

Getting the Best from Soundtraxx's Tsunami

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What we won't cover

- Installation.
 - Mostly. We have some tips
- Diesels
 - Actually quite a lot is applicable to Dismals.
- Complex lighting
 - Not commonly found on steam locos
- Stuff that's in common with all decoders
 - Consist settings, mainly
- Settings for DC operation
 - Why would you bother?

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What we will cover

- Steam locomotives
 - Including OEM locos (Bachmann, Athearn, Intermountain) as well as "purple" Tsunamis
- Keep-Alive Capacitors
- Speakers
 - choices, compromises
- Getting it running nicely
 - Including the brakes
- Setting up the Sound Properly
- Getting the DDE working

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Some Assumptions

- You're familiar with DCC
 - Using it to run trains
 - Programming and what a CV is
- You have, or will have, a decent DCC system
 - That supports 8, 12 or more functions
 - OPS mode
 - Computer interface available
- You are aware of DecoderPro
 - And may have used it
 - See Peter Lloyd-Jones' clinic for more

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Keep-Alive

- Keep-alive capacitors
 - TSU1000: runs the processor only
 - TSU-750: runs everything
 - Do not miswire: cap **will** explode and **may** affect decoder functions afterwards
 - You can add capacitance: add in PARALLEL
 - But don't use this as an alternative to clean track, wheels and adequate pickups
 - extra caps can affect booster short recovery
- More at Marcus Amman's site
 - <http://www.members.optusnet.com.au/mainnorth/alive.htm>

Connectors: plugs and sockets

- TCS do nice small 2 and 6-way
- Also try: Mouser #: 575-501101 and 575-500101
 - Same thing but in 50s: cut off what you need
- Be sure to wire with socket on the "powered" side
 - Then if it comes open, the decoder doesn't get blown
 - Use a foolproof arrangement (see next slide)

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Foolproof plug/socket

- Decoder in tender
 - Socket on decoder
- Blue in centre
- White & yellow: lights
- Right rail and cam
- Motor on the outside

If connected the wrong way round:

- Probably won't run: no power
- Power connected to cam input: no issue here
- Cam may power the decoder:
 - Runs backwards (a little)
 - F0 is the class lights, not headlight
 - Cam won't work

But no harm done!



You can also spin the motor with clip leads on the outer two pins!

Lights: I use LEDs

- No need to calculate accurate resistor values
- I use 9K resistors with 0603 LEDs
- No heat issues
- Longer life
- Plenty to choose from
 - Size, colour
- The price is right
 - Try LEDBaron on eBay.

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Speakers

- Use the largest you can get in
 - But don't go mad and cut the loco up
 - You can get good sound from small speakers
- Make sure it's decently baffled
 - inside a sealed box: the tender comes to mind
 - I prefer firing downwards on to the track
- Understand the frequency response
 - A properly baffled "ordinary" speaker beats a poorly installed "hi-bass"
 - The frequency response of your ears matters at least as much as that of the speakers!

Chuff Cams

- Use one if you can
 - You'll never get the autochuff dead on
- GME cams
 - Split/slotted: easy install on brass
- Soundtraxx flat sheet
 - May be the only way for RTR locos
- Contactless Magnetic
 - May work for you
 - Don't like Kadee magnets

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Programming

- Be methodical: don't change too much at once
- Use OPS mode to hear as you change
- Use DecoderPro to make it easier
 - And remember what you did

If you do get it all wrong:

- CV8=8 or CV30=2 resets to factory settings
- then start again.

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Programming

- Get it running properly first:
 - Address
 - Lights
 - BEMF settings & slow running
 - No momentum at this stage
 - Consist settings
 - If you use CV19 consists
- And only then start on the sound
 - Because operational settings affect the sound

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Tip #1

- If you plan to run on DC, then it matters which way round the motor is wired
 - NDOT bit in CV29 does not affect this
 - Orange to the same motor terminal as was wired to the right rail
- Program ack-pulse always spins the motor forwards
 - Check motor install by reading the address with the decoder connected to the motor
 - And watch which way the wheels turn
 - If they don't, work out why and fix it!

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Tip #2

- Reset the decoder before you start
 - Anecdotal evidence that some decoders are delivered with strange settings
 - Reverts the address to 3, etc
 - Except Blackstone models – these go back to the cab number.

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Tip #3

- Set the address as you install, as part of testing the install
 - If you can...
 - it tells you if it's wired correctly – see Tip #1
 - Check all the lights work before reassembling the loco
- Program the rest in OPS mode
 - Makes it much easier, and more fun.
 - And you won't need a program track booster
 - Use DecoderPro...
 - See Peter L-J

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Tip #4

- Get the Soundtraxx Manuals
 - Some RTR locos come with a CD
 - From Soundtraxx web site
- Technical Reference manual
 - Describes each CV and the value ranges
 - Can be a bit hard going in places
- Steam Users Guide
 - Covers everything in this clinic!
- Other doco on Soundtraxx web site.

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Tip #5

- It's your loco on your layout
- It's your ears
- But
 - Many people run WAY too loud
 - Think of the 6-foot rule
 - And blend that to the location
 - Understand CV128 (more later).

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Tsunami Lights

- Dyno Lights:
 - Add Dyno light effect:
 - DecoderPro: On the lights panel
 - CV49/50/51/52 value 15
 - Turn on the sound
 - DecoderPro: Function mapping panel
 - CV33/34: add 64
 - CV39/40: add relevant values from Tech Ref
- Firebox lights
 - Best is value 12 or 13 (12 is speed dependant)

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Tsunami Lights

- Tip #6: TSU-750 independent lights
 - Use FX6 on DecoderPro to move yellow wire to FX6
 - then Remap to another key if desired
 - Remap F0 to non-directional
 - DecoderPro Function mapping
 - CV34=65.

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Starting and Stopping: Back-EMF

- CVs 10, 209, 210, 212, 213, 214
- If it runs OK, don't touch these
- If it does jackrabbit starts:
 - Try reducing CV209 and 210 until it starts/stops to your satisfaction
 - Or halve CV212, then increase 209 and 210.
- If you use Autochuff, you'll need to reset it after altering BEMF.
 - Autochuff is throttle-setting sensitive, not motor/loco speed sensitive.

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Back-EMF CVs

- Standard PID loop: See Wikipedia for more
 - Cv209: Proportional: How much throttle to apply
 - CV209 defines %age of calculated Kp to apply
 - CV210: Integral: How fast to apply throttle
 - CV210 defines %age of calculated Ki to apply
 - Derivative: Not externalised
 - Droop defines how far away from ideal the speed gets before the decoder does something about it
 - CV212: Intensity (behaves a bit like Kd)
 - Affects how much of the correction factor is applied
 - Small values can mean a very sluggish throttle response and generally poor running.

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Back-EMF CVs

- CV213: Frequency of measurement
 - affects how often the motor checks BEMF
 - suggest that you never change this one
- CV214: Measurement window size
 - suggest that you never change this one either
- CV10
 - Enables BEMF to be trailed off at larger throttle openings.

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Setting Back-EMF

- Make sure the loco is warm
- Make sure the track and wheels are clean
- Turn off momentum (CV3/4 = 0)
- Turn off start adjustment (CV2 = 0)
 - And leave it off; BEMF is a far better substitute
- Tsunami BEMF isn't very good with coreless motors
 - They start and stop too fast

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Sound

- First set the Sound parameters
- Then do these, in order
 - Equalizer
 - Reverb
 - Individual and the master volumes
 - Background probabilities
 - AutoSounds

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Sound Parameters

- DecoderPro Sound panel or CVs 112 – 116
- Airpump:
 - Select one or more than one: count those on the loco
 - A Cross-Compound pump is one pump here.
- Articulated:
 - These settings only work on Autochuff.
 - Artics with cams need all the chuffs via cam(s)
 - Two four-points or one 8-point?
 - Compound Artics are Normal; only the LP cylinders exhaust to atmosphere

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Sound Parameters

- Select the whistle for the prototype
 - Or what you like best
- Alternate whistle gives two whistles and F3 toggles between them
 - No whistle “toot”
- Playable whistle is crap
 - In my opinion
 - Requires recent Digitrax or NCE system to use
 - Negates standard non-playable whistle on that throttle

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Sound Parameters

- Exhaust Control
 - This is the chuff rate
 - Set at step 5 or 10 **with engine warmed up.**
- Bell Ring rate
 - Above 8 or 9 gives double-ring. Neat (YMMV)
- Timeout: I like a setting of around 200
 - Loco is quiet until addressed (saves your ears with 30 locos on layout!)
 - Loco goes quiet when speed = 0 and all functions are off, after n/4 (ish) seconds.

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Equalizer

- What this does is adjust different frequencies from the amplifier
 - to match the speakers
 - and your ears
 - reduce outputs that the speaker can't handle, or you can't hear
 - emphasise those that it and you can
- Look at the speaker frequency response
 - Commonly 500hz to 12Khz
- Understand what you can hear

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Equalizer

- Look at the DP equalizer panel
 - CVs 153 to 160
- Check the Users Guide: good explanation there
 - but the Cvs listed are wrong!
- Try the pre-set settings first
 - You'll probably not like any of the results
 - Except maybe 1 and 6
- Try a manual setup

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Equalizer

- Assuming speaker frequency response of 500Hz to 12Khz (Soundtraxx 810113)
 - 1) Get the loco running at step 20 or so
 - 2) Set CV153=7 (User Adjustable on DP)
 - 3) CV154 = 0, CV155 = 128, CV156 = 175, CV157 = 175, CV158 = 200, CV159 = 200, CV160 = 200
 - 4) Adjust to taste.

Don't just shove them all to Max, all that does is turn up the overall volume.

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Reverb

- Reverb is not Echo!
 - You can easily overdo this!
- Try the various presets
 - My preference is additional reverb in Whistle

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Reverb

- CV161 = 7: User adjustable
 - Or see DecoderPro
- CV162/3/4: Adjust the reverb
 - 162: how much output goes back in
 - 163: delay in feeding it back in
 - 164: gain loop: do not overdo this, or you can blow speakers!
- 169/174: manually adjust what is reverb'd
 - DecoderPro doesn't cover CV174 (blower)

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Reverb

- Tip #7: use reverb to simulate diesels with multiple prime-movers
 - Soundtraxx now have EMD E unit decoders...
 - DD35/DD40
 - Two locos in a lashup, with one decoder

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Effect Volumes

- Sound Levels on DecoderPro
 - Cvs 129 to 136: "Foreground" sounds
 - Cvs 137 to 151: "Background" sounds
- Set these as you feel best: adjust the various volumes against each other
 - As delivered, most are **FAR TOO LOUD!**
- Look at your loco and decide what you actually want and/or need:
 - No Fireman Fred on oilburners!
 - Does the loco have power reverse?

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Sound Levels

- My advice:
 - Start with the master volume at around 70.
 - Set the whistle to Max
 - Exhaust to around 70 (too high and the DDE won't work)
 - Bell, Airpump and Injectors to 70ish
 - Rod Clank to 30
 - Blower to 30, Blower Draft to 70
 - Dynamo to 30
 - Brake squeal to 60
 - Pop valve to 128, steam release to 100

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Sound Levels

- Test these out. Adjust to suit
 - You may need to wait before the pop valves go off.
- Then turn off
 - Fireman Fred, and anything else you don't like
- Now set CV128 to something that makes sense for your environment
 - 25 to 40 for home use
 - 200+ for exhibitions.

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Automatic Effects

- DecoderPro ASC page
 - CVs 201 – 208: Probabilistic effects
- These affect how likely something is to happen when the loco is stationary
- Get rid of the effects that don't make sense:
 - Set Fireman Fred filling the tank OFF (zero)
 - You'd need to be sure you stopped at the tank every time, otherwise!
- Look at how steam locos actually work
 - And are used.

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Probabilistic Effects

- My Suggestions (as ever, YMMV)
 - Set pop valve to 50-70
 - Depending on how good the prototype was at making steam
 - And how skilled your firemen are
 - Set blower to 200
 - should always use the blower when stationary
 - Set injectors = 150
 - It's likely that they will be used when stopped

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Automatic Effects

- I don't use any of the automatic sounds
 - Steam blowdown is hateful
 - and not prototypical
 - Autowhistle and autobell become a nuisance, but you may like them
 - And you don't want the bell always sounding either
 - Grade Crossing can be useful
 - But note that the way you set up momentum and DDE may affect how it works

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Here's where we bring it to life

- Set some momentum
 - Makes it sound real
- Brakes!
 - Yes, proper brakes.
- DDE settings

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Momentum

- CV3 and 4
 - Ensures that you don't have "train-set" starts and stops
 - Never personally needed speed tables on a steam Tsunami
 - But you might
- CV3 = 25 to 50
 - Gives a prototypical start
 - Triggers the DDE
 - Fast open the throttle: DDE loudens the exhaust as the loco accelerates, and quietens it when it reaches the set speed

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Momentum

- Set CV4 = lots (I go for 150-ish)
 - Close the throttle, and the DDE quietens the exhaust as the loco decelerates to the new throttle setting
 - This is why you don't set the Exhaust sound too loud
 - Coasts along. May go 10 feet from Speed 25/100 before stopping!
 - Help!
 - Tip #8: Know how to use your Emergency Stop. Digitrax: set throttle to LOCAL Emergency Stop. Also useful for diesels: triggers prime mover shutdown.

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Brakes!

- Steam loco coasting. How do I stop it?
- CV61 and F11 (F11 can be remapped)
 - DecoderPro Advanced page: CV61 is the brake intensity.
 - When brake pressed:
 - Values below 128 are added to CV4 value
 - **Values above 128 are Subtracted from CV4**
 - And the loco then uses that that temporary value
 - DecoderPro presents these values differently
 - Use Subtract....

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Brakes!

- My suggestion
 - CV61 = 255 (DP: Subtract, 127)
 - CV4 = 150
- When throttle closed, loco decelerates at CV4=150 rate. Coasting
- Press F11:
 - Temporary CV4 value is $150 - 127 = 23$.
 - Loco now decelerates at simulated CV4=23.
 - From step 25/100, that's about 6 inches.

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Brakes!

- Brake tricks
 - Which are just like the real thing....
- Coupling up
 - Stop short of train— say 1 inch.
 - Close throttle
 - Set brakes: F11 on
 - Open throttle to step 1
 - Brakes off
 - Brakes on as it couples.
 - Reverse loco, brakes still on, throttle still open.
 - Brakes off, pull couplers to check, brakes on. Close throttle. 45

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Brakes

- Helper Operations
 - I'm assuming here
 - you **need** the helper to move the train, and one loco can't do it on its own
 - Your locos are reasonably well speed matched
 - Run helper up to back of the train. Couple up, or leave uncoupled if you drop off on the fly.
 - Digitrax DT40x throttle helps here (two knobs)
 - Helper: brakes on. Open throttle to appropriate setting (say 20).
 - Train loco. Brakes off, Open throttle.
 - As the slack works out, brakes off on the helper.
 - When you get good at that, add the whistle signals! 46

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DDE

- DecoderPro DDE page, Cvs 177 to 188
- Throttle gain. Good values are 10 – 50
 - Makes the decoder use the difference between throttle speed and actual speed; also requires large CV3/4 values
- Motor Load gain. Good values are 30 - 70
 - Makes the decoder adjust sound as seen by the motor load and BEMF. Less effective if CV 212 is a high value.
 - If too large, loco reacts to tiny load changes and you wonder why. 47

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DDE

- Attack/Delay time constants
 - Affect how fast the sound responds to throttle or motor load changes. Bigger the number, the faster the change. Leave at 10 or so
- Exhaust and Rod Clank volume changes
 - Leave both Exhaust ones at 255
 - Leave Rod Clank Low at 255
 - Reduce Rod Clank High if you get too much rod clank for your liking – or the loco is freshly shopped.

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DDE

- DDE filters
 - Suggest leave these as default until you are fully happy with everything else
- Then
 - CV185 (DDE Initial Frequency) adjusts the deepness of the chuff. Lower values = deeper chuff.
 - CV186 (DDE Gain) affects how the chuff is modified as speed rises and the cutoff is shortened. Too large a value can make high speed sound very strange

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DDE and Load

- BEMF CV212 sets overall BEMF intensity
- Default is 255, and that tends to give best BEMF control for slow speed and good starts and stops
- But if reduces the ability of the decoder to balance sound against load.

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DDE and Load

- Soundtraxx's Tsunami Users Guide shows how to adjust so that sound changes with load.
- It's a balancing act of
 - CVs 212, 178, 185, 186 and 10
 - The motor and gearing in the loco
 - The speed you run it at
 - The grades and loads that you run it on and with
 - Your ears, and your perception of the sound.

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We're done

- Questions?
 - If we have any time left. If not, I'm here all weekend (what's left of it)
- Come see and listen
 - Parson's Lumber Company, Camp 93
 - My home layout (by appointment)
- Resources
 - I'll put the slides on my blog (www.mickmoignard.com)
 - Soundtraxx web site (www.soundtraxx.com)
 - Soundtraxx yahoo group.

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