SPEAKER CONTROL TIPS

Please be sure to download and replace both the funct.h file and the SendsChr.c file in your project.  Below I have detailed instructions on how to utilize this code.

To use SendsChr.c:

Place jumper 6 on the lower two pins, it is located next to the potentiometer for the amplifier.

Make sure that potentiometer for the amplifier is turned up loud enough to hear.

Include both SendsChr.c and funct.h in your project.

Make sure to reference both functions in SendsChr.c (SendsChr and PlayTone) using the XREF directive.

Set bit 5 of Port T to output

Pass the 8-bit value that you desire the speaker to use on the stack to SendsChr in the same manner you did for lab 6

**Important Note:** since we had to change the way the code was written, you must determine the values that you need to send to the speaker.  The code creates a square wave which is sent to the speaker, this square wave is created by toggling bit 5 of Port T at a specified interval.  This interval is the equivalent of the 8-bit value that you send to SendsChr times the period of your real time interrupt.  For example, if you set the RTI control register (RTICTL) to $10, this will yield a real time interrupt period of .000128 mS or a frequency of 7812.5 Hz.  If you send 5 to SendsChr in this case, you will get a resulting frequency of 1/(5\*.000128) = 1562.5 Hz.  This is the tone that will be generated by the speaker.  Keep in mind that you will need to have a relatively high RTI frequency(small period) to get a wide range of tones.

Within your real time interrupt service routine, call PlayTone using the JSR instruction.

Here is some information about musical notes that was produced by a previous TA. The highlighted values are the range of notes that I found I could be the most accurate over:

|  |  |  |
| --- | --- | --- |
| Note | Frequency(Hz) | T(mS) |
| C3 | 130.81 | 7.644675 |
| C#3/Db3 | 138.59 | 7.215528 |
| D3 | 146.83 | 6.810597 |
| D#3/Eb3 | 155.56 | 6.428388 |
| E3 | 164.81 | 6.067593 |
| F3 | 174.61 | 5.727049 |
| F#3/Gb3 | 185 | 5.405405 |
| G3 | 196 | 5.102041 |
| G#3/Ab3 | 207.65 | 4.815796 |
| A3 | 220 | 4.545455 |
| A#3/Bb3 | 233.08 | 4.290372 |
| B3 | 246.94 | 4.049567 |
| C4 | 261.63 | 3.822192 |
| C#4/Db4 | 277.18 | 3.607764 |
| D4 | 293.66 | 3.405299 |
| D#4/Eb4 | 311.13 | 3.214091 |
| E4 | 329.63 | 3.033704 |
| F4 | 349.23 | 2.863442 |
| F#4/Gb4 | 369.99 | 2.702776 |
| G4 | 392 | 2.55102 |
| G#4/Ab4 | 415.3 | 2.407898 |
| A4 | 440 | 2.272727 |
| A#4/Bb4 | 466.16 | 2.145186 |
| B4 | 493.88 | 2.024783 |
| C5 | 523.25 | 1.911132 |
| C#5/Db5 | 554.37 | 1.803849 |
| D5 | 587.33 | 1.70262 |
| D#5/Eb5 | 622.25 | 1.607071 |
| E5 | 659.26 | 1.516852 |
| F5 | 698.46 | 1.431721 |
| F#5/Gb5 | 739.99 | 1.35137 |
| G5 | 783.99 | 1.275526 |
| G#5/Ab5 | 830.61 | 1.203934 |
| A5 | 880 | 1.136364 |
| A#5/Bb5 | 932.33 | 1.072582 |
| B5 | 987.77 | 1.012381 |
| C6 | 1046.5 | 0.955566 |
| C#6/Db6 | 1108.73 | 0.901933 |
| D6 | 1174.66 | 0.85131 |
| D#6/Eb6 | 1244.51 | 0.803529 |
| E6 | 1318.51 | 0.758432 |
| F6 | 1396.91 | 0.715866 |
| F#6/Gb6 | 1479.98 | 0.675685 |
| G6 | 1567.98 | 0.637763 |
| G#6/Ab6 | 1661.22 | 0.601967 |
| A6 | 1760 | 0.568182 |
| A#6/Bb6 | 1864.66 | 0.536291 |
| B6 | 1975.53 | 0.506193 |
| C7 | 2093 | 0.477783 |
| C#7/Db7 | 2217.46 | 0.450966 |
| D7 | 2349.32 | 0.425655 |
| D#7/Eb7 | 2489.02 | 0.401765 |
| E7 | 2637.02 | 0.379216 |
| F7 | 2793.83 | 0.357932 |
| F#7/Gb7 | 2959.96 | 0.337842 |
| G7 | 3135.96 | 0.318882 |
| G#7/Ab7 | 3322.44 | 0.300984 |
| A7 | 3520 | 0.284091 |
| A#7/Bb7 | 3729.31 | 0.268146 |
| B7 | 3951.07 | 0.253096 |