

Circuit Bending

Nicolas Collins (2006)

Traditionally, making functional electronic objects has necessitated a fair grasp of theory and a pretty clear idea of what you wanted to make *before* you picked up your soldering iron. David Tudor, Gordon Mumma, Composers Inside Electronics, and other musical designers began chipping away at these assumptions in the 1960s and 1970s. Being self-taught, they had only piecemeal knowledge of electronic theory and were less concerned about doing things “properly” than about making something that sounded cool. Immersed in a musical ethos that valued chance, they were highly receptive to accidental discoveries—in the pursuit of the “score within the circuit,” they relished wandering down side paths, rather than race-walking toward a predetermined goal.

Then in the mid-1990s Reed Ghazala pushed serendipity back to the fore of electronic practice with his fervent advocacy of what he dubbed “circuit bending.”¹ Like Waisvisz (see “The Cracklebox,” chapter 12), as an adolescent in the late 1960s Ghazala encountered the sounds of accidental circuit interaction: an open amplifier left in his desk drawer shorted against some metal and began whistling. After some experimentation, Ghazala added switches so he could control the shorting, and Circuit Bending was born. He developed a series of techniques for modifying found circuitry—especially electronic toys, whose sonic sophistication grew in direct response to the boom of semiconductor technology in the 1980s—without the benefit of the manufacturer’s schematics, or any engineering knowledge whatsoever. In 1992 he began publishing instructive articles in *Experimental Musical Instruments* (an influential journal for instrument builders) and acquired a cult following². In 1997 he launched his Web site and today a cursory Web search will reveal news groups, festivals, and workshops for circuit bending all over the world.

Circuit bending is freestyle sound design with a postmodern twang—the perfect escape for artists bored by the powerful, but often stultifyingly rational, software tools that increasingly dominate music production, yet still hooked on the digitally inspired cut-and-paste aesthetic of scavenging, sampling, and reworking found materials. With its defiantly antitheoretical stance and emphasis on modifying cheap consumer technology, bending has a natural egalitarian appeal (as well as some odd orthodoxies: looking at my instruments as I was setting up a demonstration at the “Bent 2004” Festival at The Tank Gallery in New York City, an audience member inquired, “Are they bent or hacked?” When I looked baffled he elaborated: “‘Bent’ means you have *no* idea what you are doing when you open up the circuit; ‘hacked’ means you have *some* idea”). But bending’s try-anything extreme experimentalism can produce wonderful results never anticipated by the original designers of the device being bent.

Some benders specialize in particular adaptations: German musician Joke Nies has made a specialty of hacking an early digital instrument called the “Omnichord” (see figure 1); my ex-student Jon Satrom has based his VJ career on a specific V-Tech children’s toy (see his video in the “Visual Hacking” section of the Gallery on this website). Texas Instrument’s “Speak and Spell” has been a favorite from the day it was introduced in

1978, long before the term “bending” came into use. Web sites abound with detailed instructions for specific cuts and jumpers on the boards of particular toys.

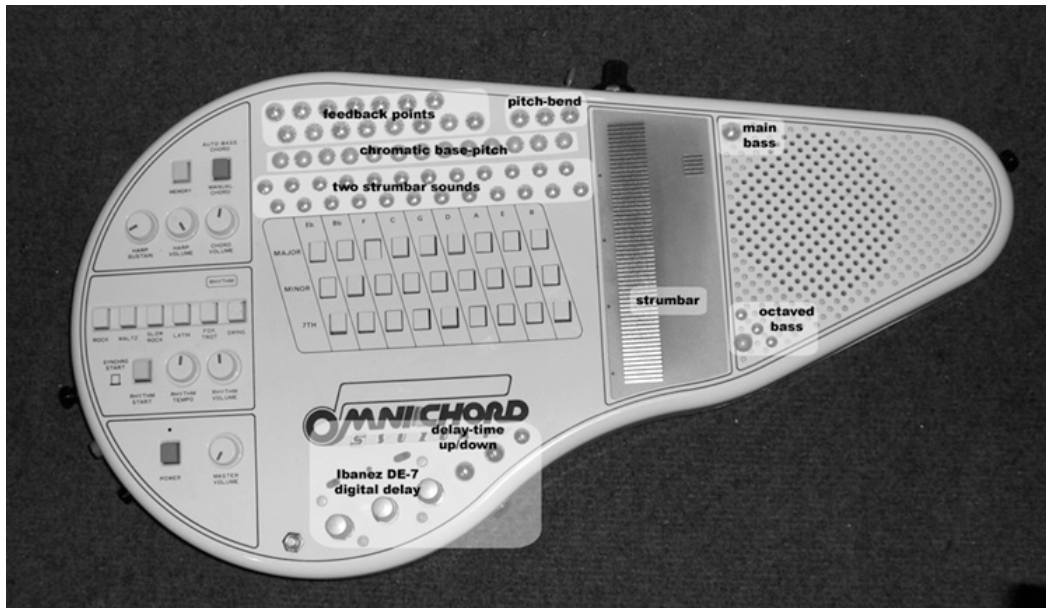


Figure 1 Bent Omnichord, Joker Nies. Photo © Joker Nies.

Phil Archer (UK) and John Bowers (UK) are representative of the recent generation of hackers, who effortlessly combine bending with Tudor-era contact mike technology and sophisticated computer programming. Archer did the “classic” bend to his Yamaha PSS-380 keyboard: exposing the circuit-board, placing the inverted instrument on the performer’s lap, and making arbitrary connections between components on the board with a stripped piece of wire (see figure 11 and his audio track in the “Circuit Bending” section of the Gallery on this website). “These connections,” he writes, “induce tones, bursts of noise and corrupted ‘auto-accompaniment’ sequences from the device which are unpredictable in their details but generally ‘steerable’ overall with practice. The precision and control afforded by the standard keyboard interface is eschewed in favour of direct contact with the circuit, and the performer is continually forced to rethink and re-evaluate their relationship with the instrument in light of the sonic results.”³ Most of his other instruments have a Frankenstein quality: a midget Hawaiian guitar whose single string is played by the sled mechanism from a CD player (see figure 2); a set of small percussion instruments whacked and scraped by motors from a dot matrix printer; a music box mechanism activating bent electronic keyboards.

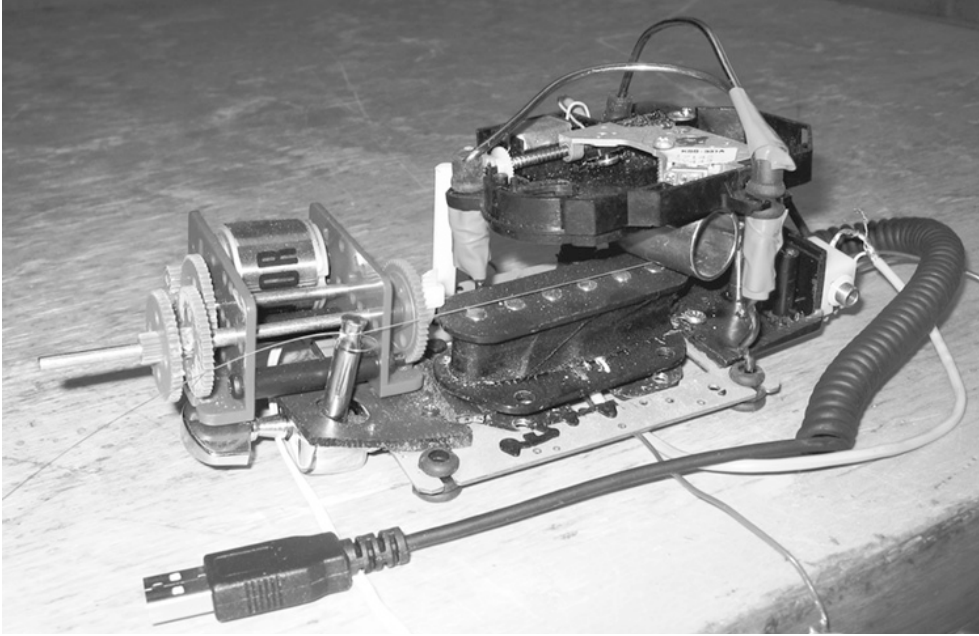


Figure 2 “CD Player Slide Guitar,” Phil Archer. Photo © Phil Archer.

John Bowers, in an ongoing struggle against his training as a computer scientist, “reinvented” what he has dubbed the “Victorian Synthesizer” (see chapter 3 and audio track in the “Laying of Hands” section of the Gallery on this website): it produces sounds with speakers animated directly by batteries, bereft of intervening electronic circuitry. Corroded metal, mercury-filled tilt-switches, and a handful of screws and washers complete instruments that could indeed have been built in the nineteenth century. His other “Infra-Instruments” combine similar electro-mechanical technology (mixing bowls filled with motors, magnets, contact mikes and guitar pickups (see figure 3); microphones embedded in a plank of wood; strings, stones, and guitar pickups strewn across a table with computers and rock effect boxes)⁴.

Notable younger Benders include Knut Aufermann (Germany/UK), Xentos “Fray” Bentos (UK), David Novack (USA), Vic Rawlings (USA), Sarah Washington (UK), Chris Weaver (UK) and Dan Wilson (UK)⁵. Britain’s particularly vibrant bending scene (including an “all bending ensemble,” P. Sing Cho— see their audio track in the “Doing It Together” section of the Gallery on this website) has roots in the prevalence of toys as affordable, alternative noisemakers among improvisers in the 1970s—most significantly Steve Beresford. As Sarah Washington says, echoing Tudor from four decades earlier, “I am an improvising musician...the choice of sounds is down to the circuit – whatever it comes up with is fine with me” (see figure 4)⁶.

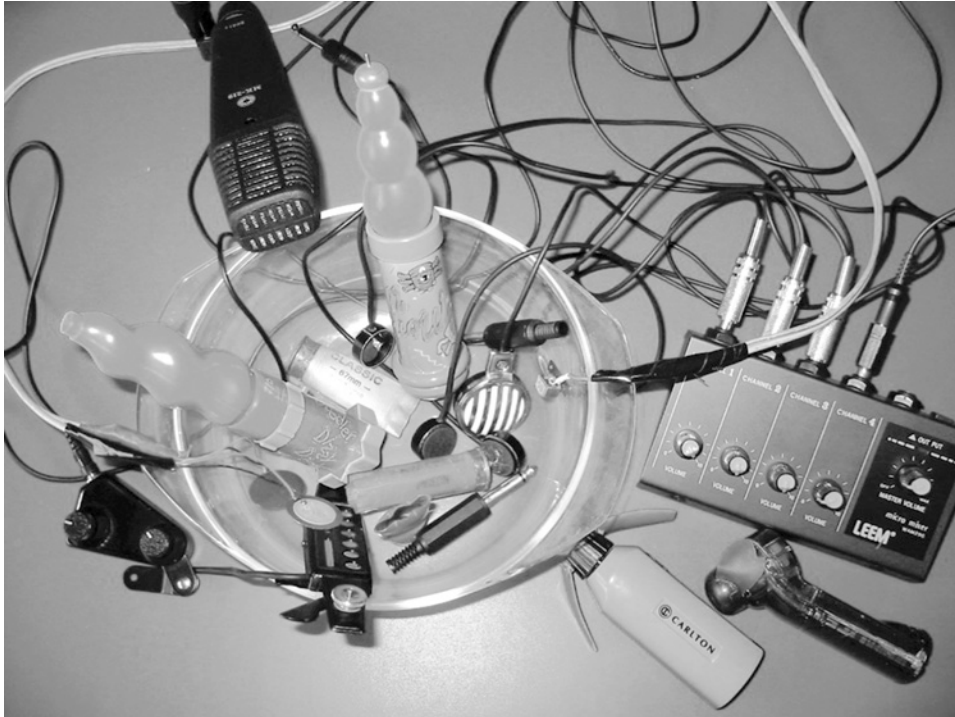


Figure 3 "Mixing Bowl," John Bowers. Photo © John Bowers.

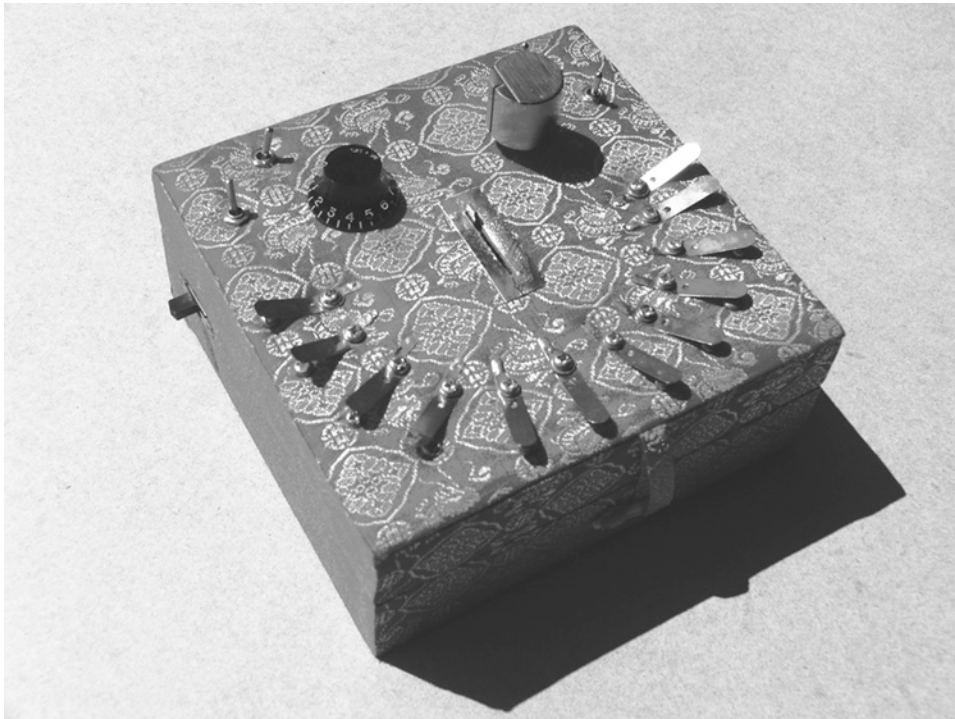


Figure 4 "Mao Tai," Sarah Washington. Photo © Sarah Washington.

¹ Reed Ghazala: <http://www.anti-theory.com>. Reed Ghazala, *Circuit Bending: Build Your Own Alien Instruments*. New York: Wiley Publications, USA, 2005.

² *Experimental Musical Instruments*: <http://www.windworld.com/>

³ The Phil Archer quotation is from personal correspondence, 2003.

⁴ Bowers, J., and Archer, P. “Not Hyper, Not Meta, Not Cyber but Infra-Instruments.” In Proceedings of NIME,05 (New Interfaces for Musical Expression), May 26–28, 2005, Vancouver, BC, Canada. Downloadable from <http://hct.ece.ubc.ca/nime/2005>.

⁵ Rawlings, Vic. “The Boss GE-7 E.Q. and Flexible Speaker Array as Tonal Filters”. *Leonardo Music Journal* Vol. 17 (2007). Pp. 37-38.

⁶ The Sarah Washington quotation is from personal correspondence, 2003. *Leonardo Music Journal* Vol. 17 (2007), *My Favorite Things – The Joy of the Gizmo*, features articles and artist’s statements by many Circuit Benders, as well as a CD, curated by Sarah Washington, with 17 tracks by various artists.