

How to Play .WAV Files with Your BugBrain (continued from page 3)

the upper left corner of the track. Now click on the box labeled Left, and select Mono. We want to get rid of the extra stereo data, since BugBrain only has one speaker, and we need our file to be as small as possible.

Step 5: From the Edit menu, select Preferences.... This will bring up a tabbed option box. Select the File Formats tab, and make sure that Uncompressed Export Format is set to WAV (Microsoft 8 bit PCM). Click OK to apply this setting.

Step 6: Now we can generate our WAV file. Select Export As WAV from the File menu. Enter a name for your .wav file, and Audacity will generate it. You can see what your wav file will sound like by clicking on the play button at the top of Audacity. Audacity may have generated a bunch of silence at the end of your track when you performed the Quick Mix. You may wish to delete this silence before you generate your .WAV, since it will make your file larger.

Step 7: We will be using the BasicX procedure PlaySound to play our .wav file. The syntax of the PlaySound procedure looks like this:

```
PlaySound(Pin,StartAddress,Length,SampleRate,RepeatCount)
```

Pin represents the pin number which is connected to the speaker (pin 15 on a standard BugBrain). StartAddress is where the beginning of your sound file is in the memory of the BugBrain, and Length is the size in bytes of your sound file. SampleRate is the frequency of your sound file, and RepeatCount is the number of times to play the sound file. You can go ahead and add a call to PlaySound in your code, filling in all of the values except for StartAddress – just enter a dummy value for your StartAddress for now, and compile your code.

Step 8: Open the .mpp file associated with your BasicX project in a text editor. On lines 16 and 17 of this file, you should see something like:

```
Code memory available: 32768 bytes
Code memory allocated: 46 bytes
```

Code memory available tells you how big your sound file can be (in this case, 32,722). If your .wav file is larger than this, you may wish to make it smaller by editing it with Audacity; however, you don't have to make your audio file smaller. You can simply put as much of it as will fit into memory, using a small utility available for download on the Yost Engineering website.

First, however, change the StartAddress for PlaySound to one more than the value of Code memory allocated; in our example, we changed it to 47. After you recompile your code, you will be ready to proceed to Step 9.

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Step 9: Download the WavAppend.exe utility, available at:

<http://tech.yostengineering.com/roboticsNewsletter>

This program should be run from a command prompt, and takes three filenames as arguments. The first file should be the .bxb file which you just compiled. The second file should be the .wav file which you created. The third file will be the name of the output file - this will be the file that you will rename and copy over the first .bxb file. So your command line should look something like this:

```
WavAppend WavExample.bxb Song.wav Output.bxb
```

The WavAppend program will give you a warning if the size of your sound file + the size of your original .bxb file is larger than 32768 bytes, but the output file will still be generated; it will simply include as much of the sound file as is possible.

Step 10: Delete the .bxb file from your project directory, take your Output.bxb file and copy it to your project directory (if necessary), and rename Output.bxb to yourprojectname.bxb. You are now ready to download this file to your BugBrain.

Step 11: Open your project in the BasicX Programming Environment, and click the Lightning Bolt button on the Downloader. This will put the modified .bxb file on your BugBrain. Your BugBrain will now play your .wav when PlaySound gets called in your code! If you need to recompile your code for some reason, go back to Step 9.

Note: The length of the sound clips you'll be able to fit on your BugBrain is pretty short. At 8000 Hz, you can fit about 4 seconds of audio, and at 4000 Hz, you can fit about 8 seconds of audio.