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DIESEL LOCOMOTIVE OPERATOR'S MANUAL & SOUND GUIDE

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NOTICE

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Meaning of Special Language

The following terms are used throughout the product literature to indicate various levels of potential harm when operating this product:

WARNING: Procedures, which if not properly followed, create the probability of property damage, collateral damage, and serious injury OR create a high probability of superficial injury.

NOTICE: Procedures, which if not properly followed, create a possibility of physical property damage AND a little or no possibility of injury.

⚠ WARNING: Read the ENTIRE instruction manual to become familiar with the features of the product before operating. Failure to operate the product correctly can result in damage to the product, personal property and cause serious injury. This is a sophisticated hobby product. It must be operated with caution and common sense and requires some basic mechanical ability. Failure to operate this Product in a safe and responsible manner could result in injury or damage to the product or other property. This product is not intended for use by children without direct adult supervision. Do not attempt disassembly, use with incompatible components or augment product in any way without the approval of Horizon Hobby, LLC. This manual contains instructions for safety, operation and maintenance. It is essential to read and follow all the instructions and warnings in the manual, prior to assembly, setup or use, in order to operate correctly and avoid damage or serious injury.

Age Recommendation: Not for Children under 14 years. This is not a toy.

Handling

Athearn® Genesis® models are created to represent the prototype equipment as accurately as possible, and therefore many of the details are delicate due to their scale sizes. Because of this, these models require careful handling. By following a few simple care and handling guidelines, you should be able to enjoy years of modeling enjoyment from your new locomotive. It is also recommended that you read through this instruction manual to help familiarize yourself with the basic components of the model, as well as its general care and handling. One basic guideline that is applicable to this, and many other diesel locomotive models, is to never grab the model by its handrails! The handrails on the Athearn Genesis locomotives are molded in engineering plastic for flexibility and have been designed to securely fit onto the locomotive, but they can be distorted and/or separated from the locomotive with rough or excessive handling. When handling the model, such as when removing it from the packaging or placing it on the track, it is best to handle the model by the fuel tank. When performing maintenance on the model that requires disassembly, it is recommended that the model is gently laid upside-down on a soft foam cradle (which are available from most hobby dealers, or can be crafted from bulk foam material available from many craft supply stores) to help protect its details and finish.

If the model will not be used for an extended period of time, it is recommended to store it in its original packaging, away from direct sunlight and extreme temperatures, to protect its details and finish.

Recommended Tools

The following is a list of tools we recommend to have on hand in order to perform any minor maintenance, if needed, on this or any other model railroad product. Many of these basic tools are available from most hobby dealers and some hardware stores. As always, please follow the manufacturer's safety guidelines when using any small hand tool.

- Small Phillips-head Screwdriver
- Tweezers (curved-type and/or straight are useful)
- Miniature Needle-Nose Pliers
- Small Flat-head Screwdriver
- Screw Grabber
- Hobby Knife

Disassembly

In order to remove the body shell, the small Phillips-head screws must be removed. Most four-axle locomotive models have two (2) screws that hold on the couplers. Most six-axle locomotive models, in addition to the coupler screws that must be removed, have two (2) additional screws in the frame (fore and aft of the fuel tank) which also need to be removed. Begin by laying the model upside-down on a soft surface, such as a foam cradle. Locate and remove the body shell screws by using a small Phillips screwdriver. Set the screws aside in a small container or dish. From experience, those small screws can easily roll off a table or workbench and seemingly disappear, so be careful! Carefully remove and set aside the coupler pocket assemblies by pulling them out from each end of the model. Next, if necessary (on six-axle locomotives), locate the final pair of screws securing the shell to the frame. There is one near each end of the fuel tank, semi-recessed into the frame; you may have to swivel each truck slightly to clearly locate and remove each screw. Once they are removed and set aside, the shell can be removed from the frame by gently pulling the body (taking care not to grip it by its handrails) from the chassis. It is best to grip the chassis by the fuel tank area when doing this.

NOTICE: Use care when removing the body shell or damage to the air reservoir, air plumbing details, or other details on the bottom of the walkway may occur.

Please note that the headlight and any other effect lighting leads (if applicable) must be disconnected from the DCC adapter board, in non-sound units, or SoundTraxx® Tsunami2® Digital Sound Decoder (DSD) board, in sound-equipped units, in order to completely remove the shell from the chassis. This board is the rectangular printed-circuit board mounted on top of the motor/flywheel assembly.

To disconnect these wires, carefully remove the small black wire locks from each of the lighting lead tabs on the DCC adapter or SoundTraxx Tsunami2 boards. Set the wire locks aside, noting that the wire locks used on the ends of the board are slightly larger than those used on the sides of the board, and are not interchangeable. On non-sound and sound-equipped models, the front and rear headlights are connected to the inner pair of tabs located at each end of the board. On non-sound models, the

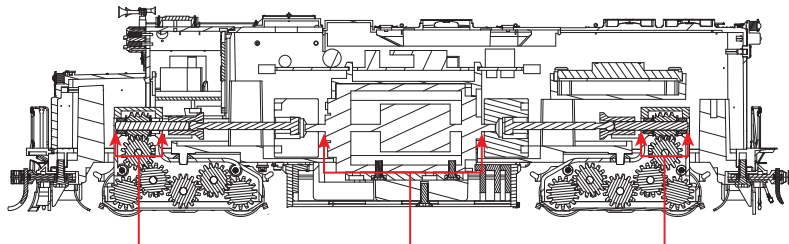
effect lights (Gyalite/MARS lights, ditch lights, etc.), if equipped, are on the right side of the board, opposite the pair of motor leads. On SoundTraxx Tsunami2 sound-equipped models, note that one of their effect lighting wires are connected to the tabs marked F3, F4, F5, and/or F6 and the other wire is connected to a V+ tab. Once this is done, the wires can be pulled free from the tabs, and the shell set aside. Take care to mark the wire bundles, such as by labeling their ends with small pieces of masking tape, to help ensure they are re-installed at their proper tabs on the circuit boards. If wires accidentally get mixed up during disassembly, don't worry; you can test your LED lights by using a 3V power source such as a DC power pack set to 3V or a battery pack containing 2 AA sized batteries creating an output of 3V. to help determine where each set of wires is supposed to be connected to (e.g., headlight wires to the end tabs of the board).

Lighting

Your Athearn Genesis locomotive has been equipped with LEDs to provide the effect lighting of the locomotive. Under normal circumstances and operation, LEDs require no maintenance and should not burn out. However, should your LEDs need attention, please contact Athearn Product Support. To do so, please visit our website at www.athearn.com

Lubrication

Athearn Genesis models require minimal lubrication. It is important to use hobby lubricants that are formulated for use on model trains and are plastic compatible. Refer to the drawing to locate the lubrication points and apply a drop to each. Light or medium oils should be used for bearings and heavier oils or greases can be used sparingly on the gears. Be careful to avoid over oiling your model, as excessive lubrication can leak from the drive train and possibly mar the finish. If any small leaks are noted, carefully wipe up any excess lubricant before operating your model.



LUBRICATION POINTS LUBRICATION POINTS LUBRICATION POINTS

Care and Cleaning

Dust and debris are among the leading contributors to poor operation of any miniature mechanism. To maintain the quality performance of your locomotive, inspection and cleaning should be performed on a regular basis. A soft bristle brush should be used to remove dust from the superstructure. The use of soaps, solvents or detergents is not recommended for this purpose as they will have a tendency to mar the finish.

Replacement Parts

Athearn parts are available to our customers and we strive to continue to offer spare parts for many of the models in our extensive line to modelers for repair and other uses. For information on parts ordering, please visit www.athearn.com

For the best possible service, please have the item number (located on the end of the original box of your model) as well as the part numbers and/or descriptions of the parts you would like to order. Please allow 4–6 weeks for delivery upon placement of your order. Also, please be aware that parts availability is dependent upon current production schedules and that certain parts for a particular locomotive type may only be available after they are introduced on certain roadnames and/or schemes for a short time.

Aftermarket Decoder Installation

Athearn Genesis non-sound locomotives feature a DCC Adapter Board that allows the modeler to easily install a 21-pin decoder of their choice. To install, simply remove the body shell (see the “Disassembly” section), exposing the DCC Adapter Board mounted above the motor. Carefully pull off the “dummy” plug from the 21-pin connector extending from the top of the Adapter Board, then install the 21-pin decoder of your choice.

Note that the number 1 pin, on the right (engineer's side) front corner of the 21-pin connector is marked by a small triangle printed on the PCB. Be sure to test the decoder for satisfactory operation before replacing the locomotive body shell.

Operating a Tsunami2 equipped locomotive in DC (analog) Mode Using a DC Power Pack

While the Tsunami2 sound system installed in your Athearn model is first and foremost a DCC decoder, it may be used on a DC powered layout. The Tsunami2 will automatically sense if it is operating in DC or DCC. When operating in DC, you may control your locomotive using an ordinary power pack, though operation will be a bit different compared to non-sound, non-decoder equipped locomotives. With the power pack's throttle set to zero, Tsunami2 will be silent as it has no power. The throttle must be turned up to about 7V or so to provide sufficient voltage to power up the internal circuitry of the decoder. At this point, you will hear the prime mover start up and settle into a steady idle. Increasing the throttle further to approximately 9 volts will set the locomotive in motion, increasing speed as the throttle is increased.

Note that the direction can only be changed when the locomotive is stopped.

When operating in DC mode, be careful not to exceed the decoder's input voltage rating of 27 volts. When your track voltage exceeds 22 volts, Tsunami2 will automatically shut off the sound and motor and flash the front and rear lights 10 times. Reduce throttle immediately.

IMPORTANT: Tsunami2 will work best in DC mode when using a high quality, electronically regulated power pack, preferably one that supplies smooth, filtered DC power. Older rheostat style power packs and pulse power packs will result in erratic and unreliable operation and should not be used with the Tsunami2 sound decoder. If your power pack provides a pulse power switch, leave it in the "Off" position. Depending on the quality of the power pack's track voltage, some automatic sound functions may require a higher sensitivity setting than needed for DCC operation to avoid continual triggering of the sound effect.

Automatic Sound Configuration Register

CV 197 selects which automatic sound functions, automatic bell, and/or automatic brake release are enabled when the decoder is operating DC mode. The Automatic Brake Release sound effect has been preset from the factory to operate on your model.

Automatic Bell - The sound decoder will turn the bell on and off at preset speed points, such as when passing through a yard or station platform. In addition to CV 197, you will need to set CVs 193 (Auto-Bell On Set Point) and 194 (Auto-Bell On Time) to configure the auto-bell sound effect. CV 193 is used to determine the speed step at which the bell sound effect will be automatically turned on and CV 194 (Auto-Bell On Time) is used to adjust the duration in seconds that elapses before the bell sound effect will be automatically turned off.

Setting Up Automatic Signals - You may want to use CVs 1.384–1.512 to enable automatic forward, reverse, and stop whistle signals. The following example details setting CV 1.407 (Forward Whistle Signal Auxiliary Map Register), CV 1.408 (Reverse Whistle Signal Auxiliary Map Register), and CV 1.409 (Stop Whistle Signal Auxiliary Map Register) to enable automatic whistle signals:

- 1) Enter a value of 1 into CV 407 to enable automatic forward signals when the locomotive is forward-driving.
- 2) Enter a value of 2 into CV 408 to enable automatic reverse signals when the locomotive is reverse-driving.
- 3) Enter a value of 12 into CV 409 to enable automatic stop signals when the locomotive is standing (regardless of direction).

Please refer to the Flex-Map Function Mapping Examples found in the SoundTraxx User's Guide at:
http://www.soundtraxx.com/manuals/tsu2_diesel_usersguide.pdf

Sound Decoder Function Assignments			
Function Key	Default Effect	Function Key	Default Effect
F0	Headlight	F15	Hand Brake
F1	Bell	F16	HEP Mode On/Off
F2	Horn	F17	Fuel Loading Sequence
F3	Short Horn ¹	F18	General Service Sequence
F4	Dynamic Brakes ² or Straight to Idle ³	F19	Straight to Idle
F5	Lighting Effect 1 ⁴	F20	Steam Generator or Aux. HEP Generator On/Off
F6	Lighting Effect 2 ⁴	F21	(Not Used)
F7	Dimmer/Cab Chatter	F22	(Not Used)
F8	Mute	F23	“All Aboard”/Coach Doors (if enabled)
F9	Alternate Mixer (Half Volume)	F24	Aux Lighting Effect (if equipped)
F10	Straight-to-8 & Sander Valve	F25	Aux Lighting Effect (if equipped)
F11	Brake Set/Release ⁵	F26	Engine RPM Notch Up
F12	Brake Select	F27	Engine RPM Notch Down
F13	Couple/Uncouple	F28	(Not Used)
F14	Half Speed & Momentum Override	Emergency Stop	Red Emergency Mars Light (if equipped)

1 - The short horn function can be changed to a grade crossing horn sequence by changing CV 37 to 0. If you would like to re-map the short horn function to another key using SoundTraxx's Flex-Map™ function mapping, CV 37 must also be set to 0 to prevent the short horn function from being activated with function key 3.

2 - On locomotives with Dynamic Brakes.

3 - On locomotives without Dynamic Brakes.

4 - If your locomotive's prototype is equipped with flashing ditch lights, they will flash when the horn button (F2) is depressed.

5 - Functional braking is not enabled by default; to enable, see "Enabling Tsunami2 Braking Rates on your Locomotive" elsewhere in this guide.

Operating with DCC
From the factory, the SoundTraxx Tsunami2 decoder installed in your Genesis model is programmed with a default address of 3. Getting up and running is easy—simply set your controller to address 3, place the locomotive on the mainline, and away you go!

Additionally, the SoundTraxx Tsunami2 has many features built-in to allow you even more audio and operational enjoyment. While we will cover as much as possible in this manual, there is much more than we can completely cover in this limited space. If you have not done so already, it is highly recommended that you refer to the SoundTraxx Tsunami2 User's Guide, which will cover in finer detail the various aspects of programming the SoundTraxx Tsunami2 decoder installed in your Athearn Genesis locomotive model. Also, the Tsunami2 Technical Reference provides supplemental information on the various Configuration Variables (CVs) available, and their exact function and make-up for those that wish to have a complete reference for advanced programming techniques. These documents are available as free downloads online on the Athearn website, at the following address:
www.athearn.com/dcc/

Additional support documents, also free, for the decoders installed in various Athearn models can also be found on the SoundTraxx website, at the following address:
<https://soundtraxx.com/reference/decoder-selector>

Please note that these are .pdf files and a computer equipped with Adobe Acrobat Reader software is needed to open and print these files. This software is also available as a free download on the Adobe website at www.adobe.com.

Programming and Reading CVs
Some command stations allow you to read a CV during Service Mode Programming, which is useful to verify current settings. If you have trouble reading or verifying CVs, the problem may be due to the design of your command station and not the Tsunami2 decoder itself. If your DSD is otherwise working properly (i.e., responds properly on the mainline to speed and direction commands) but your command station is having trouble reading CV data from the DSD, it may be due to incompatibilities between the electrical requirements of the DSD (which are different from conventional decoders due to the added audio circuitry) and the electrical characteristics of your programming track. Unlike the Tsunami DSD, the Tsunami2 DSD no longer requires a Programming Track Booster to program CVs. The Tsunami2 line of decoders also does not give a 'pulse' notification of the motor in response to a CV change

Basic CV Settings
While your new Athearn SoundTraxx Tsunami2 equipped locomotive is ready to operate right of the box with sound CVs set at the factory, please note that many of these sound CVs, ranging from a value of 0 to 255, can be adjusted by the user to suit their personal tastes. Some of the more basic sound CV settings are listed below:

Basic Volume Controls and CVs:

- | | | |
|---------------------------------|------------------------|---------------------------|
| • CV 128, Master Volume Control | • CV 134, Radiator Fan | • CV 140, Brake Release |
| • CV 129, Horn | • CV 135, Alarm Bell | • CV 143, Poppet Valve |
| • CV 130, Bell | • CV 137, Coupler | • CV 144, Steam Generator |
| • CV 131, Prime Mover | • CV 138, Train Brake | • CV 148, Emergency Stop |
| • CV 132, Air Compressor | • Apply/Release | • CV 149, Uncouple |
| • CV 133, Dynamic Brake | • CV 139, Brake Squeal | • CV 153, Clickety-Clack |

Please be aware that we cannot provide directions on usage of your DCC system. Please contact your DCC system's manufacturer, and/or refer to the documentation provided with your DCC system for guidelines on reprogramming CVs and operating your model.

DCC & SOUND

The default horn programmed from the factory is set to match the protype whenever possible; however, if you would like to change the horn sound on your locomotive, the available options for CV 120 are listed below:

<u>Horn:</u>	<u>CV 120 Value</u>	<u>Horn:</u>	<u>CV 120 Value</u>
• Nathan K3LA (Version 1)	0	• Leslie A125-3E	20
• Nathan K3LA (Version 2)	1	• Leslie A200	21
• Nathan K3L	2	• Leslie A200/S3L Combo	22
• Nathan K5HL	3	• Leslie RS3L	23
• Nathan K5LA (Version 1)	4	• Leslie RS5T	24
• Nathan K5LA (Version 2)	5	• Leslie S2M	25
• Nathan K5LA (Version 3)	6	• Leslie S2M/A200 Combo	26
• Nathan K5LH	7	• Leslie S2M/S3L Combo	27
• Nathan K5LLA	8	• Leslie S3L	28
• Nathan M3	9	• Leslie S5T	29
• Nathan M5	10	• Leslie S5T/A200 Combo	30
• Nathan P3	11	• Wabco A2	31
• Nathan P5 (Early)	12	• Wabco AA2	32
• Nathan P5 (Modern)	13	• Wabco E2 (Version 1)	33
• Nathan P5A	14	• Wabco E2 (Version 2)	34
• Nathan P5A (3rd Generation)	15	• Wabco 2 Chime	35
• Holden M3H	16	• Hancock 4700 Air Whistle	36
• Holden K5H	17	• Leslie S4T	37
• Leslie A125	18	• Leslie S3LR	38
• Leslie A125/200 Combo	19	• Leslie RS3K	39

For example, if you would like your locomotive to have the sound of a Nathan K5LLA horn, you would set CV 120 to a value of 8.

The default bell programmed from the factory is set to match the prototype whenever possible; however, if you would like to change the bell sound on your locomotive, the available options for CV 122 are listed below:

<u>Bell:</u>	<u>Ring Rate</u>	<u>CV 122 Value</u>
• Alco #1	Slow, Med./Slow, Med./Fast, Fast	0 - 3
• Alco #2	Slow, Med./Slow, Med./Fast, Fast	4 - 7
• Alco #3	Slow, Med./Slow, Med./Fast, Fast	8 - 11
• EMD #1	Slow, Med./Slow, Med./Fast, Fast	12 - 15
• EMD #2	Slow, Med./Slow, Med./Fast, Fast	16 - 19
• EMD #3	Slow, Med./Slow, Med./Fast, Fast	20 - 23
• EMD #4	Slow, Med./Slow, Med./Fast, Fast	24 - 27
• Fairbanks-Morse	Slow, Med./Slow, Med./Fast, Fast	28 - 31
• GE FDL	Slow, Med./Slow, Med./Fast, Fast	32 - 35
• Graham White Electronic Bell	Slow	36
• Western Cullen Hayes Gong Bell	Slow, Med./Slow, Med./Fast, Fast	37 - 40
• RGS Galloping Goose	Slow, Med./Slow, Med./Fast, Fast	41 - 44
• Canadian Brass Bell	Slow, Med./Slow, Med./Fast, Fast	45 - 48
• Prime Electronic Bell		49

For example, if you would like your locomotive to have the sound of an EMD #3 bell with a medium-fast ring rate, you would set CV 122 to a value of 22.

DCC & SOUND

The default prime mover programmed from the factory is set to match the prototype whenever possible; however, if you would like to change the prime mover sound on your locomotive, the available options for CV 123 are listed below:

Since the Tsunami2 sound board has enough memory for multiple prime movers, the Athearn Tsunami2 sound boards have been divided by the series of prime movers. This means that EMD 567 series prime movers are grouped onto one sound board, EMD 645 series prime movers are grouped onto one sound board, EMD 710 series (and newer) prime movers are grouped onto one sound board, and GE prime movers are grouped onto one sound board (excluding the Gas Turbine Electric). For example, if you have purchased an Athearn Genesis GP9, you will ***not*** be able to assign a GE prime mover sound. Below you will find the breakdown of prime movers by their grouping.

EMD 567 Series

<u>Prime Mover:</u>	<u>CV 123 Value</u>
• EMD 567 Non-Transition Switcher	0
• EMD 567 Non-Transition 12 Cylinder	1
• EMD 567 (Version 1)	2
• EMD 567 (Version 2)	3
• EMD 567D Turbo	4

EMD 645 Series

<u>Prime Mover:</u>	<u>CV 123 Value</u>
• EMD 645 8 cyl. Turbo	0
• EMD 645 12 cyl. Non-Turbo	1
• EMD 645 16 cyl. Non-Turbo	2
• EMD 645 12 cyl. Turbo	3
• EMD 645 16 cyl. Turbo (Version 1)	4
• EMD 645 16 cyl. Turbo EFI	5
• EMD 645 16 cyl. Turbo (Version 2)	6
• EMD 645 20 cyl. Turbo	7

EMD 710 Series & Newer

<u>Prime Mover:</u>	<u>CV 123 Value</u>
• EMD 710 12 cyl.	0
• EMD 710 16 cyl. (Version 1)	1
• EMD 710 16 cyl. (Version 2)	2
• EMD 710 16 cyl. ACe	3
• EMD 265-H 16 cyl.	4

General Electric Series

<u>Prime Mover:</u>	<u>CV 123 Value</u>
• FDL-12	0
• FDL-16	1
• 7FDL-16 Freight	2
• Dual FDL-16	3
• GEVO G-12	4
• 7 FDL-16 Passenger w/HEP	5

The default air compressor programmed from the factory is set to match the prototype whenever possible; however, if you would like to change the air compressor sound on your locomotive, the available options for CV 124 are listed below:

<u>Air Compressor:</u>	<u>CV 124 Value</u>
• Engine Driven	0
• GE “Whooping”	1
• GE “GEVO Series”	2
• EMD Shaft Driven	3

DCC & SOUND

The default train air handling system programmed from the factory is set to match the prototype whenever possible, however, if you would like to change the air handling system on your locomotive the available options for CV 125 are listed below.

<u>Air Handling:</u>	<u>CV 125 Value</u>
• Poppet Valve	0
• Air Dryer	1

The default coupler sound programmed from the factory is set to match the prototype whenever possible; however, if you would like to change the coupler sound on your locomotive, the available options for CV 126 are listed below:

<u>Coupler:</u>	<u>CV 126 Value</u>
• Light Coupler	0
• Heavy Coupler	1
• Link & Pin	2

Prime Mover Pitch Shift – CV223

CV 223 is used to alter the tone and pitch of the prime mover sound effect. This feature allows you to create unique sounding locomotives in a consist, all while using the same prime mover sound selection. This change in tone and pitch is measured in cents, which describes the ratio between two very close frequencies. Changing the value in CV 223 can replicate this effect and give each of your locomotives their own unique sound.

Entering a value from 1 to 127 into CV 223 will lower the pitch of the prime mover sound effect. Entering values between 129 and 255 will increase the pitch of the prime mover effect. A value of 128 has no effect on the tone or pitch of the prime mover sound.

A great example for how to configure this feature is a consist of 3 EMD F-units. Each locomotive will be using the “EMD 567 Non-Turbo” sound selection to replicate the chug and whine of these iconic locomotives. If you were to program CV 223 to a value of 168 in the lead “A” unit, 128 (default) in the trailing “B” unit and 88 in the rear facing “A” unit, each prime mover exhaust sound effect will play back at slightly different (WORD MISSING). This will allow for slight variations in the tone and pitch between multiple locomotives using the same prime mover selection running together in a consist. You can also use CV 223 to adjust the tone of the prime mover to reflect a recently serviced locomotive or one that has seen thousands of miles of service on your railroad.

Note: Changes to this CV are recommended to be made in increments or decrements of 30-40as smaller changes can be hard to notice.

Flashing Ditch Light Options

Please note that the ditch lights on your Genesis Locomotive are configured per prototype (flashing or non-flashing) when the horn is blown; however, if you desire your model to have flashing front ditch lights, this can be done by changing the following CVs from their defaults to the following values:

CV 55, FX7 Configuration	201
CV 56, FX8 Configuration	233

If you desire your model to have flashing rear ditch lights, this can be done by changing the following CVs from their defaults to the following values:

CV 53, FX5 Configuration	201
CV 54, FX6 Configuration	233

To configure your model to non-flashing ditch lights, simply set the CVs 55, 56, 53 and 54 to a value of 0 for constantly lit ditch lights for incandescent bulb use. It is recommended that you keep notes for any CVs that you may change for future reference. If you are unhappy with any CV changes you may have made, you can restore the factory CV settings by programming CV8 to a value of 8, then momentarily toggling the power to the locomotive off and back on again (allowing the decoder to reset). This will restore any user-made changes back to the factory default settings as well as reset the locomotive address back to 3.

Advanced Sound Features

There are many sound features found in your new Athearn SoundTraxx Tsunami2 equipped locomotive, which can be adjusted to suit your personal preferences. You can adjust the volume of each sound effect individually with the Tsunami2 built-in mixer. The short horn effect will allow you to more easily incorporate signaling practices into your operations. There is also the option of replacing the short horn function with an alternate horn if a particular prototype is equipped with dual sets of horns. For those with limited function keys, you may wish to enable the automatic signal feature. This will activate stop, forward, reverse, and grade crossing whistle signals automatically in response to train motion.

Calibrating SoundTraxx Dynamic Digital Exhaust (DDE)

The SoundTraxx Tsunami2 DSD found in your new Athearn Genesis locomotive is equipped with a cutting-edge new version of Dynamic Digital Exhaust. We highly recommend you automatically calibrate the DDE settings before adjusting throttle and braking control CVs, as this will create an amazingly accurate representation of prototypical operation. When calibrated, DDE will allow the decoder to produce more prototypical prime mover responses when encountering changes in both grade and number of cars during operation. This feature is not turned on by factory default. Follow the steps below to enable and automatically calibrate DDE load compensation:

1. Enter a value of 2 into CV 32 to select Indexed CV Page 2. This allows you to adjust DDE control CVs by accessing CVs 503–512 from your command station.
2. Set CV 512 (DDE Load Sensitivity) to a value of 16.
3. Run the locomotive at a moderate speed for a minute or two before continuing. If there is any build-up of lubrication or oil in the drive, running the locomotive first will provide better results during the calibration procedure.
4. Set the throttle to speed-step 1.
5. When your locomotive is on straight and level track, enter a value of 255 into CV 503 (DDE Load Offset) to automatically calibrate the nominal low-speed load level.
6. Increase the throttle to an appropriate moderate speed for your layout (generally between speed-step 25 and speed-step 40).
7. When your locomotive is on straight, level track, enter a value of 255 into CV 504 (DDE Load Slope) to automatically calibrate the nominal high-speed load level.

Important: If, after the calibration is complete, you feel the need to increase or decrease the sensitivity, you can do this with CV 512.

DCC & SOUND

Enabling Tsunami2 Braking Rates on your Locomotive

From the factory, your Athearn Genesis model with Tsunami2 sound features three types of functioning brakes for more prototypical operation. If you wish to use these functional braking rates to slow and stop your model, you will need to disable the automatic brake release function found in CV 1.403. Set CV 1.403 to 0 before programming any braking rates in the CV 116 (Dynamic Braking Rate), CV 117 (Independent Brake Rate) or CV 118 (Automatic Brake Rate) to allow control of the brakes with function key 4 for dynamics and function key 11 for the independent or train brakes.

A note about Tsunami2 Dynamic Brakes

Although you adjust the braking rates in CVs 116, 117, and 118 the same way, the dynamic brake function differs from the independent and train brake functions. For instance, the independent and train brake functions will bring the locomotive to a stop, whereas the dynamic brake function will not. You will hear the sound of the light dynamic brake without a change in locomotive speed the first time you turn on the dynamic brake function. When the throttle setting is above speed-step 8 (of 128), pressing the function key again will produce the heavy dynamic brake sound effect and reduce locomotive speed to speed-step 8 according to the rate in CV 116. Pressing the function key a third time will reapply the light dynamic brakes. By pressing the function key a fourth time, the dynamic brakes will turn off.

Important: Contrary to the independent and train brake functions, the dynamic brake will have no effect or sound when the locomotive is stopped.

For more information about prototypical brake application, please reference the SoundTraxx Tsunami2 users guide at

http://www.soundtraxx.com/manuals/tsu2_diesel_usersguide.pdf

Operating your new Tsunami2 locomotive with previous Genesis locomotives

Tsunami2 features a vastly improved motor control system, which produces much finer operation at lower speeds. When operating your new Genesis locomotive with previously released versions equipped with the original Tsunami decoder, you may notice some differences in the locomotive's speed between the two decoders. Never fear! A custom speed curve has been pre-loaded into your new Tsunami2 equipped locomotive to help ensure that it runs well with the rest of your Genesis models.

To access this custom pre-loaded speed curve, simply program CV 25 to a value of 16 and enable the "Speed Table Enable" bit found within CV 29. To enable the bit, simply add 16 to the current value in CV 29. To obtain this value, simply read back the CV on a dedicated programming track or enter the proper value in CV 29 based on info below:

Values when running in DC

Short address (1-127) 28/128 speed steps and a custom speed table = 22

Long Address (128-9999) 28/128 and a custom speed table = 54

Values when running in DCC

Short Address (1-127) 28/128 speed steps and a custom speed table = 18

Long Address (128-9999) 28/128 speed steps and a custom speed table = 50

The following CVs are listed for the more advanced user to know what the different CVs are able to change. Since many of these can have adverse effects on sound or performance, it is highly recommended that only experienced DCC users adjust these settings.

As these values change from model to model, the default values will not be listed in this book.

PRIMARY CVs

CV 1, Primary Address

CV 2, Vstart

CV 3, Baseline Acceleration

CV 4, Baseline Braking Rate

CV 5, Vmax

CV 6, Vmid

CV 7, Manufacturer Version Code

CV 8, Manufacturer ID Code

MOTOR CONTROL CVs

CV 10, Back EMF Cutout

CV 11, Packet Time-out Value

ANALOG MODE CVs

CV 12, Alternate Power Source

CV 13, Analog Mode Functions 1

CV 14, Analog Mode Functions 2

SECURITY CVs

CV 15, CV Unlock Code

CV 16, CV Lock ID

EXTENDED OPERATION CVs

CV 17, Extended Address (MSB)

CV 18, Extended Address (LSB)

CV 19, Consist Address #1

CV 21, Consist Function Active

CV 22, Consist FL Func. Active

CV 23, Consist Acceleration

CV 24, Consist Braking Rate

CV 25, Speed Table Select

CV 29, Configuration Byte 1

CV 30, Error Information

CV 31, CV Page Index (MSB)

CV 32, CV Page Index (LSB)

FUNCTION MAPPING CVs

CV 33, FL(f) Output Location

CV 34, FL(r) Output Location

CV 35, F1 Output Location

CV 36, F2 Output Location

CV 37, F3 Output Location

CV 38, F4 Output Location

CV 39, F5 Output Location

CV 40, F6 Output Location

CV 41, F7 Output Location

CV 42, F8 Output Location

CV 43, F9 Output Location

CV 44, F10 Output Location

CV 45, F11 Output Location

CV 46, F12 Output Location

LIGHTING CONTROL CVs

CV 49, HL Lighting Control Register

CV 50, BL Lighting Control Register

CV 51, FX3 Configuration

CV 52, FX4 Configuration

CV 55, FX7 Configuration

CV 56, FX8 Configuration

CV 57, Fwd Directional Control

CV 58, Rev Directional Control

CV 59, Lighting Flash Rate

CV 60, Grade Crossing Hold Time

CV 61, Brightness Register 1

CV 62, Brightness Register 2

CV 63, Dimmer Level Register

CV 64, Master Brightness

SPEED TABLE CVs

CV 65, Kick Start

CV 66, Forward Trim

CV 67 - 94, Speed Table

CV 95, Reverse Trim

FIRMWARE REVISION INFORMATION CVs

CV 105, Major Firmware Revision

CV 106, Minor Firmware Revision

PRIMARY SOUND CONTROL CVs

CV 112, Sound Configuration 1

CV 113, Quiet Mode Control 2

CV 114, Engine Exhaust Control

CV 116, Dynamic Braking Rate

CV 117, F11 Braking Rate

CV 118, F11 Independent Brake

CV 119, Max Recovery Speed

SOUND SELECTION CVs

CV 120, Horn Select

CV 121, Auxiliary Horn Select

CV 122, Bell Select

CV 123, Exhaust Select

CV 124, Air Compressor Select

CV 125, Poppet

CV 126, Coupler Select

MIXER CVs

CV 128, Master Volume Control

CV 129, Channel 0 Mixer Level (Horn)

CV 130, Channel 1 Mixer Level (Bell)

CV 131, Channel 2 Mixer Level (Engine)

CV 132, Channel 3 Mixer Level (Air Comp)

CV 133, Channel 4 Mixer Level (Dynamic Brake)

CV 134, Channel 5 Mixer Level (Fan)

CV 135, Channel 6 Mixer Level (Alarm Bell)

CV 136, Channel 7 Mixer Level

CV 137, Channel 8 Mixer Level (Coupler)

CV 138, Channel 9 Mixer Level (Train Brake)

CV 139, Channel 10 Mixer Level (Brake Squeal)

CV 140, Channel 11 Mixer Level (Brake Release)

CV 141, Channel 12 Mixer Level

CV 142, Channel 13 Mixer Level

CV 143, Channel 14 Mixer Level (Poppet Valve)

CV 144, Channel 15 Mixer Level (Steam Generator)

CV 145, Channel 16 Mixer Level (Cab Door)

CV 146, Channel 17 Mixer Level

CV 147, Channel 18 Mixer Level (Relays)

DCC & SOUND

CV 148, Channel 19 Mixer Level (E-Stop)
CV 149, Channel 20 Mixer Level (Uncouple)
CV 150, Channel 21 Mixer Level (All Aboard/Doors)
CV 151, Channel 22 Mixer Level
CV 152, Channel 23 Mixer Level
CV 153, Channel 24 Mixer Level (Clickety-Clack)
CV 154, Channel 25 Mixer Level (Sander)
CV 155, Channel 26 Mixer Level (Fuel Loading)
CV 156, Channel 27 Mixer Level (Air Conditioner)
CV 157, Channel 28 Mixer Level (Wrench)
CV 158, Channel 29 Mixer Level (Pneumatic Oiler)
CV 159, Channel 30 Mixer Level (Toilet Dump)
CV 160, Channel 31 Mixer Level (Cab Chatter)
CV 161, Channel 0 FX Bus Send (Whistle)
CV 162, Channel 1 FX Bus Send (Bell)
CV 163, Channel 2 FX Bus Send (Prime Mover)
CV 164, Channel 3 FX Bus Send
CV 165, Channel 4 FX Bus Send
CV 166, Channel 5 FX Bus Send
CV 167, Channel 6 FX Bus Send
CV 168, Channel 7 FX Bus Send
CV 169, Channel 8 FX Bus Send
CV 170, Channel 9 FX Bus Send
CV 171, Channel 10 FX Bus Send
CV 172, Channel 11 FX Bus Send
CV 173, Channel 12 FX Bus Send
CV 174, Channel 13 FX Bus Send
CV 175, Channel 14 FX Bus Send
CV 176, Channel 15 FX Bus Send
CV 177, Channel 16 FX Bus Send

CV 178, Channel 17 FX Bus Send
CV 179, Channel 18 FX Bus Send
CV 180, Channel 19 FX Bus Send
CV 181, Channel 20 FX Bus Send
CV 182, Channel 21 FX Bus Send
CV 183, Channel 22 FX Bus Send
CV 184, Channel 23 FX Bus Send
CV 185, Channel 24 FX Bus Send
CV 186, Channel 25 FX Bus Send
CV 187, Channel 26 FX Bus Send
CV 188, Channel 27 FX Bus Send
CV 189, Channel 28 FX Bus Send
CV 190, Channel 29 FX Bus Send
CV 191, Channel 30 FX Bus Send
CV 192, Channel 31 FX Bus Send
AUTOMATIC SOUND CONTROL CVs
CV 193, Bell On Speed
CV 194, Bell On Time
CV 195, Coach Door Counter
CV 196, Brake Squeal Sensitivity
CV 197, Analog Auto Sound Enable 1
CV 198, DCC Auto Sound Enable 1
CV 200, Pop Valve Repeat Rate
TASK PROBABILITY CVs
CV 201, Task 0 Prob. Level (Cab Door)
CV 202, Task 1 Prob. Level (Fuel Loading)
CV 203, Task 2 Prob. Level (Wrench)
CV 204, Task 3 Prob. Level (Pneumatic Oiler)
CV 205, Task 4 Prob. Level (Cab Chatter)
CV 206, Task 5 Prob. Level (Toilet)

CV 207, Task 6 Prob. Level (Air Conditioner)
CV 208, Task 7 Prob. Level (Relays)
ADVANCED MOTOR CONTROL CVs
CV 209, PID Kp Coefficient
CV 210, PID Ki Coefficient
CV 211, Low Speed Compensation
CV 212, BEMF Feedback Intensity
CV 213, BEMF Sample Period
CV 214, BEMF Sample Window Size
CV 215, BEMF Reference Voltage
CV 216, Motor Speed Step Deadband
CV 217, Motor Control Register
CV 218, Analog Motor Start Voltage Offset
CV 219, Analog Sound Start Voltage Offset
CV 220, Constant Brake Distance
CV 223, Pitch Shift
EQUALIZER & REVERB CONTROL CVs
CV 224, High-Pass Filter Cutoff
CV 225, EQ Control Register
CV 226, 62 Hz Cut/Boost
CV 227, 125 Hz Cut/Boost
CV 228, 250 Hz Cut/Boost
CV 229, 500 Hz Cut/Boost
CV 230, 1 kHz Cut/Boost
CV 231, 2 kHz Cut/Boost
CV 232, 4 kHz Cut/Boost
CV 233, Reverb Control Register
CV 234, Reverb Output Level
CV 235, Reverb Delay Time

CV 236, Reverb Feedback Gain Level
CV 241, Analog Mode Function 3
CV 242, Analog Mode Function 4
CV 243, Analog Mode Function 5
CV 245, Consist Function Enable F13-20
CV 246, Consist Function Enable F21-28
CV 247, Consist Enable Stop/Drive Functions
IDENTIFICATION CVs
CV 253, ID Byte 1
CV 254, ID Byte 2
CV 255, ID Byte 3
CV 256, ID Byte 4
EFFECT MAPPING CVs
CV 1.257, Headlight
CV 1.258, Backup Light
CV 1.259, FX3 Effect
CV 1.260, FX4 Effect
CV 1.261, FX5 Effect
CV 1.262, FX6 Effect
CV 1.263, FX7 Effect
CV 1.264, FX8 Effect
CV 1.265 - 1.272, Reserved
CV 1.273, Dimmer
CV 1.274, Mute
CV 1.275, Independent/Train Brake
CV 1.276, Half-Speed
CV 1.277, Momentum Override
CV 1.278, Grade Crossing Signal
CV 1.279, Forward Horn Signal
CV 1.280, Reverse Horn Signal

CV 1.281, Stop Horn Signal
CV 1.282, Reserved
CV 1.283, Brake Select
CV 1.284, Alternate Mixer
CV 1.285, RPM+
CV 1.286, RPM-
CV 1.287 - 1.296, Reserved
CV 1.297, Horn
CV 1.298, Bell
CV 1.299, Dynamic Brake
CV 1.300, Short Horn
CV 1.301, Straight-to-8
CV 1.302, General Service
CV 1.303, HEP
CV 1.304, Cab Chatter
CV 1.305, Coupler
CV 1.306, Uncouple
CV 1.307, SReserved
CV 1.308, Hand Brake
CV 1.309, Sander Valve
CV 1.310, Reserved
CV 1.311, All Aboard/Coach Doors
CV 1.312, Steam Generator
CV 1.313, Fuel Loading
CV 1.314 - 1.320, Reserved
CV 1.321, E-Brake Application
CV 1.322 - 1.384, Reserved
EFFECT AUXILIARY MAPPING CVs
CV 1.385, Headlight
CV 1.386, Backup Light

CV 1.387, FX3 Effect
CV 1.388, FX4 Effect
CV 1.389, FX5 Effect
CV 1.390, FX6 Effect
CV 1.391, FX7 Effect
CV 1.392, FX8 Effect
CV 1.393 - 1.400, Reserved
CV 1.401, Dimmer
CV 1.402, Mute
CV 1.403, Brakes
CV 1.404, Half-Speed
CV 1.405, Momentum Override
CV 1.406, Grade Crossing Signal
CV 1.407, Forward Horn Signal
CV 1.408, Reverse Horn Signal
CV 1.409, Stop Horn Signal
CV 1.410, Reserved
CV 1.411, Brake Select
CV 1.412, Alternate Mixer
CV 1.413, RPM+
CV 1.414, RPM-
CV 1.415 1.424, Reserved
CV 1.425, Horn
CV 1.426, Bell
CV 1.427, Dynamic Brake
CV 1.428, Short Horn
CV 1.429, Straight-to-8
CV 1.430, General Service
CV 1.431, HEP
CV 1.432, Cab Chatter

CV 1.433, Coupler
CV 1.434, Uncouple
CV 1.435, Reserved
CV 1.436, Hand Brake
CV 1.437, Sander Valve
CV 1.438, Reserved
CV 1.439, All Aboard/Coach Doors
CV 1.440, Steam Generator
CV 1.441, Fuel Loading
CV 1.442 - 1.448, Reserved
CV 1.449, E-Brake Application
CV 1.450 - 1.512, Reserved
ALTERNATE MIXER CVs
CV 2.289, Ch. 0 Alt. Mixer Level (Horn)
CV 2.290, Ch. 1 Alt. Mixer Level (Bell)
CV 2.291, Ch. 2 Alt. Mixer Level (Engine)
CV 2.292, Ch. 3 Alt. Mixer Level (Air Compressor)
CV 2.293, Ch. 4 Alt. Mixer Level (Dynamic Brake)
CV 2.294, Ch. 5 Alt. Mixer Level (Fans)
CV 2.295, Ch. 6 Alt. Mixer Level (Alarm Bell)
CV 2.296, Ch. 7 Alt. Mixer Level
CV 2.297, Ch. 8 Alt. Mixer Level (Coupler)
CV 2.298, Ch. 9 Alt. Mixer Level (Train Brake)
CV 2.299, Ch. 10 Alt. Mixer Level (Brake Squeal)
CV 2.300, Ch. 11 Alt. Mixer Level (Brake Release)
CV 2.301, Ch. 12 Alt. Mixer Level
CV 2.302, Ch. 13 Alt. Mixer Level
CV 2.303, Ch. 14 Alt. Mixer Level (Poppet Valve)
CV 2.304, Ch. 15 Alt. Mixer Level (Steam Gen)
CV 2.305, Ch. 16 Alt. Mixer Level (Cab Door)

CV 2.306, Ch. 17 Alt. Mixer Level
CV 2.307, Ch. 18 Alt. Mixer Level (Relays)
CV 2.308, Ch. 19 Alt. Mixer Level (E-Stop)
CV 2.309, Ch. 20 Alt. Mixer Level (Uncouple)
CV 2.310, Ch. 21 Alt. Mixer Level (AllAbrd/Drs)
CV 2.311, Ch. 22 Alt. Mixer Level
CV 2.312, Ch. 23 Alt. Mixer Level
CV 2.313, Ch. 24 Alt. Mixer Level (Click-Clack)
CV 2.314, Ch. 25 Alt. Mixer Level (Sander)
CV 2.315, Ch. 26 Alt. Mixer Level (Fuel Loading)
CV 2.316, Ch. 27 Alt. Mixer Level (Air Cond)
CV 2.317, Ch. 28 Alt. Mixer Level (Wrench)
CV 2.318, Ch. 29 Alt. Mixer Level (PneumaticOil)
CV 2.319, Ch. 30 Alt. Mixer Level (Toilet)
CV 2.320, Ch. 31 Alt. Mixer Level (Cab Chatter)
DIESEL ENGINE SOUND LIMITS & DDE CVs
CV 2.503, DDE Load Sensing Offset
CV 2.504, DDE Load Sensing Slope
CV 2.507, Exhaust Low Volume Limit
CV 2.508, Exhaust High Volume Limit
CV 2.509, DDE Attack Time Constant
CV 2.510, DDE Release Time Constant
CV 2.511, DDE Throttle Gain
CV 2.512, DDE Motor Load Gain
CLICKETY-CLACK CVs
CV 3.257, Clickety-Clack Axle Configuration
CV 3.258, Clickety-Clack Rate

DCC & SOUND

DC (analog)

Problem: No sound and/or locomotive will not operate when placed on the track in analog.

Solution: Check that your power supply is on and, if using block control, that the block your model is in is switched "on".

Solution: For sound-equipped locomotives, they will remain silent and non-functioning until the throttle is turned up to about 7.5 volts. You will get the most consistent operation at voltages in the 9–14V range

Problem: Locomotive runs, but there is no sound when operating in analog.

Solution: Check to see if the master volume has been turned down. Access to a DCC system will be needed to check this. The master volume CV is 128; try adjusting its value (range, lowest to highest, is 0–255) until sounds are heard.

Problem: Locomotive operates, but very erratically.

Solution: Check the wheels and track for any dirt that may be interrupting electrical contact. There are many commercially available wheel cleaning solutions, tools, and various techniques to help keep your wheels and track clean, which is vital for smooth, reliable operation in analog or DCC.

DCC

Problem: No sound and/or locomotive will not operate when placed on the track when using DCC.

Solution: Check that your power supply and DCC system are on and supplying track power.

Solution: Make sure the proper address is entered on your DCC system. All Athearn Genesis Tsunami2-equipped models have a default address of 3.

Problem: Locomotive sound and lights function, but locomotive will not move.

Solution: Make sure the locomotive is still not set up in a consist from previous operation. For more information about consisting, consult your DCC System's owners manual.

Problem: Locomotive runs, but there is no sound when using a DCC system.

Solution: Check that the locomotive sounds have not been muted. Try toggling mute on/off with the F8 function on your DCC controller.

Solution: Check to see if the master volume has been turned down. The master volume CV is 128; try adjusting its value (range, lowest to highest, is 0–255) until sounds are heard.

Problem: Locomotive runs, but the lights do not operate in DCC.

Solution: The headlights are controlled by the F0 function, and the ditchlights are typically controlled by the F5 function. Try toggling these functions on/off with your controller.

If you are having problems with your locomotives operation or non-operation, please try resetting the Decoder to Factory Defaults before contacting Athearn Help for assistance.

Resetting the Decoder to Factory Defaults

All Tsunami2 sound decoders can be reset to their factory values easily. If you have changed some CVs and are not happy with the results, or your locomotive is not responding normally, this is the first troubleshooting step that you should try.

To do this, set CV 8 to a value of 8. Once you have done this, cycle the DCC system's power off for approximately 5–10 seconds, then turn it back on. You should observe the locomotive's lights blinking 16 times after a delay of about 10 seconds, indicating a successful factory reset. After a successful factory reset, your locomotive will respond to address 3 and all CV values will be returned to their factory supplied default values.

For technical assistance, please contact Athearn Product Support. For information on how to do so, please visit our web site at: www.athearn.com. For further Tsunami2 technical assistance, please contact SoundTraxx Support at 1-888-789-7637 (toll-free), or via email at support@soundtraxx.com

Horizon Hobby, LLC 1-Year LIMITED WARRANTY on Athearn Model Railroad Products

What this Warranty Covers:

Horizon Hobby, LLC, (Horizon) warrants to the original purchaser that the product purchased (the "Product") will be free from defects in materials and workmanship for a period of 1 year from the date of purchase and less than 6 years from the date of announcement.

What is Not Covered:

This warranty is not transferable from the original purchaser and does not cover (i) cosmetic damage, (ii) damage due to acts of God, accident, misuse, abuse, negligence, commercial use, improper use, installation, operation, maintenance, or damage due to lack of or improper lubrication, (iii) modification of or to any part of the Product, (iv) attempted service by anyone other than a Horizon Hobby authorized service center, (v) excessive voltage applied to any electronic circuitry or soldering of any electronic components, (vi) light bulbs, LEDs or traction tires which are considered normal wear items, (vii) Product not purchased from an authorized Horizon Athearn dealer, or (viii) Products older than 6 years from the date of announcement.

Visit www.athearn.com to find each product's announcement date. Visit www.athearn.com/storelocator/ to find authorized Horizon Athearn dealers.

OTHER THAN THE EXPRESS WARRANTY ABOVE, HORIZON MAKES NO OTHER WARRANTY OR REPRESENTATION, AND HEREBY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER'S INTENDED USE.

Purchaser's Remedy Horizon's sole obligation and purchaser's sole and exclusive remedy shall be that Horizon will, at its option, either (i) service, or (ii) replace, any Product determined by Horizon to be defective. Horizon reserves the right to inspect any and all Product(s) involved in a warranty claim. Service or replacement decisions are at the sole discretion of Horizon. Proof of purchase is required for all warranty claims.

SERVICE OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY. Limitation of Liability HORIZON SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY, REGARDLESS OF WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, TORT, NEGLIGENCE, STRICT LIABILITY OR ANY OTHER THEORY OF LIABILITY, EVEN IF HORIZON HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Further, in no event shall the liability of Horizon exceed the individual price of the Product on which liability is asserted. As Horizon has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability. If you as the purchaser or user are not prepared to accept the liability associated with the use of the Product, purchaser is advised to return the Product immediately in new and unused condition to the place of purchase. Law: These terms are governed by Illinois Law (without regard to conflict of law principals). This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Horizon reserves the right to change or modify this warranty at any time without notice.

Warranty Services:

Questions, Assistance, and Services Your local hobby store and/or place of purchase cannot provide warranty support or service. Once assembly, setup or use of the Product has been started, you must contact Horizon's Athearn office directly or your local distributor outside of North America. This will enable us to better answer your questions and service you in the event that you may need any assistance. For questions or assistance, visit our site at: www.Athearn.com/About/Contact.aspx.

Inspection or Services: If this Product needs to be inspected or serviced, please do the following:

- 1) Obtain an RMA number: go to www.athearn.com/about/contact.aspx and select the "Technical support, product information and warranty RMA" option or call us at the service phone listed. Provide the requested information, and in the comments section describe the nature of the problem, Athearn stock number, your name, return address, and a phone number where you may be reached during business hours. We will respond via e-mail with your RMA number.
- 2) Pack the unaltered, original Product carefully and securely using the original plastic shell, foam packing, any axle spacers, and plastic slip sheets top and bottom into the original box with the Athearn label with item and description on the box end, inside an outer shipping carton, being careful to use adequate void fill materials to prevent movement in shipping and any associated damage. Damage in transit is not a covered warranty repair and will have to be photographed and communicated to you, and can only be corrected with pre-payment which will cause significant delay. Please note that original boxes are not designed to withstand the rigors of shipping without additional protection. When sending product to Horizon's Athearn office, you must include inside the box: the RMA number, a description of the problem, Athearn stock number of included items, your name, return address, and a phone number - or you can just include a printout of your Athearn RMA e-mail. ***A copy of your original sales receipt must be included for warranty consideration.***
- 3) Ship prepaid via a carrier that provides tracking and insurance for lost or damaged parcels, as Horizon is not responsible for merchandise until it arrives and is accepted at our facility. Address your shipment to the location to be found at: www.athearn.com/about/contact.aspx.

Be sure to include inside the carton a printout of your RMA e-mail with your legibly written name, return address, the nature of the defect, and RMA number. Make sure your carton also has your return address and RMA number legibly written on the exterior. Shipping, packing, and packaging costs to Horizon Athearn for warranty repair are not a covered expense.

PRODUCTS NOT MEETING THE ABOVE REQUIREMENTS WILL BE REFUSED FOR DELIVERY.

Warranty Requirements: For Warranty consideration, you must include your original sales receipt verifying the proof-of-purchase date. Provided warranty conditions have been met, your Product will be serviced or replaced free of charge. Service or replacement decisions are at the sole discretion of Horizon.

Non-Warranty Service: Should your service not be covered by warranty, service will be completed and payment will be required without notification or estimate of the expense unless the expense exceeds 50% of the retail purchase cost. By submitting the item for service you are agreeing to payment of the service without notification. Service estimates are available upon request. You must include this request with your item submitted for service. Non-warranty service estimates will be billed a minimum of ½ hour of labor. In addition you will be billed for return freight. Horizon accepts money orders and cashier's checks, as well as Visa, MasterCard, American Express, and Discover cards. By submitting any item to Horizon for service, you are agreeing to Horizon's Terms and Conditions found on our website <https://www.horizonhobby.com/service-center.html>. Product sent for repair only must follow all of the preceding steps, including the inclusion of the RMA number on the outside of the carton to avoid delivery refusal.

ATTENTION: Horizon service is limited to Product compliant in the country of use and ownership. If received, a non-compliant Product will not be serviced. Further, the sender will be responsible for arranging return shipment of the un-serviced Product, through a carrier of the sender's choice and at the sender's expense. Horizon will hold non-compliant Product for a period of 60 days from notification, after which it will be discarded.

Supplier's Declaration of Conformity 47 CFR § 2.1077 Compliance Information

Model Name: Athearn Genesis Tsunami2 8-function
Model Description: TSU-GN-2208
Responsible Party – U.S. Contact Information
Horizon Hobby, LLC
2904 Research Rd.,
Champaign, IL 61822
Email: compliance@horizonhobby.com
Web: HorizonHobby.com

FCC Compliance Statement This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. CAUTION: CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help