

General Purpose Sound Player

By Fred Miller, MMR

Introduction

The *Sound Player* project enables the Digitrax SFX Sound Decoders to play “background” or “off-track layout sounds” in a variety of ways. By applying appropriate sound clips to the project and setting various Configuration Variables (CVs), a user can create a number of different sound experiences. Some examples might be:

- Factory or Mill sounds - Up to three different timed events could independently trigger three different series of machine, warning signals or voice sounds. Each series could be set to trigger on a delay of up to 16 minutes.
- Street Sounds - Up to three series of sounds perhaps including a general background sound, punctuated by auto horns and people sounds, with different delays between initiation.
- Railroad Station – One or two general station background sounds triggered by timed events along with an “arriving train” announcement based on a physical event such as a push-button or train detection.
- Railroad Crossing – A pushbutton or train detection could trigger a crossing bell series of sounds as well as locomotive crossing signals.
- Passenger Dining Cars - could play various timed sound events such as diners chatting, dinnerware clanking and voice announcements about diner schedules.
- Rolling Stock Sounds – Timed, Throttle Function Key or whisker CAM initiated background sounds, e.g., hobos playing music, arguing, etc. A whisker sticking out of a box car could trigger a series of sounds as the car passed a defined location.

Many other implementations could be developed taking advantage of the flexible design of the *Sound Player* and a Digitrax SFX sound decoder.

How it works

The Digitrax SFX Sound Decoders are designed to play three independent “voices.” The *Sound Player* enables initiation of sounds for those voices in several different ways. All three voices can be “time initiated” on a delay of up to 16 minutes. In other words a sound will play after the established delay time and then continue to repeat the sequence of delay-play. Voice 1 can alternatively be initiated with the Throttle Function Key F1. The sounds will continue to play while F1 is active. Similarly Voice 2 can be initiated with F2, the momentary key normally used for whistles. Voice 2 will start playing for each press of the F2 key. Voice 3 can alternatively be initiated using the CAM input wire. This wire is provided in the Digitrax SFX decoders to mechanically trigger the “chuff” on a steam engine. It can be used to trigger Voice 3 sounds in the *Sound Player* project.

The Digitrax SFX decoders can operate in a DCC powered environment or alternatively powered with a plain DC supply, about 12VDC works fine. When the decoder is powered by DC, the throttle Function Keys are not available to trigger Voices 1 & 2. However the CAM input trigger does work for Voice 3 and all Voices can be initiated with the delay timers.

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All current line Digitrax SFX decoders can play individual sound clips with a maximum play length of 11.88 seconds. (This limitation is related to the size of the sound file and the ability of the decoder to read the file.) However, the *Sound Player* project can be set to play a series of sound clips without any noticeable transition so longer sound sequences can be segmented. All decoders except the SFX0416 have a memory size sufficient to hold a total of about $\frac{3}{4}$ minutes of sound clips. The SFX0416 has 4 times the memory so it can store about 3 minutes of sound.

Setting it Up

The Sound Project is loaded into a Digitrax SFX decoder using a PR2 or PR3 Computer Interface and the SoundLoader software provided by Digitrax. After the SoundPlayer.spj file is opened in SoundLoader, the user's own sounds need to be loaded to replace the eight dummy sounds provided with the project. Those sound clips must be formatted in standard Microsoft WAVE file format of 11025 hz 8 bit sampling rate, mono. Each sound clip and the total of all sound clips must not exceed the play time limits noted above. Unused sound slots should have "silence" assigned to them to free up the memory space. When the sounds have been loaded into the SoundLoader, the project can be downloaded to the SFX decoder.

A series of Configuration Variables (CVs) are used to establish the operating characteristics of the *Sound Player*. Each "voice" has 4 CVs to set.

- Select Sound Clips (bits 1-8)
- Mode (0=off, 1=Function Keys or CAM, 2=Timed)
- Timer in 4 sec increments 0-255
- Volume (1-64)

Each bit in the sound selection CV is used to select a sound clip 1-8. More than one sound can be allocated to a Voice. Individual sounds can also be allocated to more than one Voice. The right most binary bit selects Sound slot 1, e.g., a value of 00000001 would select sound 1, and the left most bit selects slot 8, e.g., a value of 10000000. A binary value of 00001111 would select sounds 1-4. (See Digitrax Manuals on converting binary values into decimal.)

The Mode selection can turn off the Voice (not used) or set whether the Voice will be initiated by a physical event or a timed event. As noted above, Voice 1 uses F1, Voice 2 uses F2 and Voice 3 uses the CAM input when not using a timer.

The Timer value sets the delay in about 4-second increments, e.g., a value of 5 would establish a 20 second delay, while a value of 255 (the highest) would set a delay of 1020 seconds, or 17 minutes.

The volume for each Voice can be set to a value of 1 to 64 with 64 resulting in the loudest. Note that CV58 is the standard Master Volume CV and has a range of 1 to 15. This affects all of the Voices.

In addition to the Function Keys F1 & F2 as described above, Function Key F3 is used to reset the timers. If a Voice mode is reset to "timer" either a decoder power on/off cycle or F3 must be used to reset to the new values.

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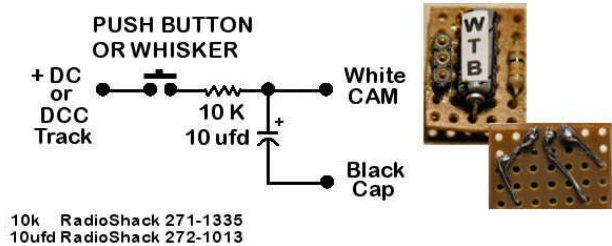
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F4 is provided to “mute” all sounds when ON. The volume of the sounds when “muted” in all Digitrax SFX decoders is set by CV135, by default this is set to 0.

The White Wire CAM input lead is operated by momentarily connecting it to either Rail circuit if operating in DCC. If running the decoder on DC (off track) the White Wire lead should be momentarily connected to the '+' DC circuit. If the input proves to be overly sensitive (triggers just by touching it) it can be filtered/debounced by a circuit recommended by Digitrax:

Run one lead of the activating switch or CAM through a 10K ohm resistor to the decoder's CAM White Wire. That junction is also connected to the '+' lead on a 10ufd capacitor. The - lead on that capacitor is run to the '-' lead on the SFX decoder's external capacitor (black lead). The second lead on the activating switch goes to either of the DCC rails, or the '+' DC lead as noted above.

CAM INPUT FILTER/DEBOUNCE



FUNCTION KEY DEFINITIONS		
FUNCTION KEY	PURPOSE	NOTES
F1	Continuous Play Voice 1	When Voice 1 in Mode 1
F2	Play Voice 2 Sounds, once	When Voice 2 in Mode 1
F3	Reset Timers	After changing Timer Modes
F4	Mute all Voices when On	

DEFINED CONFIGURATION VARIABLES (CVs)			
CV8	*	Reset to Default CVs	Default 8
CV58	*	Master Volume	1-15 15
CV60	*	Sound Scheme	Must be 0 0
CV133	*	Enable CAM	Must be 0 0
CV135	*	Mute Volume	0
CV140		Voice 1 Select clips	Bits 1-8 1=00000001
CV141		Voice 1 Mode	0=off, 1=F1, 2=Timed 1
CV142		Voice 1 Timer	In 4 sec incr 0-255 1
CV143		Voice 1 Volume	1-64 64
CV144		Voice 2 Select clips	Bits 1-8 4=00000010
CV145		Voice 2 Mode	0=off, 1=F2, 2=Timed 1
CV146		Voice 2 Timer	In 4 sec incr 0-255 2
CV147		Voice 2 Volume	1-64 64
CV148		Voice 3 Select clips	Bits 1-8 8=00000100
CV149		Voice 3 Mode	0=off, 1=F3, 2=Timed 1
CV150		Voice 3 Timer	In 4 sec incr 0-255 3
CV151		Voice 3 Volume	1-64 64

* Standard Digitrax CVs