. She described the scene, of Twig and his high school friends, as having an energy of a competitive boys' club, an energy that she liked, with everyone looking to impress each other with the creation of their next magical device.



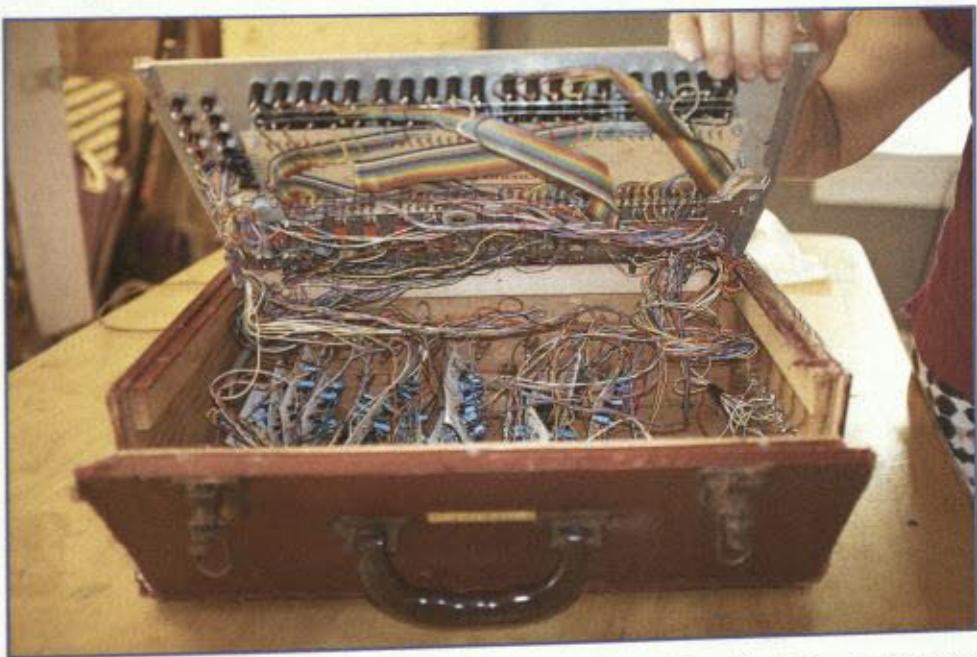
**NA.17** - A circuit-bent Tyco Hot Lixx guitar, covered in a decorative orange and packed with Carly's sound modifying switches and knobs.



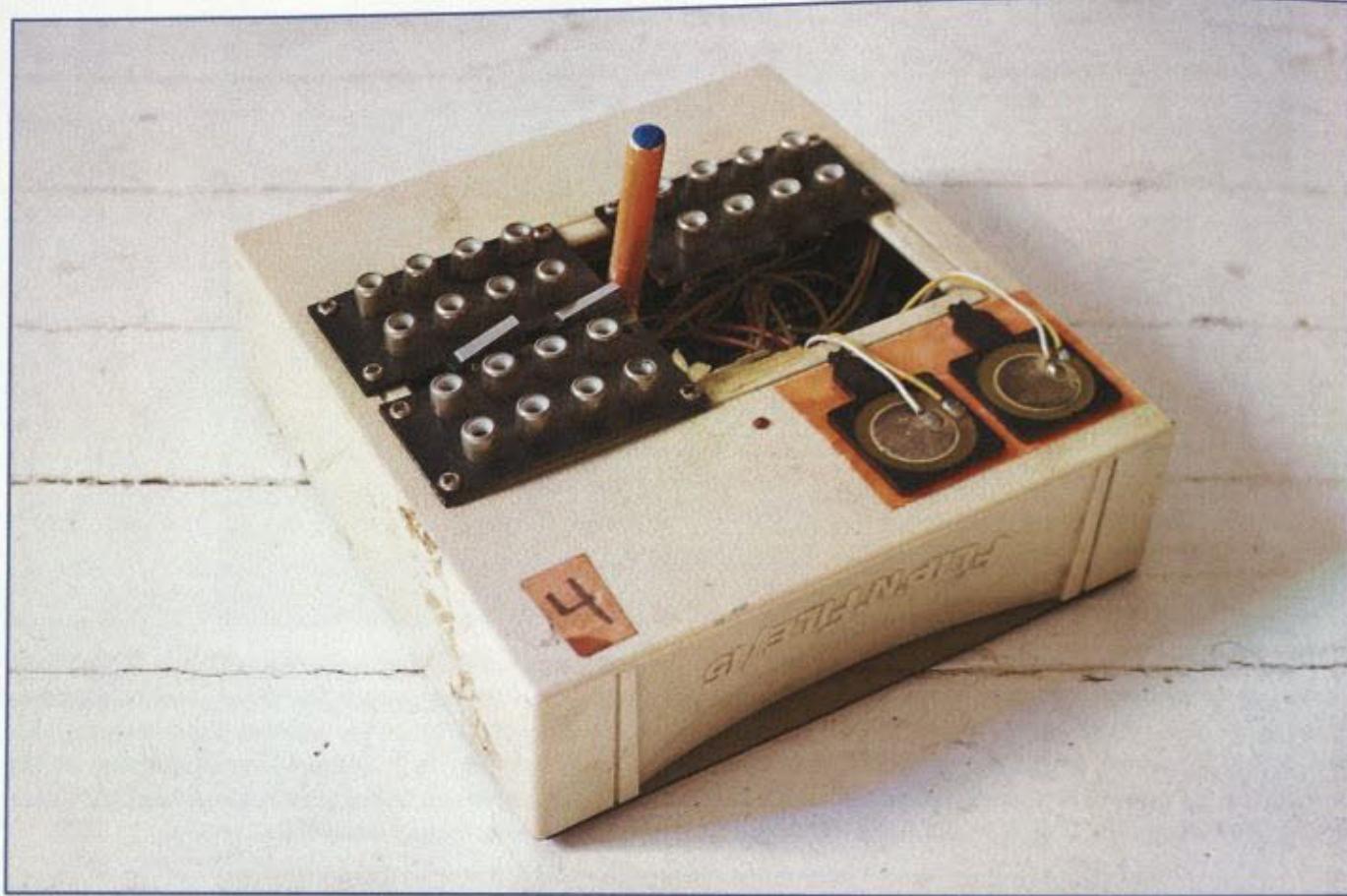
**NA.18** - This beautiful box contains the circuit for an ultra-sonic microphone. The machine converts ultra-sonic frequencies into audible frequencies. Carly said the device worked particularly well with the wrinkling of plastic near the instrument's microphone.



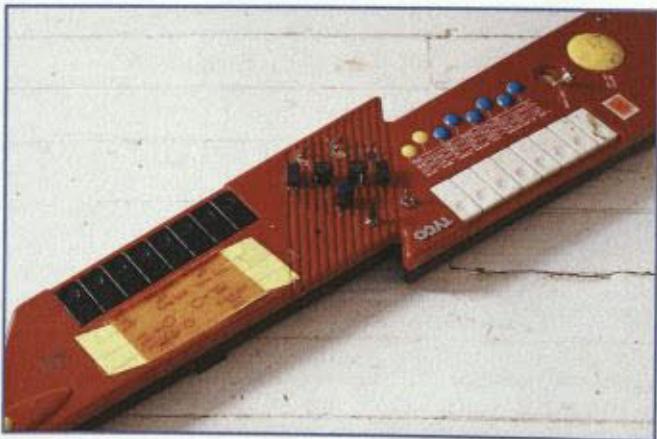
NA.19 - This instrument was a collaborative gift from Twig Harper and Peter Blasser. Peter Blasser's "ROLLz-5" circuit assembled in a custom tube-tester case with matrix switch. Peter Blasser is currently at the absolute forefront of electronic musical circuit design. He is not discussed at greater length because my interest was in keeping this book a very personal expression, and I've never met him, built anything he's designed, or played any of his instruments. He does offer the schematics for the circuits he designs as well as selling finished instruments. Please check out his work. From what I have seen and heard of them, they are absolutely incredible.



NA.20 - Carly reveals the inner workings of Twig and Peter's joint effort. Contained within is a giant network of circuits which have their components mounted on pieces of paper. The front of the instrument's case suffered some damage after falling from a shelf. Twig mentioned that some of his later de-emphasis on building electronics was the result of hearing Blasser's instruments. Peter's instruments, he said, produced the sounds he'd been searching for through his own brand of hacking. Twig began to implement more and more of Peter's circuits into his own sound system.



**NA.21** - The Patchtar - a modified and re-housed electronic device of Carly's creation. The Flip 'n' File/15 is the housing; a case originally meant to hold floppy disks. It now features two piezo disks mounted on its top, and again, an RCA jack patch panel provides access to her new sounds. We live in the physical world and can't help but appreciate some of its gifts. Carly insisted I feel the satisfying click of the orange post that acts as this instrument's power switch.

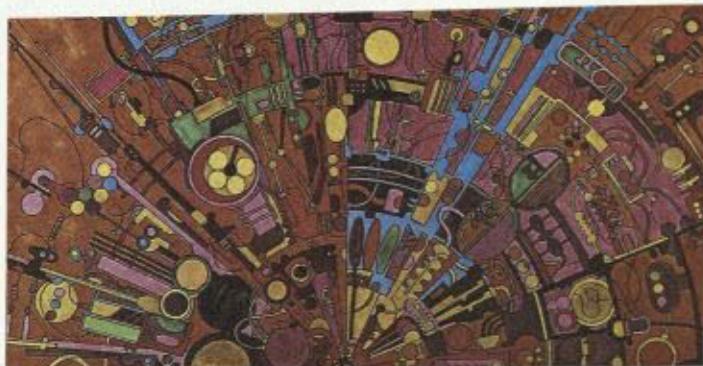


**NA.22** - On the left is a modified Tyco Hot Keys featuring new switches and dials, plus an orange hand-drawn label describing these new controls. On the right, a second modified Alesis HR-16 drum machine. The first, discussed earlier, burnt in the house fire. This second attempt at altering the same device, she said, never quite captured the quality of the original. This version has a custom painted top panel with various electronically wired metal posts.



NA.23 - Carly describes the function of her modifications to an electronic Omnichord. A retrofitted push-button panel and RCA jack patch panel control the new sounds created with her unique instrument. I want to thank Carly for the time she generously gave to both me and this book's photographer, Jason Rusnock. It was a lovely day, getting to discuss so many things, and as it relates this book, the stories of her personal mythology that are woven into these musical electronic instruments. Carly's interest and mission in using musical electronics has expanded a great deal, moving beyond electronic circuitry and pouring over into the study of various other tools applied to the aiding of spiritual energy including the study of Radionics and the practice of hypnotherapy.

# PAST PIONEERS



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This book was never intended to be any kind of academic dissertation or thorough historical examination of electronic musical instruments. I came to musical electronics with almost no interaction with commercial synthesizers, and virtually no knowledge of the history of electronic music. I became interested in building musical electronics as a practice, not a study. As I became engrossed in this work I did venture out; reading books, seeing documentaries, and hearing music from electronic music's early practitioners. I did feel a sense of kinship as I saw and heard work from these early pioneers. I wanted to include some sense of the scope and variety in musical electronics. Presented here are some of my favorites; individuals I feel a particular affinity for, and also a sense of some debt to their innovations.

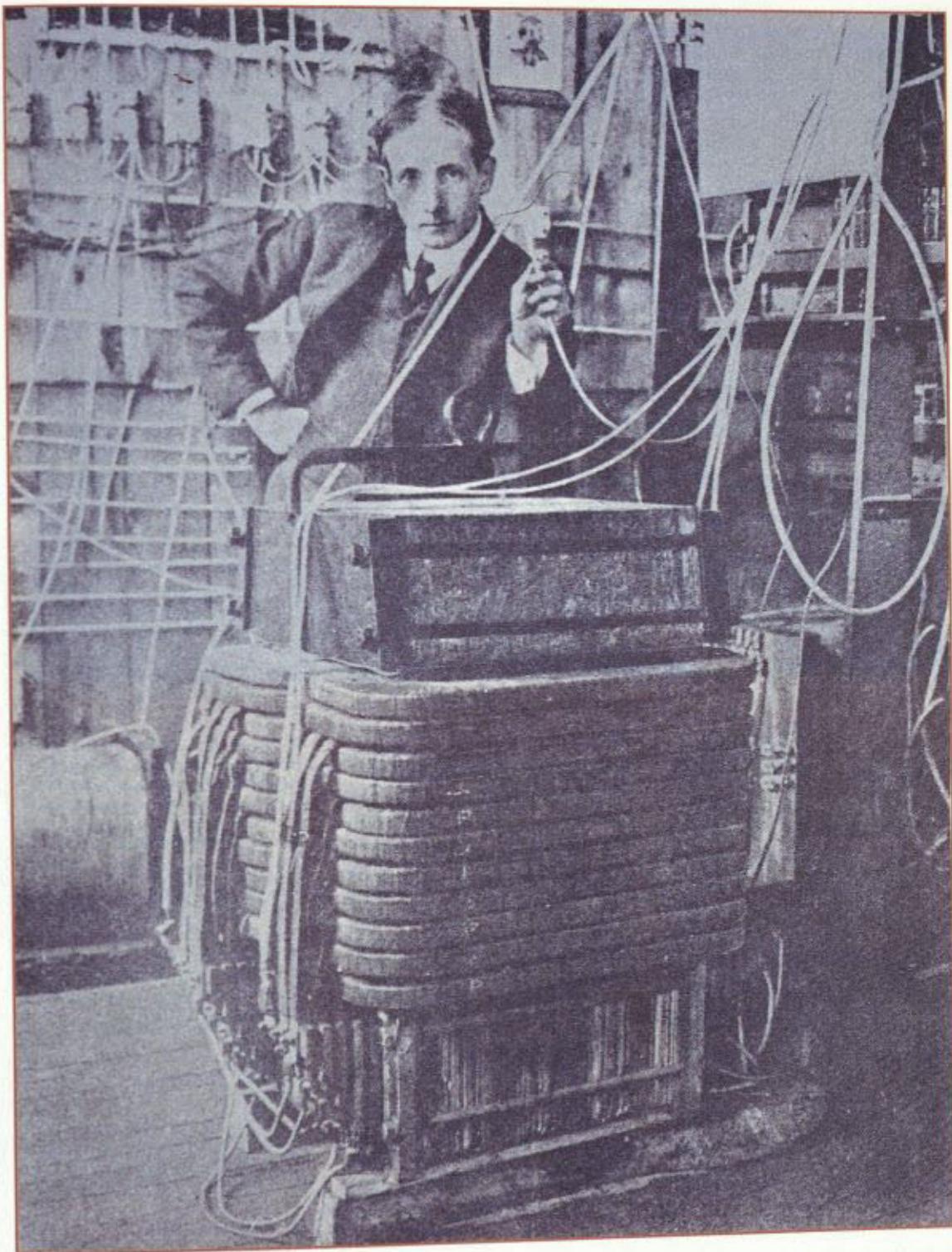
Musical electronics is unique in regards to the number of paths that intersect at its junction. Its history and development made possible by science, electricity applied to music by visionaries, instruments given shape and design by artists and craftsmen, its futures foretold by science fiction, and its sounds applied to music, theater, dance, and film. Alongside film making, it is one of the best amalgams of the arts and the sciences. Automation, space travel, and the military all developed and made more precise components that would, oddly enough, lead to the creation of music-making machines.

The story is fascinating, how this field was first conceived and the many ways and places its spores have germinated. "Electronic music" is sometimes regarded as a genre of music, but in truth, as I've

tried to make clearer by reversing its terms, musical electronics does not typify any particular genre of music. Musical electronics is simply a means to a limitless world of ends. In my estimation, its ends are most impressive when all these technologies are applied to a personal expression, one unique to its creator. That is what this book advocates. Individuals with a similar mission have existed throughout time. The pages that follow feature some of these folks. I admire all their work greatly, and I hope this book exists as a small tribute to the history they began, helped continue, and made richer, and that *Cyber Folk* can be a tiny addition to this beautiful field, where future and past both feed and grow.

A city has been built, where the past's architecture and city planning have had grafted onto it the new design, buildings and technology of the present, and in the future new materials, thoughts, and designs will find their way into the land already developed. This future city-planning will have considerations unique to its time. Amongst the city of today, the rich metropolis of musical electronics, exist many approaches from the past whose ideas have yet to be completely explored. I believe a synthesis ensures the richest future, of the past with the present to create its future.

Each new individual who finds his way into this practice builds a unique world for himself predicated upon the world that preceded him. He creates a new off-shoot, tangent, species, and genus providing another option and avenue for future individuals to pursue.



PP.1 - "Thaddeus Cahill (1867-1934) worked for more than fifteen years to create a gigantic electrical music synthesizer before the First World War. His times have been called the childhood of our era." / "He filed for the first patent on his musical machine in 1895. By then, his idea had grown to include a vast network in which music was to be generated on a perfect instrument at a central plant and distributed on leased telephone wires to homes and businesses of paying subscribers." (History of Electronic Music part one, William A. Johnson, Charles R. McHugh, Howard Rice, Thomas L. Rhea)



**PP.2** - The Theremin was invented by Léon Theremin (1896-1993). He patented the device in 1928. Léon Theremin's life and the history of his most famous instrument are a fascinating story involving the First World War, the Soviet Union, and espionage. Above, a picture of the Theremin's premier player, Clara Rockmore (1911-1998). To those unfamiliar with the Theremin, the instrument has two antennae. The proximity of the player's hand in relation to the vertical antennae alters the pitch, while the other hand's proximity to the horizontal antennae changes the volume of the sound. With the simplicity of its look and design, the response of its interface, the gesture of its performance, and the magic of its function, I still believe, after nearly a century since its creation, the Theremin is the best electronic musical instrument ever invented.



**PP.3 - Louis Barron (1920-1989)** Bebe Barron (1925-2008) created the first entirely electronic film score for 1956's *Forbidden Planet*. They developed their own unique techniques for producing and recording their sounds. *"Louis really was a technical genius. We were both musicians, but he was self-taught totally in electronics, and I think because of that he felt free to use electronics in a way that they'd never been used before. He didn't feel hampered by any formal knowledge."/ "Louis would invent a circuit and put it together. Then he would activate the circuit, it would come to life, and we would amplify it and start to tape it. It would produce a burst of the most glorious kind of energy and electronic activity. That would level out a bit - go on along a plateau, and then, in a moment of glory, it died. The electronic explanation would be that it overloaded in some way. But you could hear it climaxing, and the thing then would just give out, and run down to zero. At one point, a group of scientists came down to visit us from Salk Institute. They were working on the origins of life and had heard about what we were doing; so they came to investigate."* - Bebe Barron (*The First Electronic Filmscore-Forbidden Planet: A Conversation with Bebe Barron* by Jane Brockman)

**PP.4 - Raymond Scott (1908-1994)** was a successful band leader and record producer who became consumed with the creation of new electronic instruments, the pinnacle of which was his Electronium. *"Building on the work of his predecessors, and employing his own intuitive sense of what he called 'primitive engineering,' Scott developed the Clavivox, the Circle Machine sequencer, and the Electronium...."* (Manhattan Research Inc.-Raymond Scott: Inventor and Composer by Joel Chadabe) Scott said: *"I want the Electronium to be a beautiful instrument, to have a special sort of feeling, like a Steinway. Not to look like a Steinway, of course, but to have that sense of elegance and beauty. And I want it to have the feeling of driving, a steering machine, a cockpit of dreams."* (A Cockpit of Dreams by Michele Wood Excerpted from: *The Swing Era: The Vintage Years of Humor*, Time Life Records, 1971)



**PP.5 - David Tudor (1926-1996)** began as a piano player and developed into an electronic instrument builder and avant-garde composer. He existed at a unique intersection of art, composition, music, modern dance, and electronic engineering. There is a wide range of entry points to begin building musical electronics, and perhaps an even wider range of ways to apply its sounds.

Performance of John Cage's Variations V, 1965 (front, L to R): Cage, David Tudor, Gordon Mumma; (rear, L to R): Carolyn Brown, Merce Cunningham, Barbara Dilley. Photo by Herve Gloaguen.

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Digbee lives in Sandyston, a small town in rural New Jersey. He operates Selfish 60 Studio. *Cyber Folk* marks the first significant release of his work. Following this book will be the sharing of a good deal of music; new recordings, old unreleased albums, and potentially more live performances. He will also be devoting more time to his leather business, Digbee's Endless Leather, as well as his philosophical essays, *The Annual Reports*, and God willing would like to one day unify all his interests in the writing and producing of stage plays. A second generation of instruments is planned which will be chronicled in the book *Cyber Folk 2*.

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## **NOT A DEAD END**



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**But continuing development  
keep in touch**

## An explanation of the sounds of "Steel Creek"

I thought it would be helpful for the reader/listener to have some description of which instruments from this book are featured on the record. I've tried to point out what instruments are being played when, and some sonic description of their sounds in order to help folks make the connection between the pictures in this book and the sounds on this record. The length of this record only provides a tiny glimpse of, not all, but most of my music machines featured in *Cyber Folk*. I did not want to simply demonstrate the instruments one by one, but I wanted to play them as they are meant to be played, and show some of the musical and electronic interaction these instruments are capable of; in their natural habitat. I thought it better to provide a song, one that could be enjoyed divorced from this book entirely, or listened to and perhaps greatly enhanced after familiarizing yourself with the work contained in these pages. "Steel Creek" is a song I made specifically for this book. I suggest listening to the song first, before reading the text beneath; your mind can better paint its own picture or direct its own movie based on the music. The explanatory text can then be read later, after your imagination has created its own interpretation of "Steel Creek".

"Steel Creek" opens with a tone from Group Motion Machine #2. As this tone quickly decays a rhythm from T&T Box emerges. Pollywog quickly joins the fray and through connected body contacts the two begin a duet together. T&T Box keeps the regimented beat while Pollywog melodically dances about in its unique fashion. Little high-pitched vibrato tones from RTL Special find their way in; these tones filtered by the blue Group Motion Machine #1. Pollywog switches for a time into its lower "baritone" sound then back up to its higher voice. Merry's beeps, filtered by Gooch, soon follow. As the track speeds up, Gooch's wiggling bongo joins in. The whole affair speeds up until Pollywog, controlled by its on board body contacts, degenerates, making a slew of ringing high tones, and then the sounds of a pulsing and mutating organism. T&T Box, its rhythm so fast, creates the steady tone, then makes the last of its sonar knocks. RTL Special sweeps its tones again a moment later, along with a touch more Gooch. Pollywog's electronic critters then merge with Coy Boy 2's electrical network, this combination produced by my body's connection to each instruments brass body contacts. Coy Boy 2's searing transmission is joined by the electronic swirling special guest appearance of Twig Harper's orange oscillator. J&K Musical Bopper arrives on the scene, producing a repeating sequence, like a man on a mission. Another special guest; Craig Anderton's Zoom Bass contributes sounds similar to a giant fog horn. Now everyone jumps into the pool, RTL Special tones fly by, Gooch's repeatedly pressed percussion, the returning Group Motion Machine #2s bursts of tone and crumbling reverberations, and Beemer's repeated car honks. Pollywog remains as well with random glitching moments. Amongst the bunch, the repeated 'hweets' from a Group Motion #1 filtered Wavetek Model 30 function generator are heard. Gooch gets wiggly and loose on the bongos, and then Merry joins with more beeps. The whole crazy scene is bookended, as it all began, by one more energy surge from Group Motion Machine #2. Pinky's rising tide follows. It brings with it, once more, the swirling of Twig's oscillator. The R5 train whistle honks last, signaling it is time to go.

The song "Steel Creek" is named after a tiny factory that sits, a mile away from my home, right next to a popular fishing creek. The factory was for steel fabrication and was operational when I was a child, but has remained abandoned for years.



15 RPM  
RECORDED AT SELFISH 60 STUDIOS



JUL 20 2019

1st EDITION

