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)
C_3	130.81	7.644675
$C^{\#}_3/D^{b}_3$	138.59	7.215528
D_3	146.83	6.810597
$D^{\#}_3/E^{b}_3$	155.56	6.428388
E_3	164.81	6.067593

F_3	174.61	5.727049
$F^{\#}_3/G^{b}_3$	185	5.405405
G_3	196	5.102041
$G^{\#}_3/A^{b}_3$	207.65	4.815796
A_3	220	4.545455
$A^{\#}_3/B^{b}_3$	233.08	4.290372
B_3	246.94	4.049567
C_4	261.63	3.822192
$C^{\#}_4/D^{b}_4$	277.18	3.607764
D_4	293.66	3.405299
$D^{\#}_4/E^{b}_4$	311.13	3.214091
E_4	329.63	3.033704
F_4	349.23	2.863442
$F^{\#}_4/G^{b}_4$	369.99	2.702776
G_4	392	2.55102
$G^{\#}_4/A^{b}_4$	415.3	2.407898
A_4	440	2.272727
$A^{\#}_4/B^{b}_4$	466.16	2.145186
B_4	493.88	2.024783
C_5	523.25	1.911132
$C^{\#}_5/D^{b}_5$	554.37	1.803849
D_5	587.33	1.70262
$D^{\#}_5/E^{b}_5$	622.25	1.607071
E_5	659.26	1.516852
F_5	698.46	1.431721
$F^{\#}_5/G^{b}_5$	739.99	1.35137
G_5	783.99	1.275526
$G^{\#}_5/A^{b}_5$	830.61	1.203934
A_5	880	1.136364
$A^{\#}_5/B^{b}_5$	932.33	1.072582
B_5	987.77	1.012381
C_6	1046.5	0.955566

$C^{\#}_6/D^{b}_6$	1108.73	0.901933
D_6	1174.66	0.85131
$D^{\#}_6/E^{b}_6$	1244.51	0.803529
E_6	1318.51	0.758432
F_6	1396.91	0.715866
$F^{\#}_6/G^{b}_6$	1479.98	0.675685
G_6	1567.98	0.637763
$G^{\#}_6/A^{b}_6$	1661.22	0.601967
A_6	1760	0.568182
$A^{\#}_6/B^{b}_6$	1864.66	0.536291
B_6	1975.53	0.506193
C_7	2093	0.477783
$C^{\#}_7/D^{b}_7$	2217.46	0.450966
D_7	2349.32	0.425655
$D^{\#}_7/E^{b}_7$	2489.02	0.401765
E_7	2637.02	0.379216
F_7	2793.83	0.357932
$F^{\#}_7/G^{b}_7$	2959.96	0.337842
G_7	3135.96	0.318882
$G^{\#}_7/A^{b}_7$	3322.44	0.300984
A_7	3520	0.284091
$A^{\#}_7/B^{b}_7$	3729.31	0.268146
B_7	3951.07	0.253096