

# Designing the “Hot Strings” Guitar for Chet Atkins

By Ron Tipton

This is the story of an electric guitar and the musician who produced it: Chet Atkins<sup>1</sup>.

The story begins in the mid-1970s. I was taking a break from working on missile tracking systems to pursue what I preferred: working in audio electronics as a designer and consultant. My late wife, Virginia, and I found ourselves in Prairie Grove, Ark., working for GMS, Inc., a contractor to the Baldwin Piano and Organ Company. John Goss, the president of GMS, had hired us to design a line of guitar amplifiers for the Gretsch Division of Baldwin<sup>2</sup>, and for other audio designs that might come up.

Another design did come up: Baldwin needed a piano tuning device for their grand piano manufacturing plant in Conway, Ark. This is another story, but it's relevant because I used two epoxy potted modules in the design to make it all fit inside the box they wanted to use. Chet heard about the modules and came to the GMS plant to talk to me about a project he had in mind. This was in October or

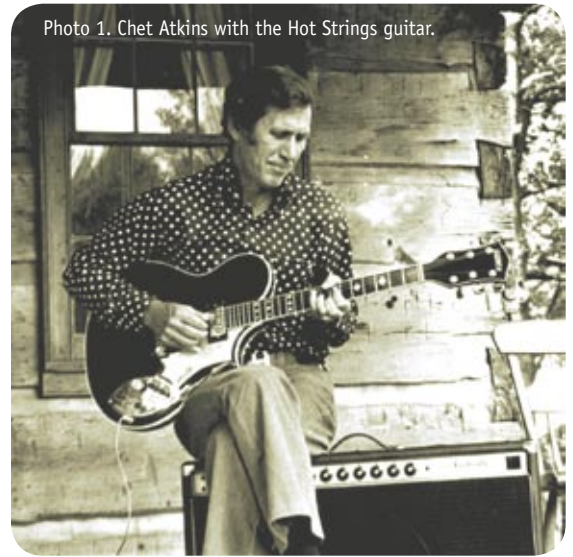


Photo 1. Chet Atkins with the Hot Strings guitar.

November 1975.

I must digress a bit here to fill in some details. RCA owned recording studios in Nashville and also manufactured all kinds of semiconductors at that time: small signal and power transistors, matched transistor arrays in DIP packages, and CMOS integrated circuits. Chet worked for RCA (a major supplier to Baldwin).

## A HOLLOW IDEA

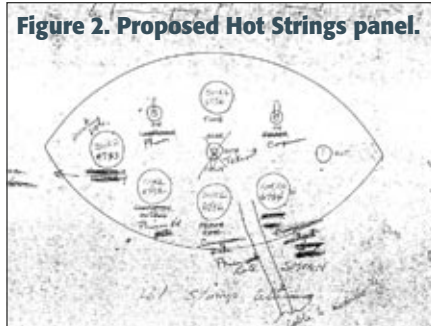
The project Chet had in mind was incorporating some special effects modules into the guitar body. There were a number



Photo 2. Chet Atkins tests the special effects Hot Strings.



Figure 2. Proposed Hot Strings panel.



trial. Chet came to Prairie Grove about mid September to give it a try. The photos were taken inside the GMS plant and across the street in Battlefield Park (the site of a Civil War battle). We carried the equipment across the street to have enough space for all the GMS employees to listen and soon an impromptu concert developed, with many of the local residents showing up. Randall Goss, who was 15 or 16 at the time and the son of the GMS president, was the only one of us with enough foresight to bring a camera. I have him to thank, and I do, for having a set of 8 x 10" photos to mark the occasion.

After the concert, Chet and I

walked back to the GMS plant discussing his impressions. He was generally pleased with the performance of the modules but he wanted to make some changes in the arrangement on the control panel; plus, he thought the phaser volume was too low at the "full on" (CW) end of the blend control. **Figure 2** is a control panel drawing with his handwritten changes.

This is also when he came up with a name for the guitar: "Hot Strings." If you look closely, maybe you can see where he wrote it near the bottom of the figure. I apologize for its quality; it's a nearly 30-year-old "Thermofax" copy.

Readers with sharp eyes will notice that one of the changes he made was to eliminate the toggle switch in the center that selected either the front, rear, or both (in

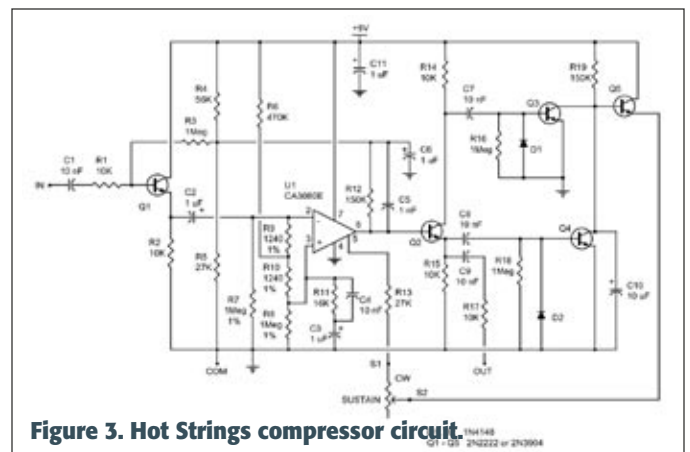
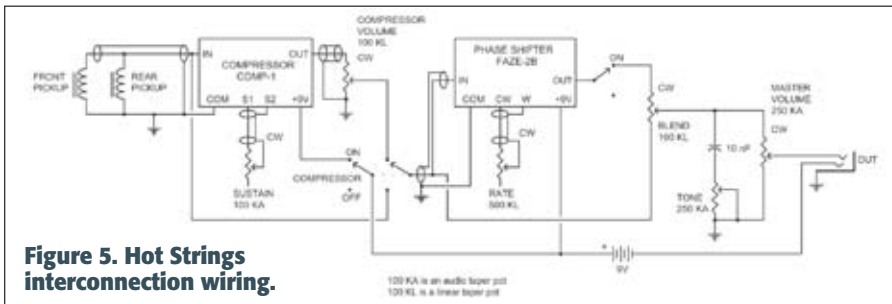


Figure 3. Hot Strings compressor circuit.





**Figure 5. Hot Strings interconnection wiring.**

pretentious and easygoing in real life as he appeared to be on stage. I truly enjoyed working with him.

2. In the late 1960s, the Gretsch company was sold to Baldwin. Under the leadership of Fred Gretsch III, it returned to the Gretsch family in 1985.

### RESOURCES

The "Official" Chet Atkins website is [www.misterguitar.com](http://www.misterguitar.com), and it contains a lot of information about the musician and his career. You can order a two CD set of unreleased solo guitar recordings made in his home studio over a ten year period starting in 1982.

Garrison Keillor (from *A Prairie Home Companion*) is a big fan of Chet Atkins and

has all of the radio broadcasts that Chet appeared on archived on the PHC website at: [www.prairiehome.publicradio.org](http://www.prairiehome.publicradio.org).

When we're looking for design information these days, we just do a Google search. But that wasn't possible in 1975, and finding design resources was much more difficult. Bernie Hutchins, a professor at Cornell University, started publishing his *ElectroNotes* newsletter in 1972. And his *Musical Engineers Handbook* was published in 1975. Although it's rather dated, I still use my collection of *ElectroNotes* and the *Handbook* for reference. *ElectroNotes* is still being published and all the back issues and the *Handbook* are available. You can't order them online, but you can print an order form and mail it to the address on

the form with your check or money order. ([www.electronotes.netfirms.com](http://www.electronotes.netfirms.com))

The *Handbook* contains a chapter on the CA3080 and its "big brother," the CA3094. The OTA (Operational Transconductance Amplifier) was a popular way to implement a resistor whose value changed with the control current. These OTAs are still available from Harris Semiconductors. My designs for both modules were based on ideas from the *Handbook* and various *ElectroNotes* issues.

### HOW IS THIS STORY APPLICABLE TO TODAY'S MANAGEMENT DECISIONS?

A tongue-in-cheek answer might be that you can sometimes get good value from a consultant.

But seriously, two items come to mind: be willing to take input from your customers and be open to serendipity.

If you ask ten musicians what they need, you will probably get at least ten answers. So you as a manager or design engineer need to understand your business well enough to know which of the suggestions would have the most appeal and be practical to manufacture. If the suggestion comes from a "big name" in the industry, as it did in this story, you may well have a winner. (I have no idea how many of the Hot Strings guitars Gretsch sold.)

Read trade journals and keep an open mind about what is going on in yours and related fields that you might incorporate into a new design. The epoxy potted modules made the Hot Strings design practical at that time, and could have gone unnoticed. Find out what is going on now in materials or fabrication or whatever that you might put to good use.

**Ron Tipton** has degrees in electrical engineering from New Mexico State University and is retired from an engineering position at White Sands Missile Range. In 1957 he started Testronic Development Laboratory (now TDL Technology, Inc., [www.tdl-tech.com](http://www.tdl-tech.com)) to do consulting and to develop audio electronic products. During the 1960s and 70s, TDL built active filters and pseudo-random noise generators for several well-known companies including Bose Corp. and Acoustic Research. He is still the TDL president and principal designer.