Steam

Programming Guide

Revised: 6/9/2014

This manual covers the setup and configuration of the Sound Components of the WOWSound Steam decoder. All NMRA, Lighting and Motor Control programming are covered in the **TCS Comprehensive Programming Guide** available for download at: www.tcsdcc.com

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If the AudioAssist logo appears after a title, that function is adjustable using Audio Assit™. It is recommended and easier to adjust these features using AudioAssist.

NOTE: Please view our instructional video about AudioAssist on our website.

Version Number

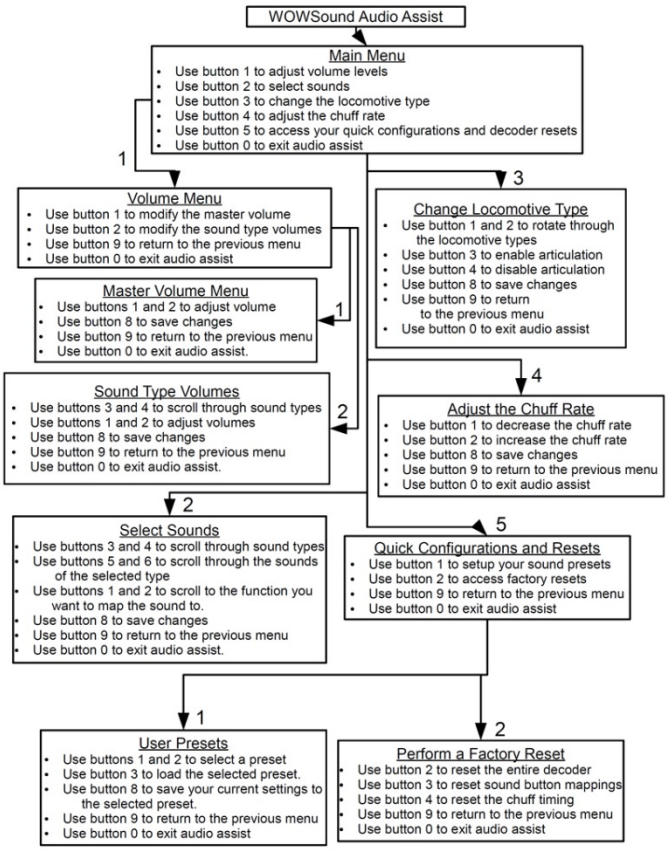
The WOWSound Version Number can be found by reading the value in CV 248. This is necessary when looking up information in the TCS WOWSound section of our website.

Audio Assist™

AudioAssist is an auditory feedback, main line configuration tool that allows for quick and easy set-up of nearly all the sound functionality.

To enter AudioAssist, stop your locomotive on an operational track and press function button 8 in rapid succession 4 times. The decoder will start talking to you giving you a menu similar to a telephone answering machine. Just follow the verbal instructions to adjust or remap many of the sound options. When you have made a selection press 8 to save each selection and then press 0 to exit.

NOTE: Please view our instructional video about AudioAssist on our website.



4 CV Programming Overview

All NMRA, light and motor control CV's are the same as in the TCS Standard line of decoders and can be found in the **TCS Comprehensive Programming Guide** downloadable from the TCS website. TCS uses 4 indexed CV's to program the sound features found in the WOWSound decoder line.

By using CV 201, CV202, CV203 and CV204 to adjust sound features, TCS is able to include thousands of different possibilities with the WOWSound decoders. What each of the 4 CV's represents in described in the following Table 1.

Table 1

Action	CV 201	CV 202	CV 203	CV 204
Assign Sounds to Buttons	1	Button #	Sound # High *	Sound # Low *
Individual Volume Change	2	Volume Level ***	Sound # High *	Sound # Low *
Chuff Timing	3	Speed Step	Coarse Adjustment	Fine Adjustment
Sound CV Change	4	CV#	CV Value High *	CV Value Low *
Factory Reset	5	None	None	Type of Reset (2-10)**
Sound Type Volume	6	Volume Level ***	Type # High *	Type # Low *

* Found in "List of Sounds" in the WOWSound section on our website

** Found in Factory Resets (see Table 2 below)

*** Found in "Sound Types" in the WOWSound section on our website

NOTE: Visit the WOWSound section of the TCS website for instructional videos, calculators and a list of sound CV's.

Table 2 **** Factory Resets**

Value	Reset Actions
2	All Decoder Settings (Motor, Light Sound)
3	Sound Button Mappings
4	Individual Volumes
5	Chuff Timing
6	Sound CV's
7	Sound Type Volumes
8	Loads Preset #1 (ver 3 only)
9	Loads Preset #2 (ver 3 only)
10	Loads Preset #3 (ver 3 only)

NOTE: CV's 201, 202, 203 must be set before CV 204 is written. The full programming operation takes place ONLY when CV 204 has been programmed.

4 CV Write Operation

1. Determine the type of programming action you wish to perform and enter the corresponding value from Table 1 in CV 201.
(Example: Assigning a sound to a button enter a value of 1 into CV 201)

2. If you are looking to perform any operation besides a factory reset enter the value of the specific field you are operating on into CV 202.
(Example: when mapping a sound to function button 12 enter a value of 12 into CV 202)

3. Enter the "High" or "Coarse" value (found in the appropriate table on our website) into CV 203
(Example: To assign "Strasburg #475 Air powered bell" enter a value of 0 into CV 203)

4. Enter the "Low" or "Fine" value (found in the appropriate table on our website) into CV 204
(Example: To assign "Strasburg #475 Air powered bell" enter a value of 1 into CV 204)
The full programming operation takes place ONLY when CV 204 has been programmed.

4 CV Read Operation

1. Simply add 100 to whatever value you would program into CV 201 to perform a write operation to switch it to a read operation..
(Example: Using our example above add 100 to 1 for a value of 101. Program a value of 101 in to CV 201)

2. Now enter the value of the specific field you want to read into CV 202.
(Example: Write a value of 12 into CV 202)

3. Now write ANY value to CV 204. (to trigger the read)
(Example: Write a value of 10 (it can be anything) into CV 204

4. Now you can Read the values of CV's 202, 203, and 204 on your programming track using CV read back.

Cylinder Cocks Shut Off Speed Step

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Cylinder Cocks Shut Off Speed Step	4	1	0	0-126	**0**	**16**

This sets when the Cylinder Cocks shut off after the locomotive starts. The higher the value in CV 204 the higher the speed step at which the Cylinder Cocks shut off.

Random Sound 1 Frequency

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Random Sound 1 Frequency	4	2	0	0-255	**0**	**200**

This sets how often Random Sound 1 plays. (Default: Air Pump) The higher the value in CV 204 the more frequent the sound plays.

Random Sound 2 Frequency

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Random Sound 2 Frequency	4	3	0	0-255	**0**	**96**

This sets how often Random Sound 2 plays. (Default: Shoveling) The higher the value in CV 204 the more frequent the sound plays.

Random Sound 3 Frequency

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Random Sound 3 Frequency	4	4	0	0-255	**0**	**64**

This sets how often Random Sound 3 plays. (Default: Injector) The higher the value in CV 204 the more frequent the sound plays.

Random Sound 4 Frequency

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Random Sound 1 Frequency	4	5	0	0-255	**0**	**16**

This sets how often Random Sound 4 plays. (Default: Safety) The higher the value in CV 204 the more frequent the sound plays.

Random Sound Overall Timer

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Random Sound Overall Timer	4	6	0-255	0-255	**3**	**0**

This sets the size of the time block for Random Sounds. The higher the value in CV 203 and CV 204 the larger the block of time for Random Sound calculations and therefore the less frequently they will be played.

Random Sound Cutout Speed

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Random Sound Cutout Speed	4	7	0	0-126	**0**	**20**

This sets at what speed step the Random Sounds cutout. The higher the value in CV 204 the higher the speed step that the Random Sounds stop playing.

Whistle Set

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Whistle Set	4	8	0	Whistle #	**0**	**0**

This sets which Whistle Set plays in Long, Short and Whistle Quill. **Whistle Set number can be found in the WOWSound section of our website.**

Proto-Chuff Start Speed Step

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Proto-Chuff Start Speed Step	4	9	0	0-126	**0**	**10**

Proto-Chuff varies the chuff recordings making the overall chuff more realistic. This sets the speed step that the Proto-Chuff effect starts. The higher the value set in CV204 the higher the Proto-Chuff starting speed step.

Global Volume

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Global Volume	4	10	0	0-5 or 0-100	**0**	**5 (100)**

This sets the Global Volume of the WOWSound decoder. WOWSound ver. 1 & 2 have a range of 0 to 5 with 5 being full volume. WOWSound ver. 3 has a range from 0 to 100 with 100 being full volume.

Steam Locomotive Type

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Steam Locomotive Type	4	11	0	See Below	**0**	**0**

This sets the Steam Locomotive Chuff Type.

Value CV 204	Locomotive Type	WOWSOUND Version 1 & 2	WOWSound Version 3
0	Heavy Steam	Yes	Yes
1	Medium Steam	Yes	Yes
2	Light Steam	Yes	Yes
3	Reading & Northern #425	**No**	Yes
128	Articulated Heavy Steam	Yes	Yes
129	Articulated Medium Steam	Yes	Yes
130	Articulated Light Steam	Yes	Yes
131	Articulated Reading & Northern #425	**No**	Yes

Automatic Sounds

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Automatic Sounds	4	12	0-15	0-246	**15**	**134**

This sets which automatic and random sounds are active. See Below for values

Enable Random Sound #1	Enable Random Sound #2	Enable Random Sound #3	Enable Random Sound #4	Play Rod Clank	Idling Sound	Automatic Forward Whistle	Automatic Reverse Whistle	Automatic Stop Whistle	Automatic Direction Change Sound
1	**2**	**4**	**8**	**2**	**4**	**8**	**16**	**64**	**128**
Add values above for CV 203				**Add values above for CV204**					

Brake Grinding Sound Start Speed

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Brake Grinding Sound Start Speed	4	13	0	0-126	**0**	**15**

This sets the speed step that The Brake Grinding Sound is activated. The higher the value in CV 204 the higher the speed step the grinding sound will start.

Dual Mode Functions (Light & Sound Mode)

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Dual Mode Functions (Light & Sound Mode)	4	14	0-255	0-255	**2**	**3**

This sets which function buttons work in both Light Mode and Sound Mode. See below for values.

F0F 1	F0R 2	F1 4	F2 8	F3 16	F4 32	F5 64	F6 128
Add values in row above for CV 204							
F7 1	F8 2	F9 4	F10 8	F11 32	F12 32	F13 64	F14 128
Add values in row above for CV 203							

Proto Chuff Variation – BEMF Sensitivity

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Proto Chuff Variation – BEMF Sensitivity	4	15	0	0-8	**0**	**1**

This sets how sensitive the chuff is to load. This affects the volume of the chuff when the loco is working hard or hardly working. The higher the value in CV204 the LESS sensitive the chuff will be to load and the volume of the chuff will be lower and change less.

Chuff Rate Adjustment

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Chuff Rate Adjustment	4	16	0	0-200	**0**	**100**

Default is set at 100% chuff rate. Increasing the value in CV204 will speed up the chuff rate. Decreasing the value in CV204 will slow the chuff rate down. **(It is recommended and much simpler to use CV AudioAssist to make this adjustment)**

Chuff Timing – Individual Speed Step

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Chuff Timing – Individual Speed Step	3	Speed Step 0-126	0-255	0-255	**Varies**	**Varies**

The higher the value in CV203 & CV204 the faster the chuff rate. Use this adjustment only if you are a glutton for punishment. **(It is recommended and much simpler to use CV AudioAssist to make this adjustment)**

Thermal Shutdown Temperature

DO NOT ADJUST!

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Thermal Shutdown Temperature	4	17	0-255	0-255	**3**	**32**

Cylinder Cocks Auto Turn On Time

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Cylinder Cocks Auto Turn On Time	4	18	0-255	0-255	**1**	**0**

Determines how long the locomotive will need to be at 0 speed before the cylinder cocks sound will turn on automatically with the next speed command (Loco must come to a complete stop before this timer will begin counting down).

User Options

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
User Options	4	19	0	0-255	**0**	**184**

This sets which User Option is activated. See table below for values.

Use Cam	Mute on Startup	Enable Articulation Chuff Out of Sync	Enable "Rotate Whistle" Audio Feedback	Enable "Light Mode/Sound Mode" Audio Feedback	Enable Audio Auto Shutoff Timer	Using Digitrax Throttle with F2 momentary
1	4	8	16	32	64	128
Add Values above for CV 204						

Articulated Chuff Slip Rate

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Articulated Chuff Slip Rate	4	20	0	0-255	**0**	**240**

Determines how fast the articulated chuffs will go into sync and out of sync with each other. The higher the value in CV 204 the faster it goes into and out of sync.

Audio Auto Shutoff Time

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Audio Auto Shutoff Time	4	21	0-255	0-255	**1**	**0**

Sets how long the locomotive must sit idle before the sound will shut off. The higher the value in CV's 203 & 204 the longer it will sit before the sound shuts off. (The default setting is approx. 3 min.)
NOTE: Audio Auto Shutoff Timer must be activated in "User Options" for this to work.

Sound Type Volume

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Sound Type Volume	6	Volume Setting	0	Sound Type #	**0**	**Varies**

This sets the Volume of a particular Sound Type. WOWSound ver 1 & 2 have a Volume range of 0 to 5 with 5 being full volume. WOWSound ver 3 has a Volume range from 0 to 100 with 100 being full volume. **The sound Type number can be found in the WOWSound section of our webpage.**

Re-Map Sounds to Function Buttons

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Re-Map Sounds to Function Buttons	1	Function 0 to 32	Sound # High Byte	Sound # Low Byte	**Varies**	**Varies**

You can re-map any sound to any button or the 4 random sound outputs. Function Buttons 0 – 28 with Random Sound 1 = 29, Random Sound 2 = 30, Random Sound 3 = 31, Random Sound 4 = 32. **Sound # High Byte & Low Byte Numbers can be found in the WOWSound section of our website.**

Individual Sound Volumes

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Individual Sound Volumes	2	Volume Setting	Sound # High Byte	Sound # Low Byte	**0**	**Varies**

You can set the volume of each sound independently. WOWSound ver 1 & 2 have a Volume range of 0 to 5 with 5 being full volume. WOWSound ver 3 has a Volume range from 0 to 100 with 100 being full volume. **Sound High Byte & Low Byte Numbers can be found in the WOWSound section of our website.**

Resets and Presets

Functionality	CV 201 Value	CV 202 Value	CV 203 Value	CV 204 Value	CV 203 Default Value	CV 204 Default Value
Individual Sound Volumes	5	0	0	Reset or Preset Type 2 - 10	**0**	**Varies**

Allows you to do several different Factory Resets depending on your needs. You can also call up one of 3 User Presets that you may have saved using .

User Presets are available in WOWSound decoders starting with Ver 3. They allow you to save 3 versions of you own sound settings for easy resets to settings other than the factory default values. User presets can only be setup using . Enter the value needed from the chart below into CV 204.

Value	Reset Actions
2	All Decoder Settings (Motor, Light Sound)
3	Sound Button Mappings
4	Individual Volumes
5	Chuff Timing
6	Sound CV's
7	Sound Type Volumes
8	Loads Preset #1 (ver 3 only)
9	Loads Preset #2 (ver 3 only)
10	Loads Preset #3 (ver 3 only)

Prototype Mode vs. Slot Car Mode

The WOWSound Steam sound decoder comes from the factory set to **"Prototype Mode"**. What this means is that Acceleration CV 3 is set to a default value of 32 and Deceleration CV 4 is set to a default value of 96. This simulates the Prototype characteristics of a real locomotive meaning it will accelerate slowly with the prototypical loaded sounds. The locomotive will also take a very long time to come to a stop without the use of the **"Brake"** defaults to button 7 and **"Brake Release"** defaults to button 6. When you close the throttle the loco will coast while you hear Rod Clank and/or the Snifter Valves.

To change to a more conventional operation or **"Slot Car Mode"** simply set the values of CV's 3 & 4 to lower levels to get the kind of operation you are more comfortable with.
Go to the TCS website to view an instructional video about "prototype operation"

WOWSound Brake Operation

The WOWSound Steam sound decoder uses a slightly different type of "Brake" than the TCS Standard decoders. WOWSound uses a separate "Brake" button (default is Button 7) and a separate "Brake Release" (default is Button 6).

Every time you press the "Brake" button there is a 20% brake application as well as a random brake squeal sound. If you continue to press the "Brake" button several more times there is an additional 20% brake application each time you press the button. With 5 presses of the "Brake" button you are in emergency and the loco stops very quickly. Anytime that you press the "Brake Release" button you will hear the air release from the brakes while the brakes release and you can continue. Increasing the throttle setting will also release the brakes.

Pressing the "Brake Button" will apply the brake regardless of the throttle setting. So you can simulate "Power Braking" with passenger trains to keep the train stretched etc.

The "Brake" and "Brake Release" buttons can be re-mapped to any other buttons desired. See "Re-Map Sounds to Function Buttons". While the default values for the Braking rates work very well for most people; they are adjustable using CV's. See Chart below.

CV	Default Value	Brake Rate	
CV 183	32	Brake Rate 1 (1 press)	**The Larger the number the longer it will take to come to a complete stop.**
CV 184	26	Brake Rate 2 (2 presses)	
CV 185	16	Brake Rate 3 (3 presses)	
CV 186	8	Brake Rate 4 (4 presses)	
CV 187	3	Brake Rate 5 (5 presses)	

Using a CAM (Optional)

The Tan Wire in the auxiliary plug goes to the cam wiper. The cam itself is mounted on either the loco axle or Drive wheel with a cam kit (Third Party) that has continuity with either Rail A or Rail B.
Activating the CAM is done in **"User Options"** on page 12.

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