SOUND MULTIPLEXER
(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?
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 ANSIERING 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

- 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.

Vellemen MK195
• Home built version with minimal components
• Wiring fairly simple
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.
IMPEDEENCE 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 high 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

I17 xxx x x x x xx

Duration*
30: 30 secs
40: 40 secs
50: 50 secs
60: 60 secs
90: 90 secs
120: 120 secs
150: 150 secs
180: 180 secs
210: 210 secs
240: 240 secs
* Based upon 8kHz

Package Options
X: Die
E: TSOP
S: SOIC/SOP
P: PDIP

Options
Blank: None
01: vAlert

Tape and Reel
Blank: None
R: Tape & Reel

Temperature
Blank: Commercial
I: Industrial

Lead-Free
Blank: Leaded
Y: Lead-free

Product Selection Guide

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<th>Part Number</th>
<th>12 kHz</th>
<th>8 kHz</th>
<th>6.4 kHz</th>
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<th>Die</th>
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<td>20 secs</td>
<td>30 secs</td>
<td>37 secs</td>
<td>45 secs</td>
<td>60 secs</td>
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<td>I1730S</td>
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<td>62 secs</td>
<td>75 secs</td>
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* 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.
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

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THE END