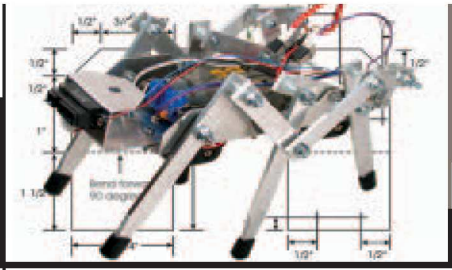

■ GUEST HOSTED BY VERN GRANER

EVOLUTION OF THE BOOGIEBOT MOBILE PLATFORM

MUSIC HAS BEEN A BIG PART OF MY LIFE as far back as I can remember. I've played music in bands, composed and produced music, and (for a short time in the '80s) I even made my living playing in a rock band. One of the constants in my experience with live music is that most performances require a PA system of some kind. And, though a big PA system is wonderful to listen to and perform through, it is a nightmare to load, transport, and assemble!

HEAVY METAL

PA systems are HEAVY. Professional speaker cabinets can weigh hundreds of pounds. Amplifiers have wire wound transformers and steel chassis that make them hefty, as well. Add in mixing boards, lighting equipment, floor monitors, mic and light stands, miles of cables, and you end up with a LOT of weight.

When I was younger, I didn't give a second thought to moving this stuff for each show. Now that I'm a bit older (hopefully wiser?), the idea of schlepping around hundreds of pounds of equipment to perform isn't quite so appealing.

Though no longer a member of a band, I am a member of The Robot Group, Inc. — a 501(3)(c) non-profit corporation in Austin, TX — that, among other things, participates in various community outreach programs. We regularly spend weekends at museums, schools, libraries, Scout meetings, etc., where we show off our creations and try to encourage people to become more involved in robotics, art, and technology.

Though we bring out different displays and equipment, depending on the audience and venue, we almost *always* bring along a PA system. We use it for speaking to the crowd, playing sound to go with our video projector, and to allow us to perform music using the Thereping instruments (detailed in the April '06 issue of *Nuts & Volts*).

Carting all this stuff to and from these events is not the high point of the day for us. As we were loading up after a fairly big performance (Figure 1), I was daydreaming about creating a PA system that could actually unload and load itself. These daydreams are the seeds that would eventually blossom to become "BoogieBot."

■ FIGURE 1. Vern Graner playing the drums while audience members play Therepings.


FIGURE 2


FIGURE 3

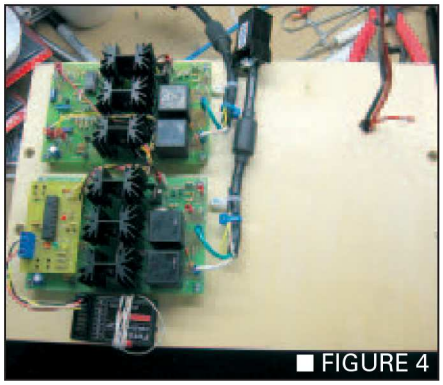
FIGURE 4

But first, I needed a platform.

GET YOUR MOTOR RUNNIN'!

I was lucky enough to receive a salvaged power chair from another member of The Robot Group. It was in pretty rough shape (Figure 2) with the chair portion missing, the fiberglass shell pretty banged up, the speed controller blown, and the batteries in need of replacement. But the motors were still good and the tires were fine.

To rehab the chair, I stripped off the old fiberglass, cleaned the chassis, and removed the old speed controller (Figure 3). I mounted two new MC7 speed controllers and an RCIC2_SC dual channel joystick mixer from Diverse Electronics (Figure 4). The RCIC2_SC mixer allows you to do skid-steer with a single joystick from the R/C receiver.

I found replacement batteries right here in town at **Battery Wholesale.com** that has a store front in Austin so I was able to get the batteries without shipping charges. With new speed controllers, charged batteries, and the Futaba radio in place, I was ready to try out my new mobile platform.

TESTING ... TESTING ... IS THIS THING ON?

I switched on the power for the first time and carefully pushed the joystick forward. The motors made their whirring sounds but the chassis sat stock still. A bit of investigation showed I had not engaged the wheels! Seems this type of power chair has mechanical "free wheeling" levers that need to be placed in the "run" position or the motors don't engage. With the levers in the run position, I again moved the joystick and the chassis slowly rolled across the floor! Success! I then tried running it a bit faster and was pleasantly surprised to find the MC7s made no buzzing noises when PWM'ing the motors. They do have relays that click when the motor direction is changed, but the controllers are otherwise silent.

I thought the refit was complete until a fellow robot group member discovered that the motors on this chair have electric brakes that need to be energized to release them! Once we rigged up the wires to the electric brake leads on the motors, my battery life and top speed improved dramatically. So, now I had a powerful mobile platform but ... what could I do with it?

BREAK IT DOWN!

Because of the diversity in our group membership and the audiences


FIGURE 5

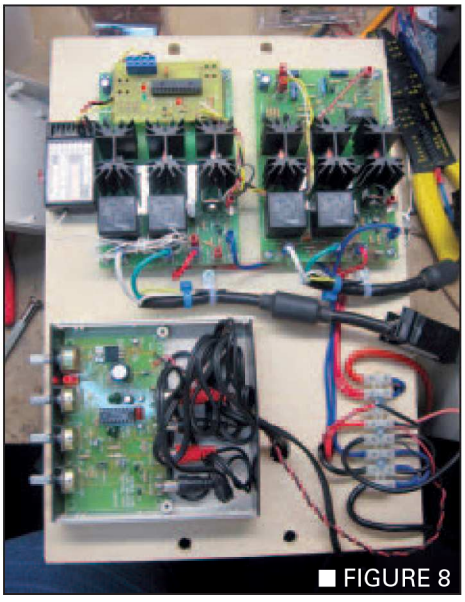
FIGURE 8


FIGURE 6

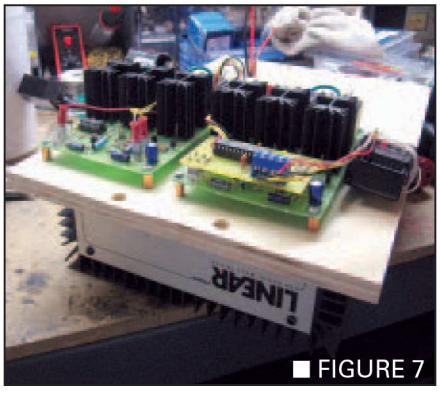

FIGURE 7

■ FIGURE 9

we encounter, there's a surprising amount of gear to be set up and broken down when we do an event (Figure 5). We had a show coming up at the Bob Bullock Texas State History Museum, and I had this new mobile platform ready to go when it hit me (the idea, not the mobile platform). Why not use this new chassis to hold a PA system we could take with us?

I found a suitable piece of wood to use as a base for the speakers and tried it on for size (Figure 6). Now all I needed was an audio amp and some speakers. Since the chassis is powered by dual 12V batteries, I dug out an old 200 watt car audio amp and attached it to the underside of the speed controller board (Figure 7) and then added a small audio preamp kit (Figure 8). I couldn't find a pair of speakers that would easily fit on the wooden top so — in a hurry — I affixed a couple of portable speakers directly on top of the battery cases. Last, I stole ... er, "borrowed" my son's iPod and I had a complete mobile music system ready to go (Figure 9).

AND THE BEAT GOES ON ...

BoogieBot was a big hit at the show, running around blasting music, spinning in circles, shimmying to the beat, and dancing with the kids. The great response has encouraged me to take the platform to the next level. I plan to create some large scale speakers to sit atop the platform and put in larger amplifiers and a sub woofer so it can *really* rock. I'm hoping to use some beefy gearmotors to allow the speaker cabinets to extend/retract Transformers-style and to add more lights and a mirror ball so the BoogieBot can be a mobile dance party.

I'll keep track of my progress with my camera and share my story as it proceeds. For now, you can see more pictures of BoogieBot at the link in the Resources list or, you can drop me an email at vern@txis.com to see how things are going. **NV**

RESOURCES

■ *Diverse Electronics*
www.diverseelectronicservices.com

■ *Battery Wholesale*
www.batterywholesale.com

■ *Bob Bullock Texas State History Museum*
www.thestoryoftexas.com

■ *BoogieBot at Movie Premiere*
www.notepad.org/surfsup