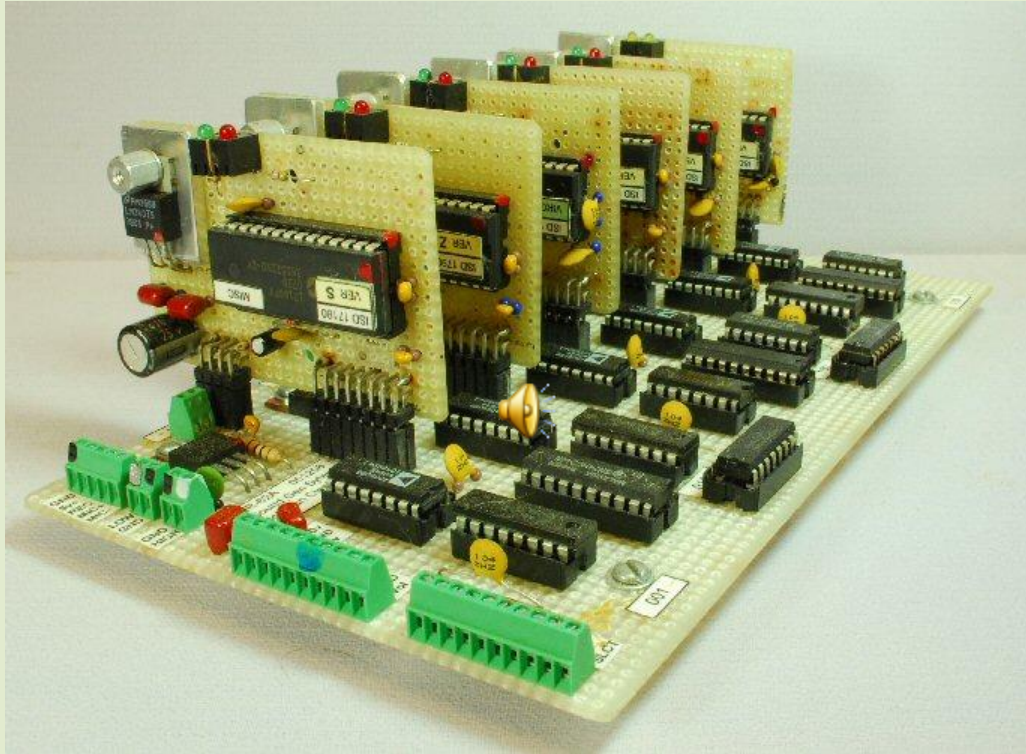


(A poor man's sound system)



Presented by BOB VAN CLEEF
of the North River Railway





Sawmill at Timberly

Let's say you are switching out the Saw mill. Your locomotive has sound but can you hear the whine of the saws or the flow of the water?



Roundhouse at Harrietta

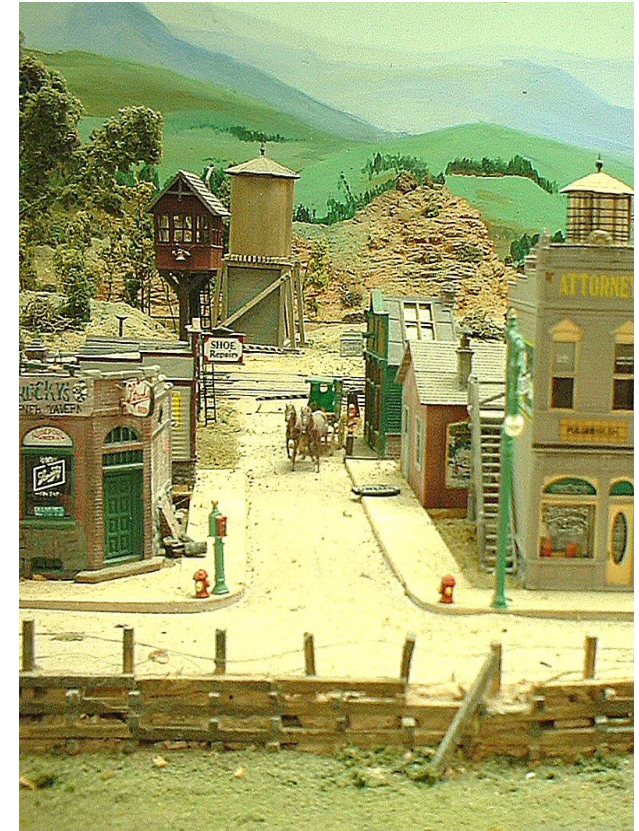
Or your locomotives may chuff out of the roundhouse but how about hearing the clanging of work being done in the engine house?



First Class Passenger service at Harrietta

Wouldn't it be nice if while you are waiting to start your run you hear off in the distance some unseen oncoming train?

- Engine sounds always add another dimension in realism and ambiance of any layout.
- But what about outside an engine? How about grade crossing signal, a trackside industry or just an horse and buggy going by?
- What about an occasional thunder storm or an open field?



Downtown Bobston
on the North River

A FEW SOUND SYSTEMS



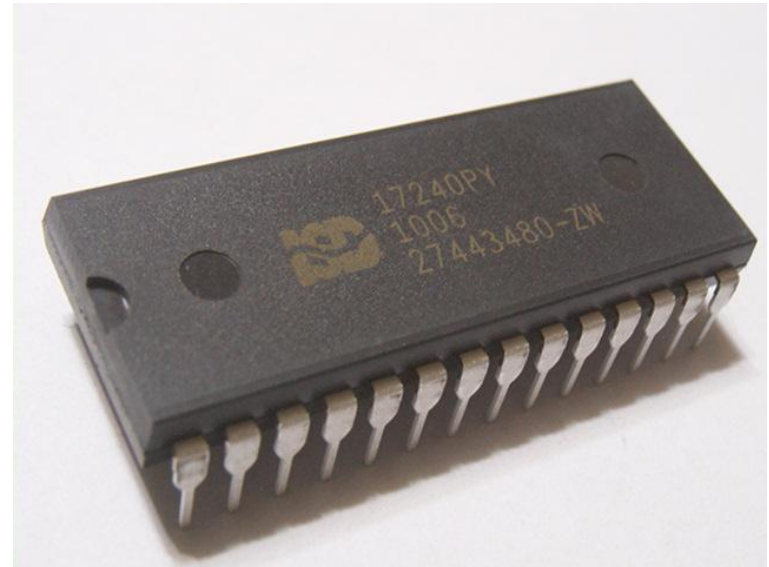
- There are, of course, dozens of various devices for creating sounds on a layout
- One way is to simply buy extra DCC sound generators and mount them under the table but most decoders only have engine sounds.
- Also, These are specialized sound devices that can produce a limited 1 to four or five sounds that can range anywhere from \$10 to \$75.

OR



YOU CAN USE AN INEXPENSIVE ANSWERING MACHINE CHIP

- This system uses inexpensive chips found in some answering machines.
- You will need to use a personal computer. PC and any of thousands of sounds clips for your sound or you can record your own.
- An IPOD or the equivalent will make the transfer of sounds easier.

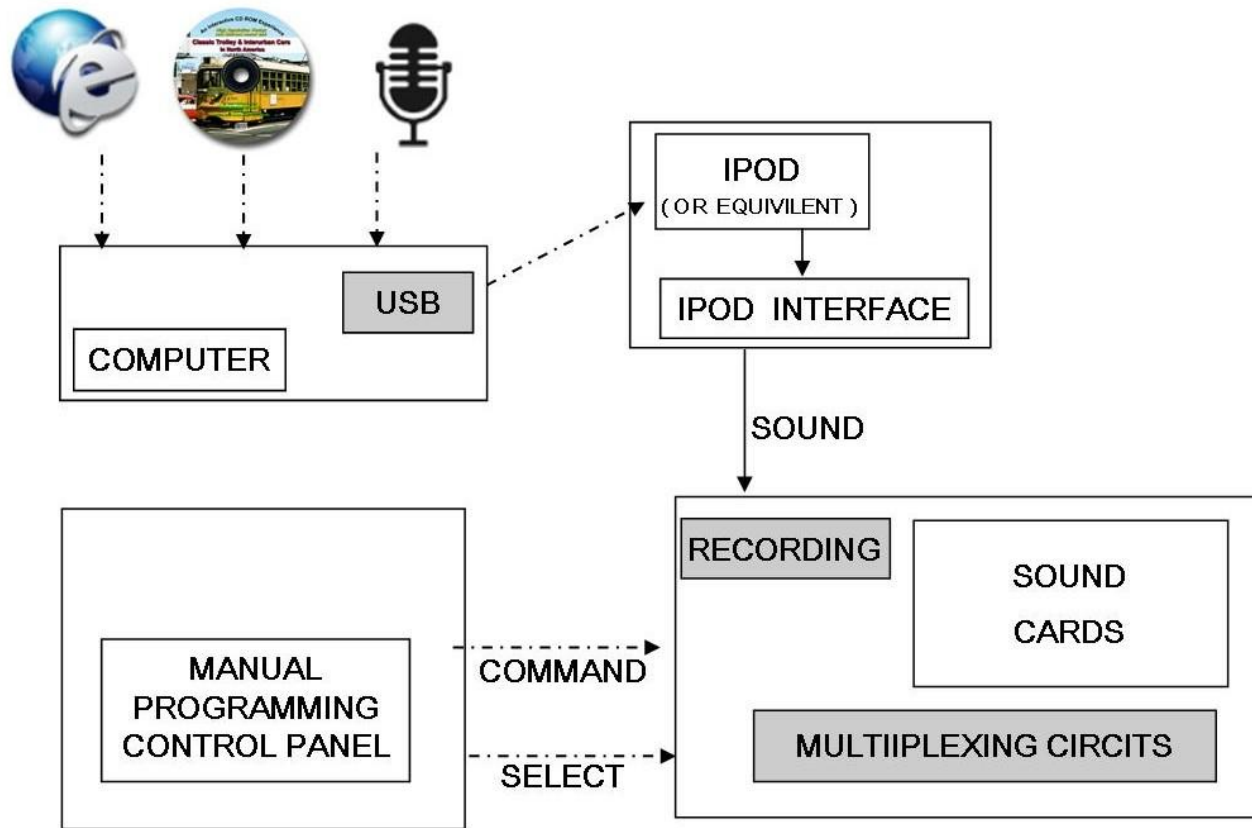


The IDS 17240 can store up to 8 minutes of sound with reasonable fidelity.

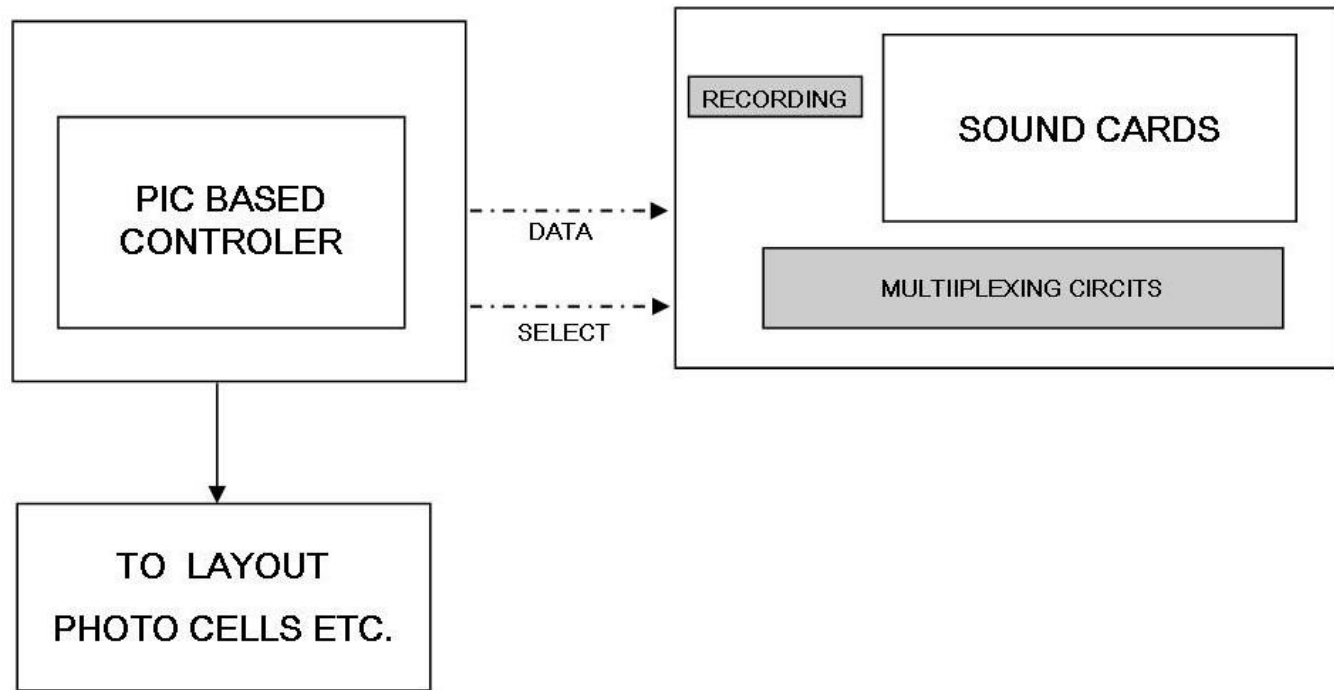
SYSTEM OVERVIEW



- Between 50 and 100 sound clips or even more can be stored on this system
- Any sound can be played on any of (6) speakers.
- It is possible to play up to any (6) different sound clips at the same time.
- Sounds are played under the table and can be used in conjunction with DCC sound in locomotives

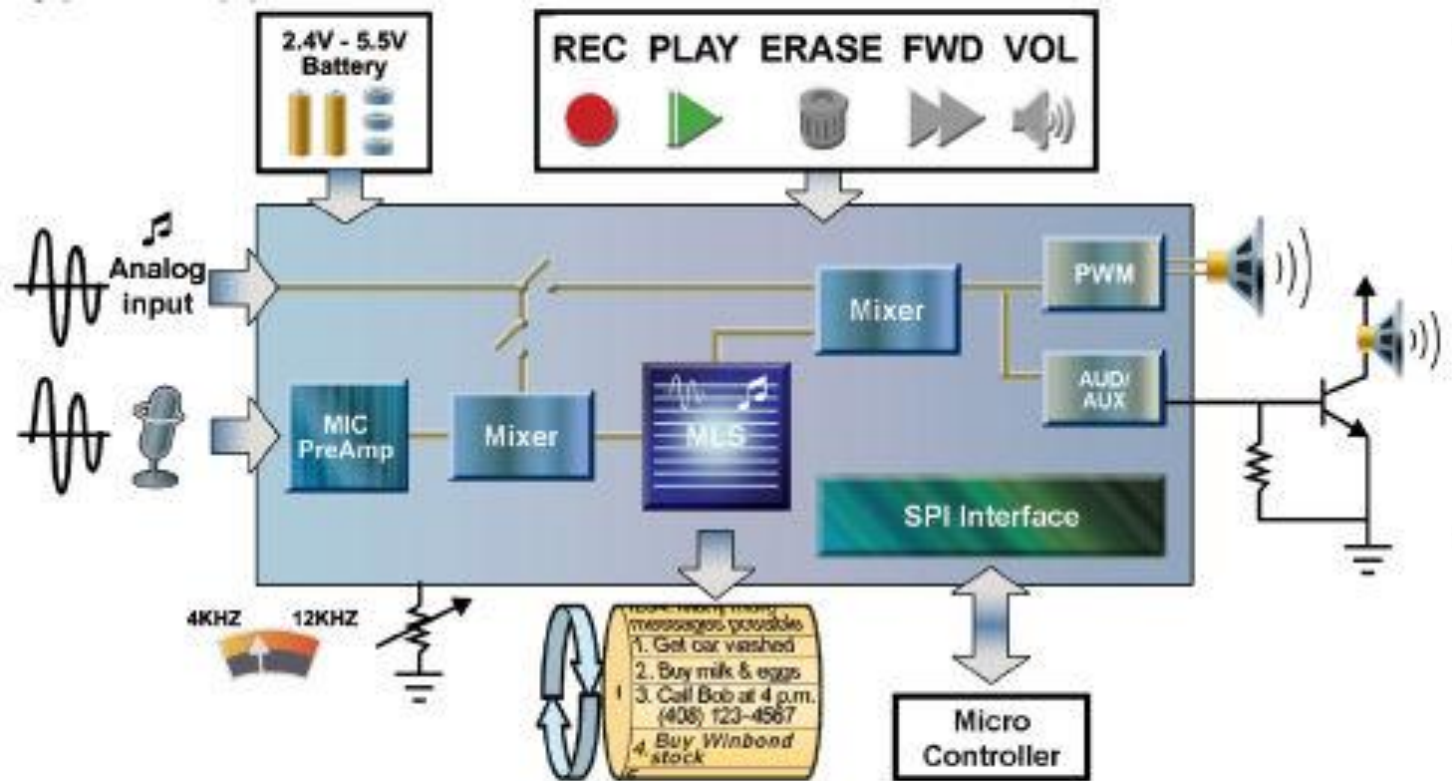


- The first step is to obtain whatever sound clips you need from the internet or media and covert them into .mp3 files.
- I found it easiest to download these to an IPod and from there into the multiplexer and sound cards.
- A programming control panel is used to select the chip/track desired and to monitor the download process.



- Once the programming is complete a PIC based controller and a simple program can automate the multiplexer.
- The North River Railroad uses a computer controlled block system with photo cells to detect train movements.
- These and a randomizer are used to trigger the sound clips.

USE AN ANSWERING MACHINE CHIP

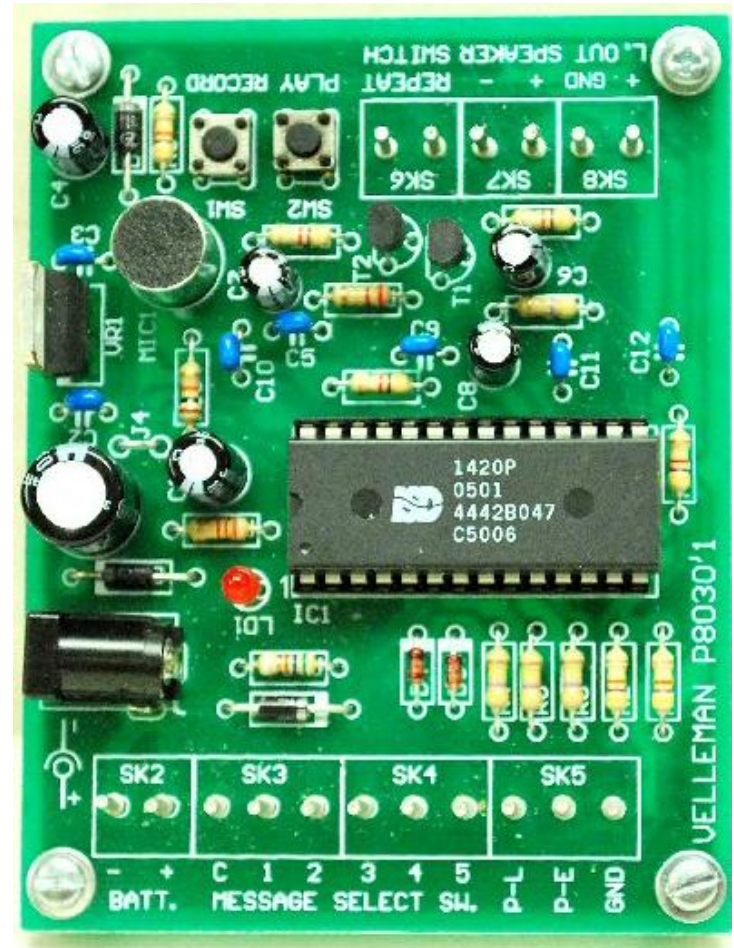


The heart of this system is a versatile chip used for answering machines. It can Record, play and select several “messages”.

A SOUND KIT

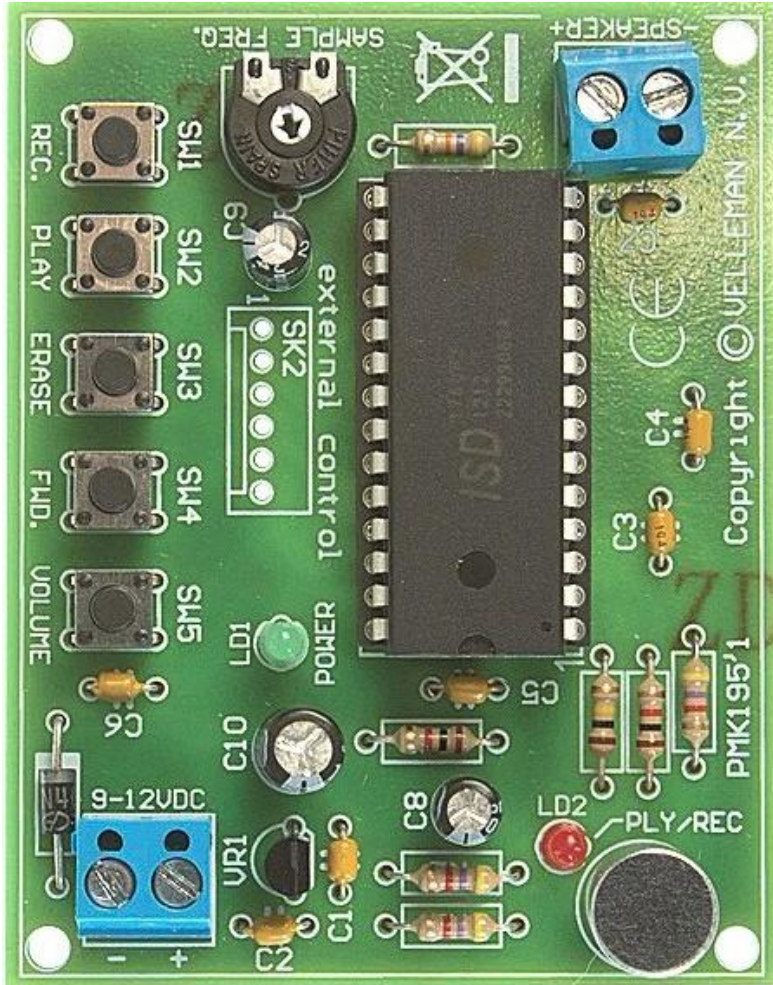
(A poor man's sound system)

- This project all began with this Record and Playback kit.
- It is one of several kits available to hobbyists for experimenting with chips designed for answering machines.
- It is Simple and easy to use.
- Sound quality basically relies on sound source.
- This kit has been replaced by the Velleman MK195



Velleman K8030

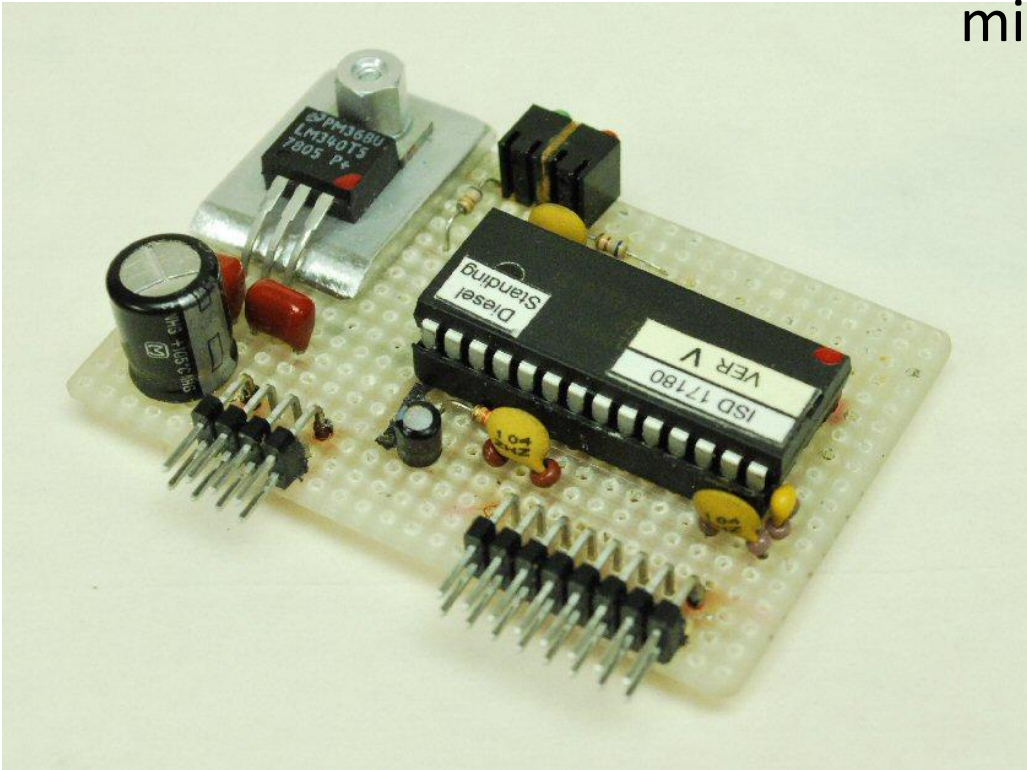
THE ISD-17xxx SERIES OF CHIPS

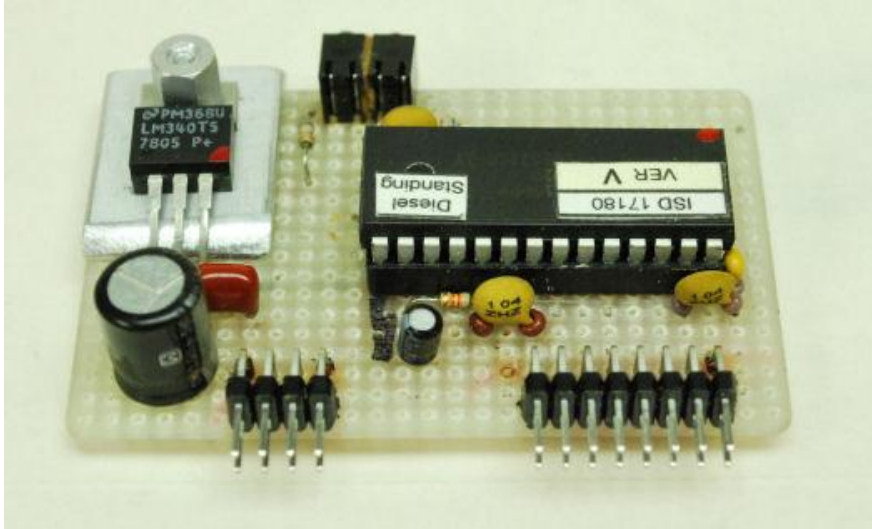


Vellemen MK195

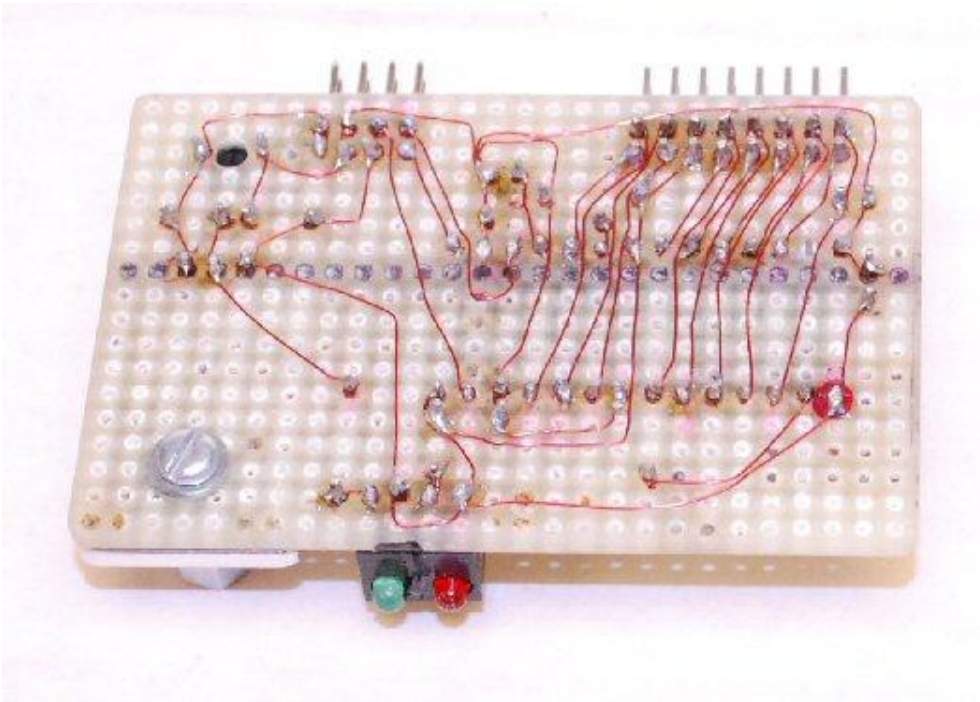
- Several versions are available with different lengths of total recording time.
- The number of tracks are limited only by the recording time.
- Can be controlled manually.
- Both the recording of sound clips and playback control can be done from a USB interface.
- Check for match for speakers and microphone

- Home built version with minimal components

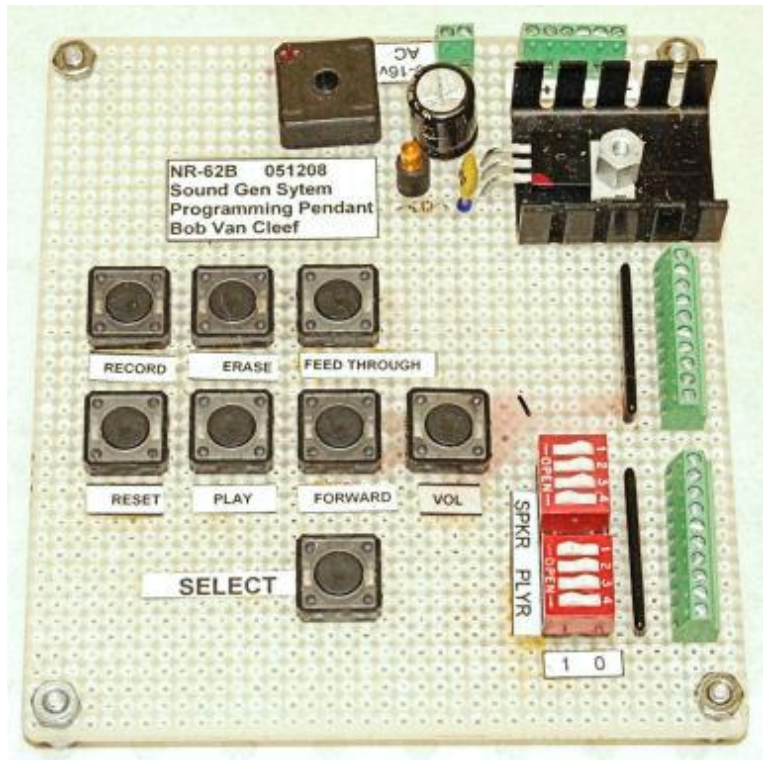




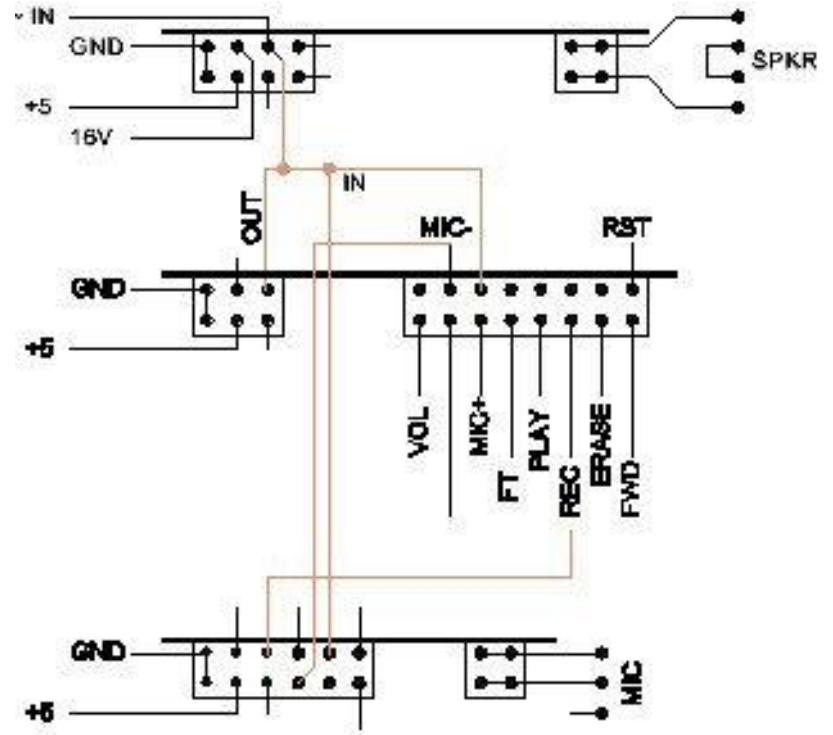
- Wiring fairly simple



MANUAL PROGRAMMING CONTROL PANEL

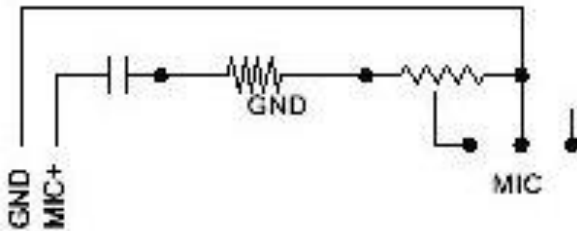


- This panel provides all control signals used by the recorder chip for testing and recording purposes.
- It also provides the power for the sounds cards
- It also Emulates bus of computer.



IMPEDENCE MATCHING

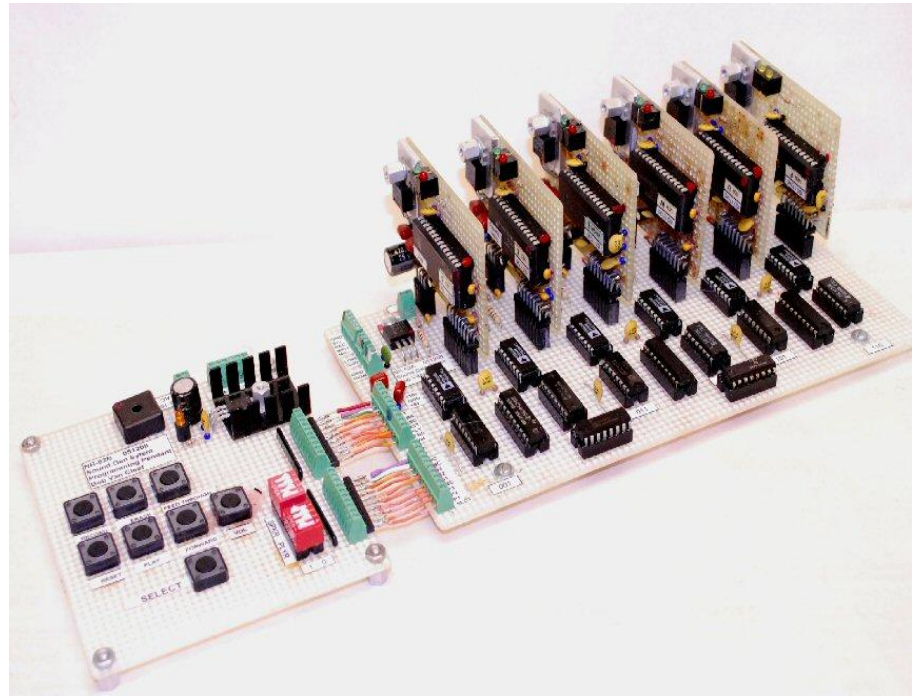
- Speakers operate with a low resistance in the range of 4 to 16 Ω .
- Microphones operate with a relatively high resistance of 1K to 100k Ω .
- Some type of circuit like this along with the iPod volume control are needed to adjust the signal levels of the speakers and microphone to work together.



**Speaker / microphone
impedance matching
interface circuit.**

TESTING THE MULTIPLEXER

- Each of (6) speakers is connected to a player
- Each player has 6-10 sound tracks
- Only the time capacity of chip determines maximum sound clips played
- A track can be “looped” to provide continuous sounds



SPEAKERS



- Almost any small 8Ω speaker is more than enough for system.
- The size is important ONLY if you do not have an enclosure.
- Remember, this is NOT a radio system. Sounds should be audible only when the listeners are within three to five feet of the speaker.

SPEAKER ENCLOSURES

- Naked speakers do not project sound well.
- Some sort of enclosure is required to direct the sound waves forward.
- This is especially with lower frequencies.
- The dimensions and hole do make some difference but are now way critical.



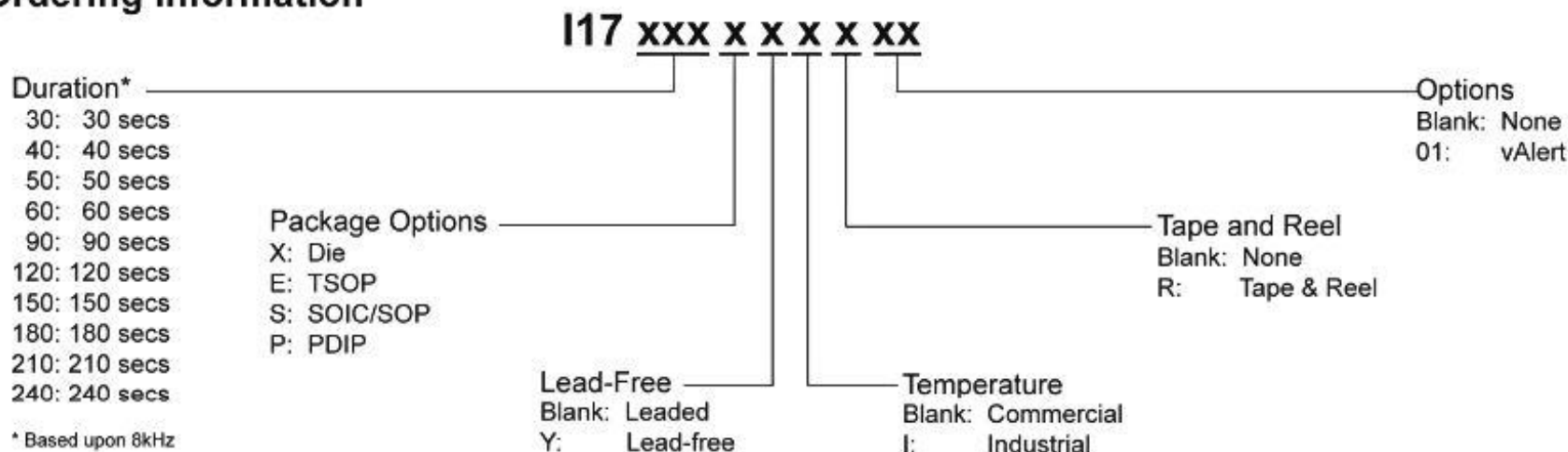
Large enclosure insures hi fidelity of bass while maintaining good reproduction of higher frequencies.

For More Information...

This clinic and several others are available on-line at:

<http://www.NorthRiverRailway.net/MLTPLX.PDF>

Ordering Information

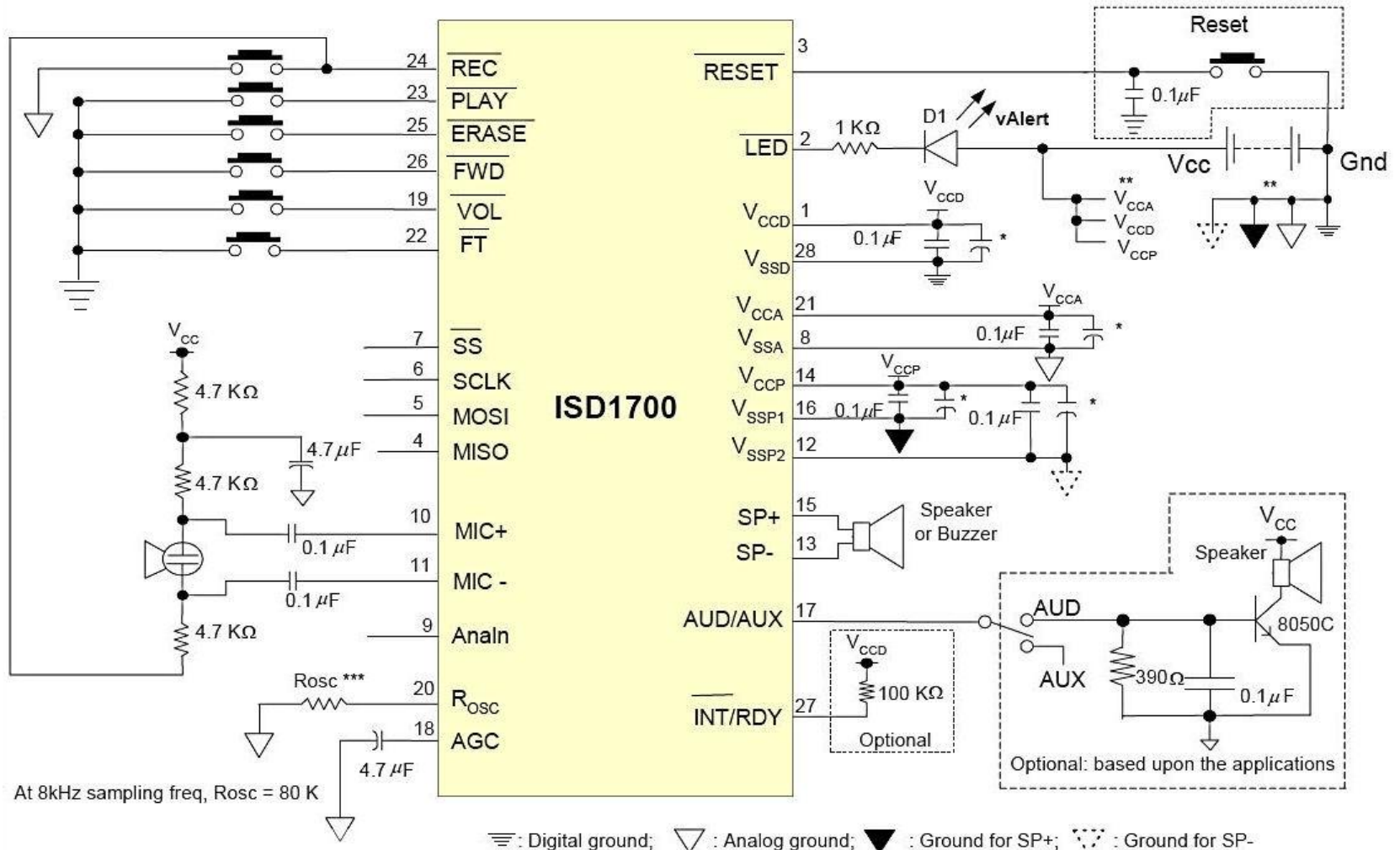


Product Selection Guide

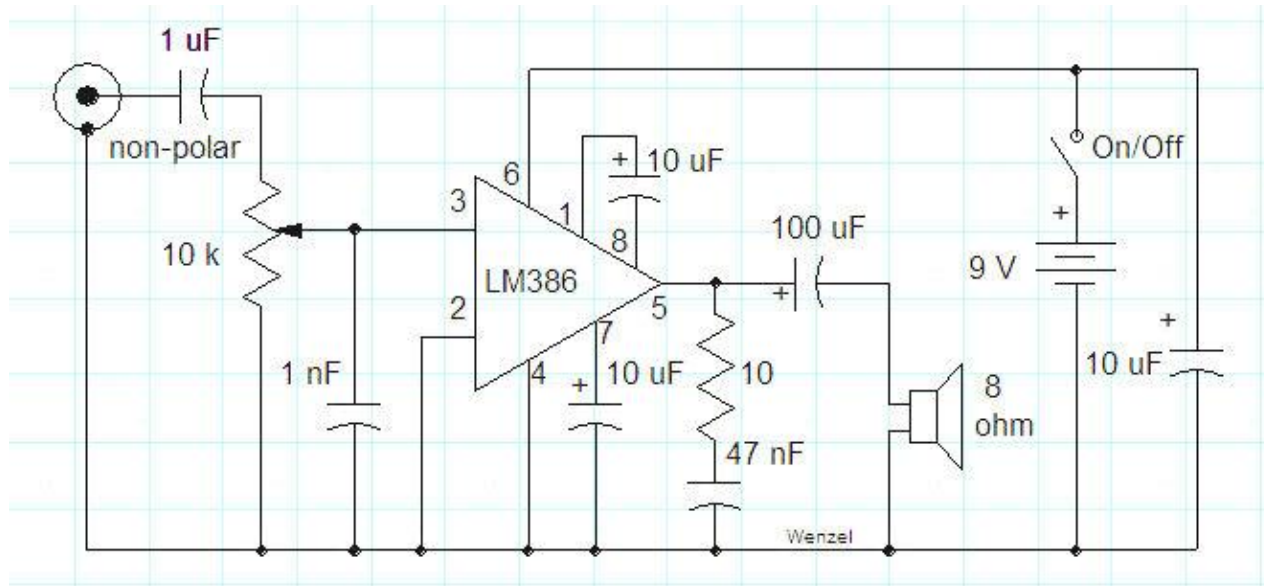
Part Number	Sampling Frequency									Availability*
	12 kHz	8 kHz	6.4 kHz	5.3 kHz	4 kHz	Die	28L-SOIC	28L-PDIP	28L-TSOP	
ISD1730	20 secs	30 secs	37 secs	45 secs	60 secs	I1730X	I1730S	I1730P	I1730E	Now
ISD1740	26 secs	40 secs	50 secs	60 secs	80 secs	I1740X	I1740S	I1740P	I1740E	Now
ISD1750	33 secs	50 secs	62 secs	75 secs	100 secs	I1750X	I1750S	I1750P	I1750E	Now
ISD1760	40 secs	60 secs	75 secs	90 secs	120 secs	I1760X	I1760S	I1760P	I1760E	Now
ISD1790	60 secs	90 secs	112 secs	135 secs	180 secs	I1790X	I1790S	I1790P	I1790E	Now
ISD17120	80 secs	120 secs	150 secs	181 secs	240 secs	I17120X	I17120S	I17120P	I17120E	Now
ISD17150	100 secs	150 secs	187 secs	226 secs	300 secs	I17150X	I17150S	I17150P	I17150E	Now
ISD17180	120 secs	180 secs	225 secs	271 secs	360 secs	I17180X	I17180S	I17180P	I17180E	Now
ISD17210	140 secs	210 secs	262 secs	317 secs	420 secs	I17210X	I17210S	I17210P	I17210E	Now
ISD17240	160 secs	240 secs	300 secs	362 secs	480 secs	I17240X	I17240S	I17240P	I17240E	Now

* Availability subject to change without notice. For latest information, please contact your local sales agent. For lead-free package, please contact your local sales agent

TYPICAL SCHEMATIC



BOOST POWER TO SPEAKERS



This circuit can be used to boost the power of a signal enough to power a speaker from inside an enclosure. It does work but I found it unnecessary.

This presentation has been brought
to you by the North River Railway

Bob Van Cleef
46 Broadway
Coventry, CT 06238
<http://www.northriverrailway.net>

THE END

