Rail Conductor

AniSound User Manual

Version 2025_Aug_21

Contents

Change History

2/15/2025: Table 3.5, CV 21, Assign Track Volume: Added clarification that volume returns to previous value upon completion.

8/21/2025: 1. Introduction and 2.2.2.5 Speaker Output: Updated text to be consistent with new speaker product offering.

8/21/2025: 2. Setup: Added a "quick start" paragraph at the beginning of this section.

1. Introduction

Rail Conductor Video: Introduction

The AniSound AC/DC/DCC/battery circuit/decoder (mobile or stationary) plays selectable MP3 sound tracks (up to 3-watts) to a speaker (available separately) and/or stereo mini plug (for computer speakers). The circuit is powered from DCC, 12 volts AC/DC, a 9-volt battery or anything in between. Thousands of sound tracks can be stored in the included Micro SD card (1GB or ~3 hours of sound) pre-loaded with many sound effects (see website examples) however users can replace/add sound tracks with MP3 or WAV files of their choice from their computer and use a different SD card of up to 32GB. Complete libraries of free sound effects are on line (e.g. www.zapsplat.com or www.pixabay.com) or make your own – free tools like ClipChamp (www.clipchamp.com) or Audacity (www.audacityteam.org) can mix, match and record any sounds. See Audacity usage example 7:40 into Sawmill example video. Purchase options include adapters for the SD Card to insert into a computer USB 2.0 port or SD slot.

Sound tracks are triggered any of four ways. The www.railconductor.com "Install/Setup" video shows examples.

1) (AC/DC/Battery/DCC) Pulsing any of 5 terminals to ground initiates a dedicated sound track. The pulse can be from a panel button, other electronics or a magnetic switch. As examples:
    - Rolling stock has an AniSound and speaker inside with a magnetic reed switch on the floor. As the car goes over a permanent magnet under the track at each station, the switch is pulsed causing a sound track to play station "train arrival" sounds on the station PA (or whatever sounds are desired – e.g. wheel squeal on a curve). Or…

    - Desired stations could have a stationary AniSound with a magnetic reed switch mounted under the track and a speaker in or under the station. Whenever a permanent magnet (mounted in loco/rolling stock) clicks a reed switch in/near the track, station "train arrival" sounds on the station PA (or other desired sounds) are played. Different reed switches could be clicked by different magnets (i.e. further off center) so that different sounds can be played for different trains. This approach has less rolling stock modification and has no interference with any existing magnetic uncouplers.
2) (DCC) Function Mode will trigger selectable sound tracks when any of up to six DCC loco function commands are received. This effect works well for AniSound in a box car behind the locomotive. The loco's decoder functions could be muted to substitute custom or *actual* recorded sound effects or play in addition to compliment the loco's sounds – or select an unavailable loco function for dedicated control.

Any sound track can be played or functions with a start and stop (e.g. bell) will loop on a track until the DCC function is discontinued. The loco address can be the same for each of the six functions or all different. In fact, it can be given its own dedicated address or the same as the AniSound address to be like a stand-alone loco decoder (with no motor control). This is handy for "moving a speaker around" the layout – at one place it might play cattle loading sounds but in the next town it plays a rotary coal dumper sound.

3) (DCC) AniSound can be triggered with DCC commands. For example, assigning CV 52 to 01 will play track 1. CV 53 = 255 will loop on track 255. Volume and stop play commands are also available. This is like a DCC controlled MP3/CD player.

   (AC/DC/Battery) Non DCC users can use the button to adjust volume (see the "Setup/Install" video (at 9:43) on the website.

4) (AC?/DC?/Battery?/DCC) Play can be triggered at the completion of a previous sound track so that a string of sound tracks can sequence out. Some tracks can even loop until a DCC "stop" command is received or the "stop" terminal is pulsed to ground. For example, the Olympic Logging steam sawmill auto-starts at power up with firing up the boiler, then it loops infinitely on a 2:22 long set of different saws and planers cutting logs. Then at the end of the work day, a DCC stop command sequences to a quitting-time horn followed by the boiler shutting down and finally

lumberjacks singing around the AniLight campfire. AC/DC users could employ this after the configuration was set with DCC commands at the club or by request to Rail Conductor.

AniSound has a purchase option without the three terminal strips for users who prefer soldered connections or want to fit AniLight into their rolling stock. See the purchase options video.

Imagine the auto-sound potential:

- A train arriving at the station with custom PA announcements (could be in your voice) with train number, your town names, passengers talking loading/unloading, idling locos, all aboard calls, etc.
- Cattle loading/unloading at the stockyard
- Whatever the industry – find or make an MP3, load it and play it!

MP3 Specifications:

Supported sampling rates (kHz): 8/11.025/12/16/22.05/24/32/44.1/48

- 24 -bit DAC output, support for dynamic range 90dB, SNR support 85dB
- Fully supports FAT16, FAT32 file system, maximum support 32G of the SD card.
- 30 levels of adjustable volume

Both short and long loco decoder addressing are supported. Command examples are in Appendix B - Examples.

Basic configuration entails assigning a unique DCC address and sending Configuration Variable (CV) commands to play a file, loop on a file or change the volume.

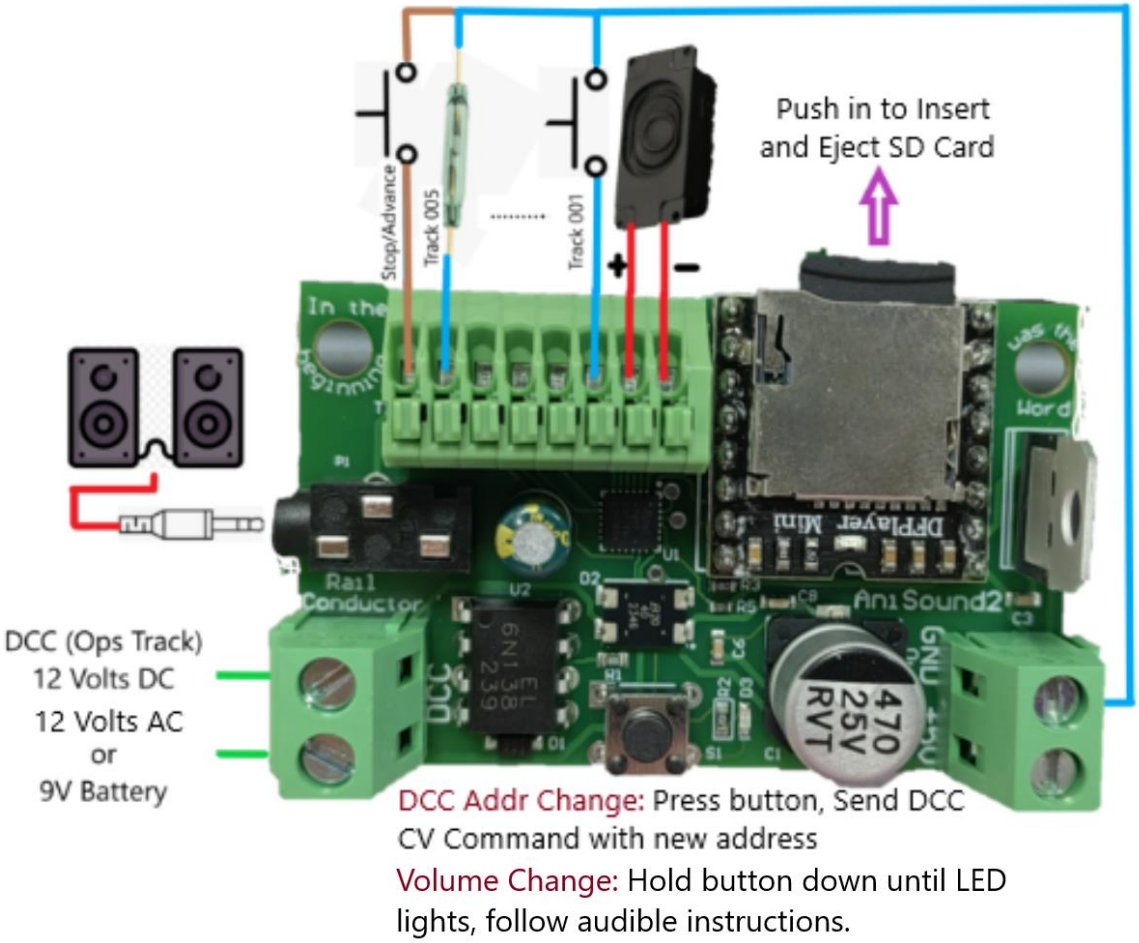
Apologies for the length of this manual. As an on-line/searchable document, detail was favored to describe the extended features.

2. Setup

As an “aliveness” test or “quick start”, plug in either speaker (red wires below), wire in power (green wires below) and turn on the power. AniSound should announce its hardware/software versions in English through the speaker (can be disabled for operations). Then you are ready for further setup…

Rail Conductor Video: AniSound Install/Setup

Rail Conductor Video: AniSound DCC Setup



1. Connect speaker(s) (red wires above). This is a 3.5mm stereo plug (e.g. for computer speakers), a 3W or less small speaker or both.
2. Connect any desired switched trigger wires (blue above). When the push button, reed switch, etc. is closed to ground (i.e. pressed) the corresponding (001 - 005) sound track in folder 01 will play (small 1-5 labels on back of circuit board). Looping can also be performed by having a short silent track sequence to a looping track (DCC commands required for sequencing).
3. Connect the “stop” switch if desired (brown wires above). When pulsed, this will stop the currently playing sound track, or if it’s

part of a sequence of sound tracks, it will advance to the next sound track.

4. Connect AC, DC or DCC Operations Track wires (green above) into the AniSound “DCC” terminals in either order and tighten screws. Note that the wire must be inserted above the metal bar in the terminal opening – the screw pulls the wire up rather than clamp down.
5. Turn on the power. If speakers are connected, AniSound will audibly self-identify until this feature is turned off with CV 13. The DCC address starts at 3.
6. Pulsing any 1-5 trigger terminal to ground (GND) plays the factory default verbal readout of that terminal (i.e. voice saying “1”, “2”, ... “5”). Overwrite 001-005 files in folder 01 with any desired MP3 file.
7. (DCC Users) Press the button on the decoder to assign an address (LED should now stay on).
8. (DCC Users) Send any DCC loco CV command on the Operations Track with the address desired for this decoder. Examples for different DCC systems are in Appendix A - Command Entry from DCC Systems. When the command is received the LED will go out indicating the new address has been successfully assigned. AniSound will then reboot.
9. Change sound tracks to any desired content. Turn off power and press the SD card further in (purple arrow above) so the lock will release for an eject. Push it into an adapter (see purchase options video). Insert the adapter into your computer. First, copy the entire SD Card to your hard drive for archival. Play/choose MP3 files in various folders of the SD Card or download desired MP3s from the Internet (e.g. free files at www.zapsplat.com and www.pixabay.com) – or make your own! Use the free

www.audacityteam.org tool to, fade in or out and mix sound effects on top of each other (only one AniSound track can be played at a time). Store the MP3 files onto the SD Card in the required format (see SD Card video) replacing the factory test files. If sequences of audio tracks are desired, reference the Sawmill/Sequenced Tracks video. Eject from your computer, remove from adapter and re-insert into AniSound.

2.1 Loco or Stationary Decoder?

AniSound drives no motor or lights so it's not a "classic" loco decoder. It doesn't require a DCC signal and so is often referenced as a "circuit". It can be mounted in a structure, under the layout or in a boxcar with a speaker and electrical pickups to get DCC from the railroad track. It has incredible flexibility with dozens of commands – far beyond a DCC accessory decoder's defined abilities.

So, in terms of how it interfaces with a DCC system, it is like a loco decoder though not configured on the programming/service track. Remember it can also be powered by and old power pack (e.g. 12V AC/DC) and even a 9V battery with folder 01 tracks 001 through 005 played with a GND pulse on the corresponding terminals 1-5 or a stop from terminal S.

2.2 Installation

The AniSound printed circuit board (PCB) is meant to be installed where sound effects are desired. If AniSound will be located in rolling stock:

- The purchase option without terminals may be required. AniSound with terminals likely will not fit into even an HO boxcar; though without terminals it fits in larger HO boxcars well.
- Consider configuring AniSound first at the workbench since button operation and SD Card removal could be cumbersome later.

2.2.1 Mounting

AniSound has two 0.16 inch mounting holes 2.025 inches apart. If screws are used, heads should be noncountersink (an over-torqued beveled edge could split the printed circuit board). Many "junk draw" screws could work. #6 Panhead screws fit nicely. Do not mount to a conductive (e.g. metal) surface as this would short out pins poking through the back of the circuit board (not covered by warranty).

2.2.2 Connections

First the electrical connections are described below, then how to wire up the terminals or solder into the holes is covered.

2.2.2.1 Input Power

AniSound is powered from two terminals labelled "DCC". 16VAC, 12VDC, DCC (operations track) or a 9V battery are wired to these two terminals (in either order).

AniSound will work from a throttle pack cab output if the voltage level is high enough. An old MRC Tech II power pack worked on throttle setting ~17 out of 100. Warning, high throttle settings can overheat the voltage regulator (labelled Q1 with a metal plate on the back). Using the heat sink purchase option on this part would help but AniSound does not cover *any* damages from excess heat due to higher voltages.

If in rolling stock, electrical pickups in the wheelsets are required if a 9V battery is not used. A battery could have some type of on/off switch to prevent taking the rolling stock apart for each power up. This could be a switch protruding out the bottom, a latching reed relay toggled by a magnetic wand over the roof (consider form E, latching bistable, reed switch like a lower cost version of KSK-1E66 https://standexelectronics.com/products/latching-bistable-1-form-e-reed-sensor/) or some other approach. An "always on" hardwired Duracell coppertop battery lasted less than 10 hours (~70ma with no volume). Full volume needs about 120ma with a 3W 8 Ohm speaker.

If it is desired to change to DCC operation, just press the AniSound button (LED goes solid on) and send a CV command with the loco address desired. The CV command will not execute but the LED will go out indicating the address is accepted and AniSound will restart.

2.2.2.2 Output Power

AniSound needs to provide a ground (GND) output for the Trigger and Stop switches (see sections below). But why the +5V? As long as AniSound circuitry needs +5V power why not also make it available for other layout electronics in the area? The GND and +5V provide up to 1 AMP of output power. Over about 200ma, the heat sink (see "Purchase Options" video) should be clipped on to the Q1 voltage regulator. Run your external electronics (lights, etc.) at max output for maybe 10 minutes to see how hot Q1 gets (damage not covered by warranty).

2.2.2.3 Trigger Inputs

Small copper clad text labels the "MP3 Triggers" (1-5) inputs on the back of the circuit board. Whenever GND is touched/pulsed to one of these inputs, the corresponding folder 01 track 001-005 plays (identical to the CV 52 DCC command).

2.2.2.4 Stop Input

Small copper clad text labels the “Stop” (S) input on the back of the circuit board. Pulse this input to ground (GND) to stop the existing sound track from playing/looping (identical to the CV 54 DCC command). If the current track is part of a sequence of sound tracks it will advance to play/loop the next sound track in the sequence.

2.2.2.5 Speaker Output

Small copper clad text labels the “Speaker” (S+ and S-) outputs on the back of the board. Wire this up to an 8 Ohm speaker (up to 3 watts). A compatible speaker is available as a separate product at www.railconductor.com for convenience.

2.2.2.6 Speaker Jack

Just above the “Rail Conductor” text on the board, there is a 3.5mm stereo jack (labelled P1) to plug in stereo computer speakers. This is useful when louder, higher quality or stereo sound is desired – perhaps under the layout for city sounds or thunder. Computer speakers have a power adapter (i.e. wall wart) to boost the volume and can be found online for ~$20. Olympic Logging uses this option under the layout towns to play port sounds in sync with the fast time clock. Computer speakers could also just be used during configuration at the bench for convenience before the speaker output is wired up. Both the speaker output and jack can be used simultaneously (though not sure why). Check to be sure the Q1 voltage regulator doesn’t get too hot – if so, attach the TO-220 heat sink (see purchase option video at 1:28).

2.2.3 Wiring

2.2.3.1 Terminal Blocks

For the screw terminals, each wire must be stripped and inserted above the metal bar in the terminal opening – the screw pulls the wire up rather than clamp down. This is demonstrated in the Install video at 3:20. The terminal manufacturer ships with screws quite tight; if Rail Conductor hasn't pre-loosened (which could lead to a loose screw during shipping), a larger handled screw driver may be needed initially. Several wires can go into the terminal openings if needed and twisted together if desired. This is more likely for the GND terminal since all of the 1-5 and S terminals switch to GND.

For the push-tab terminals, strip wire (26 to 20 gauge) about 5/16" (or 8mm), push down on terminal tab, insert wire at about 45 degrees and release the tab. This is demonstrated in the Install video at 5:12. The speaker (S-, S+), trigger numbers (1-5) and S connections are labeled on the underside of the printed circuit board since there was no room on the top (sorry a magnifying glass is needed). If AniSound is screwed to your layout structure, consider transferring these labels by writing them on the mounted surface before they can no longer be seen! Left to right the order is S-, S+, 1, 2, 3, 4, 5, S.

2.2.3.2 Soldering

The "no terminals" purchase option requires soldering…

Push-Tab Terminals: There are 8 holes near the top of the board for speaker connectors (S- and S+), trigger numbers (1-5) and stop (S). These are labeled on the underside of the printed circuit board since there was no room on the top (sorry a magnifying glass is needed). If screwed to your layout structure, consider transferring the small

labels by writing them on the mounted surface before they can no longer be seen! The hole size is only .037 inches (or 0.94mm); wire gauge of 20AWG might fit, 22+ is better. Note, the two smaller holes (between the two sets of four holes) are to be avoided.

Power down AniSound. Strip the wire and follow this "how to solder" video. The pads are small so assure there are no shorts before re-powering (this damage is not covered by warranty).

2.3 SD Card Format

Rail Conductor Video: AniSound SD Card

Inserting the SD Card while AniSound is powered can stress the SD card and should be avoided.

Rail Conductor recommends making an "AniSound Factory SD Card" folder to copy all SD card content onto your hard drive to revert back to factory defaults if needed.

There must be a top-level directory of folders with names starting at 01 and going as high as 99. The included SD memory card has such folders to set the precedent. Rail Conductor has organized different MP3 sound track contents in many of the folders. Each sound track file name must begin with a 3-digit number from 001 to no greater than 255 (i.e. 001, 002, …, 255). Optionally a space followed by any other characters can follow to describe the sound effect.

Folder 97 has automated AniSound announcements in an automated voice of "Brian". Folder 98 has the same announcements by Ava. As long as AniSound has voice ability and plenty of storage, why rely on only a blinking LED to prompt the user for inputs or alert errors? Though the onboard LED flashes too in case the memory card is not inserted or a speaker is not connected (reference Appendix C). AniSound power up and confirmation announcements are inhibited

when the voice is turned off (see command CV 13) but error messages and volume button prompts persist.

Folder 02 and higher folders contain sound tracks for the layout categorized by Steam, Diesel, Harbor, Logging, Storm, Band, Nature, etc. Since the folder name itself can't be descriptive, these categories are described in a "Folder Organization" file at the end of Folder 99 (above all the other files where violating the standard won't affect access to previous files). The user can add to these files and add more folders (adhering to the naming conventions) as desired.

Folder 01 is a special case. Think of this as the default or working directory. If less than 255 sound files are needed, this could be the only directory needed – this also prevents having to declare a folder number (command CV 15 or CV 51) since folder 01 is the default. From the factory, the first 32 sound files contain a short audio ID verbally announcing the name of the file ("1" through "32"). This helps the user define track sequences and test track looping before overwriting the ID file with the desired (probably much longer) sound effect with the same number in the name.

Folder 01 tracks 001-032 have a special DCC ability to:

a) Have a unique volume just for this track
b) Loop when played. This can also be initiated from terminal triggered tracks when a short silent file (see folder 01 track 033) is played from the trigger and then sequences to a looped track).
c) Initiate another track upon completion. This allows a beginning sound, a looping middle and an end sound upon receiving a STOP command via DCC or a GND pulse on terminal S.

Reference section 3.2 Define Track Sequences for how configure the above effects.

Users can add, change or delete any of the sound files from 001 to 255 in each of the 01, 02, 03, …, 96 folders.

File names within folders must start with 001 – 255 but can have optional space followed by descriptive text after the track number. Strange AniSound behavior can result if the naming convention is violated. Usually, the daughter-board on AniSound cannot initialize and a "Bad SD Card Names" error will be announced at power up if a speaker is connected.

If a non-existent track is played or looped a "Track not defined" error message will be announced.

3. Configuration Variable (CV) Commanding

Rail Conductor Video: Install/Setup

Now it's time to tell AniSound which tracks will play and when. Long or short address CV commands are used to configure and operate AniSound. Only CV commands are required to configure AniSound. With other decoders, a CV command only updates a variable in the decoder's memory; here the CV number usually commands an operation and the command value is a parameter (e.g. sound track number) for that operation. The end of this section defines all the commands. Many commands are stored such that they are held between power cycles and need not be re-entered.

There are four categories of CV commands:

3.1 Define Basic Configuration

The first group of commands describe basic housekeeping and recovery for the Decoder. CV 8, like most loco decoders, restores factory defaults even erasing the DCC decoder address!

Ever heard an unfamiliar beep from your computer and wondered if that was e-mail, Facebook, or??? As shown in the videos, AniSound talks to you. Every command sent has a tailored confirmation. This is why a speaker should be connected before power up – so AniSound can help instruct the configuration process. Just for fun, there's an automated male "Brian" voice (the default) or a female "Ava" voice that are selectable through CV 13. Of course, when configuration is complete and AniSound is animating sounds on the layout, voices would spoil the realism, so the conversational voice can be disabled – though error announcements persist.

Several commands set the volume. There are several levels of volume. If volume is ignored by the user, the hardware default of 30 (loudest volume available) is used. But this can seem overpowering for a user that wants to simulate how volume fades over distance – or avoid multiple sound effects that combine into confusion. In scale, most sounds would completely dissipate over 4-5 feet of scale distance. There is a power up override volume configurable with CV 14 which is auto-commanded at each power up. And even then, some sound tracks (first 32 tracks in folder 01) can override that volume for a particular track via CV 21 (reference 3.2 Define Track Sequences). Then for the user that just wants a "volume dial" like a CD player, there is CV 50 that just sets the current volume, overriding any previous volume.

Some users may only desire a single sound effect all the time – perhaps a several minute sound track meant to replay automatically to persist the sound as long as power is applied. For this there is auto-play (CV 16) and auto-loop (CV 18) that configure either play or loop on a folder/track at power up. To disable a previously assigned CV 16/18, just assign 0. For a CV 18 assigned audio track to work, CV 16 must be 0 so whenever CV 18 is assigned, CV 16 is auto assigned 0.

3.2 Define Track Sequences

For a how-to video click here.

To achieve more realism, sound tracks can be sequenced together. This would, for example, enable a starting sound, a repeating middle sound and an ending sound to complete an effect. The best way to demonstrate this is with an example. Olympic Logging has a steam powered sawmill (click here for video) that auto-starts with a sound track that brings up the boiler and engages the belts. At completion, this automatically starts another 2:22 track that loops cutting sounds forever. When a "stop" (via panel button into terminal S or a DCC CV 54 command) is received, it automatically starts a turning off the boiler sound track. When that concludes, a sound track of loggers singing around the AniLight campfire finishes the fast-clock, day long effect.

These definitions use commands that need two parameters – usually the sound track number and which sound track it should sequence next. Since CVs can only update one variable at a time, a "select track" (CV 20) command is first sent and then which track should be played or looped next (CV 22 and CV 23 respectively) follows. The select track command also made this a

convenient place for the per track volume command. Select the track with CV 20 and then assign its volume with CV 21.

Note that there's limited "save between power cycles" memory to store these sequence and volume definitions so only tracks 001-032 in folder 01 can have this extra sequencing and dedicated volume capability.

3.3 Define Function Mode Tracks

With Function Mode commanding, up to six different loco functions (e.g. bell, whistle or any F1-F28 function) auto trigger the playing or looping of a sound track! Each of the six can be for a different short/long loco address.

For a how-to video, click here.

Loco functions are categorized into two different types. Functions that have a start and stop (e.g. bell) will auto-loop whenever the function is commanded and stop when the function off is received later; these are called "looping" functions. Other functions (e.g. coupler crash) are only initiated by the user with no stop – so these will play the selected track only one time and are called "one-shot" functions.

First tell AniSound which loco address (CV 42/CV 43) and which function number (CV 44) is to trigger playing of the sound track. If the track is not in the default folder 1, tell AniSound which folder has the sound track to play with a CV 15 command. Finally, a CV30-CV41 command stores all these parameters, identifies which of the six slots (A-F) to use, whether the function is looping or one shot and which track to play. Reference Table 3.5 below for more details on these parameters.

Each of the six functions can have a different short or long loco address. In fact, it doesn't have to be a real loco at all. Even the AniSound address can be used preventing interference with other decoders altogether. This is handy for "moving a speaker around" the layout. At one place it might play cattle loading sounds but in the next town it plays a rotary coal dumper sound. This usage is called "stand-alone" mode. This can also be achieved with normal play commands in the next Track Operations section but then the folder/track numbers must be remembered and played.

3.4 Track Operations

Of course, there's a CD/MP3 player mode that supports basic play (CV 52/CV 53), volume (CV 50) and stop (CV 54) commands. Just pre-load the folder (if not the default folder 1) with a CV 15 or 51 command before sending the play/loop command (CV 52 / CV 53). Again, more details are below in Table 3.5 Configuration Variable (CV) Commands.

Table 3.5 Configuration Variable (CV) Commands

This table can be copied/printed with the "My Value" column filled out for each AniSound. If factory defaults must be restored, these values can help restoration. The AniSound address in the top row identifies each.

"My Value" Column shows my commanded values for AniSound with Addr:____			
CV	Commanded Operation with Value sent to this CV	Value Range	My Value
	Basic Configuration (CV < 20)		
8	Reset Decoder to Factory Defaults. All CV commanded data (decoder address, volumes, track sequence definitions, functions, etc. must be re-programmed). Assure settings are recorded in the "My Value" column at right for easier restoration.	Any, ignored	N/A
13	Audible Announce Voice Select Select how AniSound talks to you	0 = None 1 = Brian (default) 2 = Ava	
14	Assign Startup Volume (0-30) If 0, factory volume (30) persists	0-30	
15 or 51	Select Folder to Play or Loop in subsequent commanding. If never use tracks over 255, this can stay at the default (of 1). (Needed for basic	1-99 (default = 1)	N/A

	configuration and track operations – so listed in each category [15 and 51].)			
16	Assign Startup play track upon power up. Current Selected Folder (CV 15 command) will also be stored. 0 (default) means "no power up track".	0-255		
18	Assign Startup loop track upon power up. Current Selected Folder (CV15 command) will also be stored. 0 (default) means "no power up looping". CV 16 must be 0 (default).	0-255		
19	Announce Hardware/Software versions	Any, ignored	N/A	
	Define Track Sequences (CV 20-29) (Folder 1 only)			
20	Select Track. Track to be used in subsequent commanding stored here.	1-32	N/A	
21	Assign Track Volume for CV 20 selected track. 0 is OFF. 30 is maximum. Each 001-032 track can have a dedicated volume. Volume is returned to previous value after track completion. Each CV20/CV21 pair can be recorded in right column.	0-30	Trk	Vol
22	Assign Sequenced Play. Whenever the CV 20 track is played, the track in this command's parameter will play next. If zero, the CV 20 track just ends upon completion. If the sequenced track is	0=Ends sequencing 1-32 =sequences can persist further over 32=sequenced track will be	Trk	Next

	over 32, then it will play but no further sequencing can be defined. Record the CV20 track # with the Next track Played/Looped (in CV 22 or CV 23) in column at right. A 'P' or 'L' can be written in the right margin.	last		
23	Assign Sequenced Loop. Whenever the CV 20 track is played, the track in this command's parameter will loop next. If zero, the CV 20 track just ends upon completion. If sequenced track is over 32, then it will loop but no further sequencing can be defined. Looping continues until a stop/advance (CV 54) is received or another play is commanded (CV 52 or CV 53). Record the CV20 track # with the Next track Played/Looped (in CV 22 or CV 23) in column at right. A 'P' or 'L' can be written in the right margin.	0=Ends sequencing 1-32 =sequences can persist further over 32=sequenced track will be last		

	Define Function Mode Tracks (CV 30-49)		
30	Function Track_A (One-Shot). Configures slot A to play assigned track in folder stored in CV 15 every time loco address stored in CV 42/43 receives function number stored in CV 44. The track will only play one time (i.e. "one-shot") and then stop. If track 0 is assigned, this slot will be cleared no longer playing a track.	0=Delete Function 1-255=Track #.	42: 43: 44: 15: 30:
31	Function Track_A (Looping). Configures slot A to play assigned track in folder stored in CV 15 every time loco address stored in CV 42/43 receives function number stored in CV 44. The track will play continuously (i.e. "looping") until the loco function is turned off, a CV 54 command is received or another play is performed. If track 0 is assigned, this slot will be cleared no longer playing a track.	0=Delete Function 1-255=Track #.	42: 43: 44: 15: 31:
32	Function Track_B (One-Shot). Like CV 30 command above but for additional loco function	0=Delete Function 1-255=Track #.	42: 43: 44 15: 32:
33	Function Track B (Looping). Like CV 31 command above but for additional loco function	0=Delete Function 1-255=Track #.	42: 43: 44 15: 33:
34	Function Track_C (One-Shot).	0=Delete Function	42:

	Like CV 30 command above but for additional loco function	1-255=Track #.	43: 44 15: 34:
35	Function Track_C (Looping). Like CV 31 command above but for additional loco function	0=Delete Function 1-255=Track #.	42: 43: 44 15: 35:
36	Function Track_D (One-Shot). Like CV 30 command above but for additional loco function	0=Delete Function 1-255=Track #.	42: 43: 44 15: 36:
37	Function Track_D (Looping). Like CV 31 command above but for additional loco function	0=Delete Function 1-255=Track #.	42: 43: 44 15: 37:
38	Function Track_E (One-Shot). Like CV 30 command above but for additional loco function	0=Delete Function 1-255=Track #.	42: 43: 44 15: 38:
39	Function Track_E (Looping). Like CV 31 command above but for additional loco function	0=Delete Function 1-255=Track #.	42: 43: 44 15: 39:
40	Function Track_F (One-Shot). Like CV 30 command above but for additional loco function	0=Delete Function 1-255=Track #.	42: 43: 44

			15: 40:
41	Function Track_F (Looping). Like CV 31 command above but for additional loco function	0=Delete Function 1-255=Track #.	42: 43: 44 15: 41:
42	Assign Loco Address MSB. Holds the upper part of a long loco address (i.e. desired address/256) used by CV commands 30-41. Assign 0 (default) for short loco addresses. This value is stored permanently when a CV 30-41 command is received.	0-39	N/A (see 30-41)
43	Assign Loco Address LSB. Holds the loco address (or lower part of a long loco address) used by CV commands 30-41. The value is computed: desired address – (CV 42 *256). This value is stored permanently when a CV 30-41 command is received.	0-255	N/A (see 30-41)
44	Assign Function Number. Holds the CV 42/43 loco's function number to trigger the play of a track. This value is stored permanently when a CV 30-41 command is received.	1-28	N/A (see 30-41)
	Track Operations (CV 50+)		
50	Assign Present Volume. 0 is OFF, 30 is maximum. If no track play is active, "Volume Change" announces at the new setting, otherwise, active play	0-30	N/A

	changes volume while continuing to play.		
51/ 15	Select Folder to Play or Loop in subsequent commanding. If never use tracks over 255, this can stay at the default (of 1). (Needed for basic configuration and track operations – so listed in each category [15 and 51].)	1-99	N/A
52	Play track assigned to this CV. If it has a sequenced track, it will start when finished. Current Track Folder (CV 15 command) is used to select the track. A folder one (CV 51 = 1) play of track 1-5 is identical to pulsing the '1' – '5' terminal on AniSound to ground.	0-255	N/A
53	Loop ("Repeatedly Play") track assigned to this CV until a stop/advance (CV 54) received or another play/loop received. Current Track Folder (CV 51 command) is used to select the track.	1-255	N/A
54	Stop playing whatever track is playing/looping. If it has a sequenced track, it will start to play/loop. This command is identical to pulsing the 'S' (stop) terminal on AniSound to ground.	Any, ignored	N/A

Appendix A - Command Entry from DCC Systems

All AniSound configurations are performed with a CV command “on the main” – including defining a new DCC address. The programming track is never needed/used. All CV commands are described in Table 3.5.

How to send a CV command and use a CV command to define a new DCC address are described below for popular DCC command systems. Playing audio tracks with function commands (F1-F28) is the most convenient, and also described.

NCE PowerCab™

Configure AniSound Decoder Address Steps:

Wire NCE “Track” terminals to AniSound DCC terminals

Plug in NCE to wall outlet

AniSound self identifies if either speaker is connected

Press PROG/ESC until “PROGRAM ON MAIN” is displayed

Press ENTER, “PROG LOCO:” is displayed

Enter desired AniSound address (short or long) and ENTER

Enter ‘2’ for “CV”

Press Button on AniSound (circuit board LED comes on)

For “PROG CV NUM:”, enter “52” and ENTER

For “ENTER VALUE:”, enter 1 and ENTER

After a few seconds, AniSound reboots with the new address

To test, enter CV NUM: 52 and VALUE:1 again to play track 1

CV Command Steps:

Choose desired command from Table 3.5 and follow the steps below:

Navigate to the power up display

Press PROG/ESC until “PROGRAM ON MAIN” displayed

Press ENTER, “PROG LOCO:” is displayed

Enter AniSound address (short or long) and ENTER

Enter ‘2’ for “CV”, “PROG CV NUM” is displayed

Enter number from CV column in Table 3.5 and press ENTER

For “ENTER VALUE:”, select from Value Range in Table 3.5

Press ENTER to execute CV command

Function Mode Grade Crossing Example:

To make AniSound play *actual* grade crossing horn on F9 for loco 005, send these CVs as described in last section:

CV 42 <- 0

CV 43 <- 5

CV 44 <- 9

CV 15 <- 12

CV 30 <- 6 Slot A plays folder 12, trk 6 for F9 on loco 5

To test, select loco 5 and press 9.

Function Mode Cattle Pen Example (“Stand Alone Mode”):

To make AniSound play cattle sounds on F15, send these CVs as described above:

CV 42/43 <- AniSound Address

CV 44 <- 15

CV 15 <- 10

CV 32 <- 1 Slot B plays folder 10, trk 1 for F15

To test, select AniSound address, 'A' to get Fn+10 and press 5.

DigiTrax DCS 52™

Many video examples are in the DCC Functions video, click here.

Configure AniSound Decoder Address Steps:

Wire DCS 52 "Rail A" and "Rail B" to AniSound DCC

Plug in DCS 52 to wall outlet

Press track power button on lower left, "Track Status" lights

AniSound self identifies if either speaker is connected

Press Loco button

Enter desired decoder address (short or long)

Press Loco button again

Press the menu button, "Main Menu A" will display

Press '2' for CV Programmer

Press '1' for "Po; Ops on Mainline"

Enter CV Number of "52" (the play track command)

Press 'B' button for "CV Data"

Enter ‘1’ to select a play of track 1

Press Button on AniSound, circuit board LED comes on

Press ‘A’ button for “Write”

After a couple seconds AniSounds boots with new address

To test, press ‘A’ button for “Write” again, track 1 will play

CV Command Steps:

Choose desired command from Table 3.5 and follow the steps below:

From home screen with AniSound connected and powered…

Press Loco button

Enter AniSound decoder address

Press Loco button again

Press the menu button, “Main Menu A” will display

Press ‘2’ for CV Programmer

Press ‘1’ for “Po; Ops on Mainline”

Enter desired CV Number from Table 3.5

Press ‘B’ button for “CV Data”

Enter desired CV Value from Table 3.5

Press ‘A’ button for “Write”

To change more CVs, press ‘C’, enter CV Number, press ‘B’, enter CV Data and press ‘A’.

Function Mode Grade Crossing Example:

To make AniSound play *actual* grade crossing horn on F9 for loco 005, send these CVs as described in last section:

CV 42 <- 0

CV 43 <- 5

CV 44 <- 9

CV 15 <- 12

CV 30 <- 6 Slot A plays folder 12, trk 6 for F9 on loco 5

To test, select loco 5 and press 9.

Function Mode Cattle Pen Example ("Stand Alone Mode"):

To make AniSound play cattle sounds on F15, send these CVs as described in last section:

CV 42/43 <- AniSound Address

CV 44 <- 15

CV 15 <- 10

CV 32 <- 1 Slot B plays folder 10, trk 1 for F15

To test, select AniSound address, 'A' to get Fn+10 and press 5.

MRC Prodigy Express™ [Preliminary]

CV Command Example

Press TBD

Accessory Command Example:

Press TBD

Appendix B - Examples

Let's work some examples to help resolve any questions.

A) Forest Sounds – Basic loop on MP3 folder:track 5:2.
Here's the commands to configure AniSound:

CV 51 assigned 5	Select Folder 5
CV 53 assigned 2	Loop on track 2 in folder 5

Or, to make this loop start automatically at power up:

CV 51 assigned 5	Select Folder 5
CV 18 assigned 2	Loop on track 2 in folder 5 at power up

B) Lumber Mill – The factory default MP3s have several steam era lumber mill sounds in folder 4:

- "001 Lumber Mill Start": Bringing the boiler on line
- "002 Lumber Mill Cutting": Band, planer and chop saws
- "004 Lumber Mill Stop": Taking the boiler off line

Let's make them play in order at power up:

Play 0001 at startup
Loop on 0002 at the completion of 0001
Play 0004 whenever a STOP command (CV 54) is received or "S" terminal pulsed to ground (via pushbutton) at the end of the work day.

Here we'll use track sequences (reference the Track Sequences section). Track sequences only work in folder 1 on tracks 001 – 032. So, we'll need to copy the folder 4 tracks to track 1 but let's first test the sequence with the default self-identifying tracks.

Here's the commands to configure AniSound:

CV 16 assigned 1	Track 001 played on power up
CV 20 assigned 1	Set track 001 to be configured
CV 23 assigned 2	Track 001 upon completion will loop on track 002
CV 20 assigned 2	Set track 002 to be configured
CV 22 assigned 4	Track 002 upon completion will play track 004

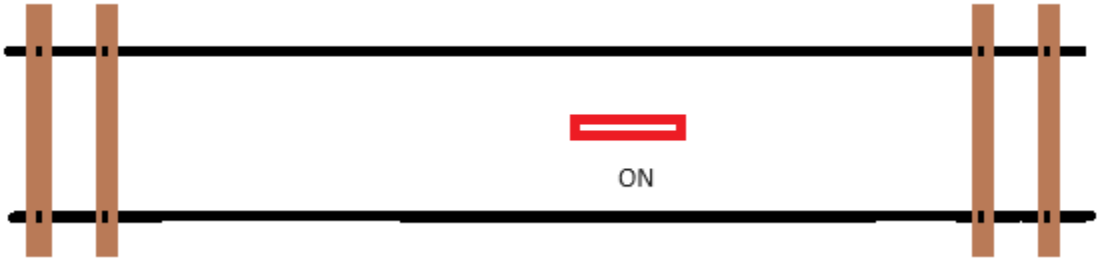
On power up, it will verbally announce "1"; a repeated "2" until a CV 54 is commanded or a GND pulse on the 'S' terminal; and finally, a "3".

Now, eject the SD Card from AniSound and plug into your computer (using a purchase option adapter if needed). Copy folder 4 tracks 1,2 and 4 to folder 1 deleting the old folder 1 tracks 1,2 and 4 (after a backup to hard drive). Eject and plug the SD Card back into AniSound.

Now, when AniSound starts, the lumber mill will power up and cut lumber all day until the end of day is triggered for the boiler to power down.

C) Box Car Sounds – Could have a reefer generator/condenser sound activated by a DCC command – or auto-startup.

D) Passenger Station Sounds – Put a Reed switch on the floor of a baggage (or larger) car with AniSound and speaker inside. Wire the Reed switch to GND on one side and a terminal (any of 1-5) on the other. Drill in a permanent magnet between the rails at a station.



Whenever the baggage car goes over the magnet, station sounds will play for as long as your recording lasts. This could be "Train 40 arriving on track 1" (even in your own voice), unloading sounds, coach doors, bell, "all aboard", steam hiss, idling sounds, etc. The free Audacity app can merge all these sounds into a single MP3 track you copy to your SD card. Departure sounds could follow. You can time your stay such that you accelerate out of the station as the sounds are ending.

A real beauty of this approach is that you can add more stations for the cost and effort to drill one magnet between the rails!

If different train arrival sounds are desired for different stations, wire the Reed switch to the 'S' terminal. Sequence each station audio to loop on a copy of the folder 01, track "033 Silence" so silence is "played" while travelling between stations. Then when the Reed switch pulses the 'S' terminal at the next station, a new

station audio can be sequenced (calling out different station names, greeting family, etc.). If there's Kadee™ uncoupler magnets along the route triggering the next station early, insert an additional silent play to accommodate. The only requirement is that the train not deviate from the expected route to keep station calls in sync.

If AniSound doesn't fit in any of the passenger train cars (likely for HO), the magnet could be placed in the car and the Reed switch on the track. Then AniSound is mounted in/under the station.

E) Cattle Car Sounds – In the same way the passenger example works above, any industry sound can be played. Cattle sounds as cattle exit/enter cattle cars, ice being loaded into reefers, anywhere AniSound can fit into your rolling stock. Just put a different MP3 file for the desired sounds and wire the Reed switch to that MP3 trigger.

Appendix C – Troubleshooting

Error/LED Codes:

The LED on the AniSound decoder will display the following alerts:

LED on solid: AniSound is waiting for a DCC Address to be assigned. Send a Loco CV command with the address to be assigned to this decoder. If address change is not desired press button again.

2 Repeating Flashes: A configuration variable (CV) command outside the allowed range was received. Reference Table 3.5 for allowed CV assignments.

3 Repeating Flashes: AniSound can't initialize the SD Card. This occurs when the SD Card is missing or has badly named folders or sound files. Inserting SD Card while powered can stress the SD card and should be avoided.

4 Repeating Flashes: When a new command is sent before the previous completes execution, AniSound announces "Command Queue Overflow" and will seem to ignore the subsequent 3+ commands and throw out all 3+ commands in the queue. Processing then continues normally.

5 Repeating Flashes: A command parameter was out of range (but ignored). This will result for example, when a volume level over 30 is selected. Reference Table 3.5 for allowed ranges. AniSound also announces "Bad DCC Command Parameter".

6 Repeating Flashes: Occurs when an audio track that does not exist is played. AniSound also announces "Track not Defined".

Unexpected Symptoms:

1) Symptom: Nothing is right, CVs must be set wrong, configuration is hopeless.
   Remedy: To configure AniSound back to factory defaults, send a command to write CV 8 to any value (reference Table 3.5 CV 8). Commanded data (decoder address, volumes, track sequence definitions, functions, etc.) must be re-configured). Assure settings are recorded in the right "My Value" column in Table 3.5 for easier restoration. A JMRI "Decoder Pro" interface is planned for development.

2) Symptom: DCC commands don't work.

1) Cause: The volume may be too low.

Remedy: If the blue LED next to the memory card lights when there should be sound, then the volume is likely too low. For DCC, there is a current volume (CV 50), a power up volume (CV 14) and a track volume (CV 21) - assure whichever is active is audible (over 20?) and try again. For non-DCC, hold down the button until the LED comes on and follow instructions.

2) Cause: The CV command address may not be the AniSound address.

Remedy: Check what is being sent from your DCC system and repeat.

3) Cause: The AniSound address may have been accidentally changed.

Remedy: Assign it to the desired address. Pulse the AniSound button, the LED comes on (i.e. not flashing). Send a loco CV command with the desired AniSound address. No other configurations are lost.

3) Symptom: Sequenced tracks don't play.

Cause: If folder is set incorrectly (CV command 15/51), then it will attempt to play the track in the wrong folder. Remember the folder is also assigned when startup play/loop commands are sent.

Remedy: Send a CV 15/51 folder command to force the desired folder, even if folder 1.

4) Symptom: Function Mode functions don't play correctly.

Cause: AniSound doesn't "mix" sounds (playing different audios at the same time) – though this can be achieved with Audacity when creating the audio track. So, if one function starts a track and another function starts another track, when the second track ends the first will not restart.

Remedy: Plan function initiation so that tracks are started or stopped as desired. One-shot functions will only start a track when the function ON is received. Looping functions will start when the function ON is received and command a STOP when the function OFF is received. Note that when a one-shot audio completes, the DCC command system function may still be on – it can't be re-played until first turned off.

5) Symptom: All terminals toggled off as did the GND and +5V terminals powering other layout electronics.

Cause: Is the AniSound voltage regulator (Q1 part with a metal plate) very hot? This part has a built-in overtemperature cutoff feature for safety. When too much current is being pulled through Q1 it will turn off until it cools.

Remedy: If needed, a TO-220 heat sink can be installed on top of Q1 (see purchase option video at 1:28). Otherwise, reduce the number of things being powered on the GND +5V terminals.