



BIG BOY
4-8-8-4



Jack Pfeifer photo

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HISTORY

The Union Pacific was built as the eastern portion of the Transcontinental Railroad. The original line was built west from Omaha across Nebraska and Wyoming, into Utah to a meeting with the Central Pacific at Promontory. Within a few years the junction was moved east to Ogden. In the early 1900s, the mainline of the Los Angeles and Salt Lake, an UP subsidiary, joined the original Overland Route at Ogden. The majority of UP's traffic went through Ogden.

The line across the Nebraska prairies from Omaha to Cheyenne, Wyoming had no serious grades as it followed the Platte River most of the way. West from Cheyenne, it was a much different story. First, the railroad had to cross the Continental Divide on Sherman Hill. West of Sherman Hill, the railroad encountered several grades near one percent as it traversed the Basin and Range country. Eastbound trains faced their toughest challenge immediately after leaving Ogden. The Echo Canyon line through the Wahsatch Mountains was the steepest grade on Union Pacific's part of the Overland Route. It meant that most of UP's eastbound traffic had to contend with the grade.

From 1918 through 1924, UP acquired a group of 65 compound 2-8-8-0 locomotives to replace double-headed 2-8-0s on the grades of Wyoming and Utah. The 2-8-8-0s could handle the tonnage, but being compounds with 57-inch drivers, they were not very fast. 2-10-2s, three-cylinder 4-10-2s, and the three-cylinder "Union Pacific" type 4-12-2s were also used. They could not handle as much tonnage, and the 2-8-8-0s remained the primary locomotive between Cheyenne and Ogden. By the 1930s, speed was becoming a much bigger factor, but with the grades, pulling power was still the most important part. UP finally found a solution by splitting the 4-12-2 design into a simple articulated locomotive. This resulted in the Challenger 4-6-6-4 locomotives. Fifteen Challengers were delivered in 1936 and twenty-five more in 1937.

The Challengers were much faster than the 2-8-8-0s and only marginally less powerful. They were equipped with 69-inch drivers and designed for 80 miles per hour. The Challengers were rated at over 5,000 tons across Nebraska and 4,290 tons across Wyoming. But on the grade over the Wahsatch Mountains, they were limited to 3,100 tons eastbound. UP wanted something that could make the same speeds as the

Challengers and could handle the same 4,290-ton trains over the Wahsatch without a helper. In 1940, Union Pacific President William Jeffers gave orders to the Department of Research and Mechanical Standards.

Formed in 1936, the Department was under the leadership of Vice President Otto Jabelmann. The easiest solution was to scale up the successful Challenger design by adding another pair of drivers to each half of the locomotive making a 4-8-8-4 design. The task before Jabelmann's department was to fit such a large machine into the real world. To be of any use, the new locomotive had to negotiate the existing curves and fit within the weight limits of the railroad's bridges.

Big Boy Locomotive Weights and Dimensions		
	4000 - 4019	4020 - 4024
Tractive Effort	137,375 Lbs.	137,375 Lbs.
Cylinders, diameter and stroke (4)	23.75 in. x 32 in.	23.75 in. x 32 in.
Driver diameter	68 in.	68 in.
Grate area	150 sq. ft.	150 sq. ft.
Steam Pressure	300 Psi.	300 Psi.
Total Evaporating Heating Surface	5,889 sq. ft.	5,755 sq. ft.
Superheater Type	Type E	Type A
Superheating Surface	2,466 sq. ft.	2,043 sq. ft.
Total Engine Weight	762,000 Lbs.	772,250 Lbs.
Weight on Drivers	540,000 Lbs.	545,200 Lbs.
Boiler Diameter	95 in.	95 in.
Driving Wheel base (each)	18 ft. 3 in.	18 ft. 3 in.
Driving Wheel base (total)	47 ft. 3 in.	47 ft. 3 in.
Total Engine Wheel base	72 ft. 5 in.	72 ft. 5 in.
Engine Length	85 ft. 9 in.	85 ft. 9 in.
Tender Weight (full load)	427,500 Lbs.	436,500 Lbs.
Tender Coal Capacity (level)	28 tons	28 tons
Tender Water Capacity	24,000 gal.	25,000 gal.
Tender Length	47 ft.	47 ft.
Overall Wheel base	117 ft. 7 in.	117 ft. 7 in.
Overall Length	132 ft. 10in.	132 ft. 10 in.
Total Weight (full load)	1,189,500 Lbs.	1,208,750 Lbs.

They had an advantage in that the new locomotive was intended for a limited operating area, where the mainline was engineered for high-speed and heavy traffic. The basic Challenger design was lengthened, given a larger firebox, and larger cylinders, while the driver diameter was reduced one inch to 68 inches. Other changes were the result of improved technology such as the cast frame with integral cylinders instead of the built up frames of the Challengers. Like the Challengers, they were designed to burn the semi-bituminous coal from Wyoming mines. The tender used the successful "centipede" design from the 1939 built 4-8-4s. The coal and water capacity was based on calculations of usage on a run through Echo Canyon with yard delays and meets factored in.

Not every limitation could be overcome. One was the length of the locomotive. The boiler overhang would have resulted in sideswipe collisions on some double track curves. These curves were widened a few feet to eliminate that problem. The length also meant the new locomotive was too long for existing turntables, so new 135 foot turntables were installed at Ogden and Green River, the western and eastern terminals for the planned operation of the new locomotive.

In 1941, UP placed an order for twenty 4-8-8-4's, numbers 4000 — 4019, with the American Locomotive Company, or ALCO as it is better known. Each engine cost \$265,174. According to legend, an unidentified machinist at the ALCO plant is responsible for the name "Big Boy", having written it in chalk on a partially complete locomotive. Although there is some evidence that UP intended to call it's newest and largest locomotives "Wahsatch" in honor of the grade they were built to overcome, the Big Boy name stuck.

The first Big Boy, number 4000, was formally accepted by the UP at Omaha at 6 P.M. on September 5, 1941. Traffic during World War Two resulted in 5 more Big Boys, numbers 4020 — 4024, being built in 1944. These were slightly heavier due to wartime restrictions of various metals and had a different arrangement of boiler tubes and flues.

In service, the Big Boys started out on the Ogden to Green River segment. A typical freight train powered by a Big Boy took four hours to go the 75 miles from Ogden to Evanston, Wyoming, consuming 20 tons of coal and 12 to 13 thousand gallons of water. Big Boys were also cleared to run from

THE MODEL

Ogden to Pocatello, Idaho and from Granger, Wyoming to McCammon, Idaho, but they were not used on those lines. Because Cheyenne was their home shop for heavy work, the Big Boys regularly ran from Ogden to Cheyenne for shopping. When released from the shop, it was customary to use the Big Boy as a helper for Sherman Hill for a few runs before releasing it back to the freight pool. Before long, the run from Ogden to Cheyenne was the normal Big Boy operating area. Each Big Boy ran about 7,000 miles each month throughout their careers. Producing about 6,000 horsepower, the Big Boys were very well suited to hustling hot Pacific Fruit Express trains over the grades of Wyoming.

Big Boys had been cleared to run the LA&SL to Los Angeles from the beginning with some speed restrictions on the tighter curves found in several areas. None ran into Nevada or California, but during World War Two, traffic on the LA&SL route to Southern California was near the line's peak capacity. Several Big Boys operated for a while from Salt Lake City to Milford, Utah to see if their power could ease the traffic crunch. Since the LA&SL used oil instead of coal, a clamshell coal loader was used at Lynndyl, Utah to supply coal to the Big Boys. The biggest problem encountered was the lack of water and very poor quality of the water found in the desert.

Another experiment was the conversion of number 4005 to an oil burner just after the end of World War Two. The experiment was not a success as only one burner was installed and it heated just one spot of the crown sheet so much that the crown sheet leaked considerable amounts of water into the firebox. After a short period of testing, the 4005 was converted back to coal. Without dieselization, it is probable that more Big Boys would have been acquired including oil burners for the LA&SL.

Despite the influx of diesels following World War Two, the Big Boys and Challengers remained the prime power on the Overland Route from Ogden to Cheyenne. Helpers were used on Sherman Hill including double-headed Big Boys. They also saw service as helpers, leading gas turbines and diesels over Sherman Hill. They remained active on through the 1950s, not being retired until the early 1960s.



Jack Pfeifer Collection

- G9150 BIG BOY UNDECORATED W/O DEFLECTORS
- G9151 BIG BOY UNDECORATED W/ DEFLECTORS
- G9152 BIG BOY #4005
- G9153 BIG BOY #4006
- G9154 BIG BOY #4019 WITH DEFLECTORS
- G9155 BIG BOY #4024



Dave Martindell photo, Clayton Tinkham collection



Model Features

The Genesis™ 4-8-8-4 Big Boy is the culmination of the art of design and tooling integrating the latest innovations in electronic technology. The Big Boy model has been developed from its inception as the finest three dimensional operating miniature representation of the prototype available.

Enclosed in the premium quality box are the following items:

1. History and Instruction Book that includes a warranty and instruction card
2. HO scale 4-8-8-4 Big Boy Locomotive
3. HO scale tender with full electronics package installed
4. Hand Held Wireless DC Controller

Upon inspecting the locomotive and tender note the many details that have been incorporated in its construction.

Locomotive and tender features

- Boiler backhead with full details and printed manual controls.
- Individually applied detail parts such as piping, valves, generators, etc.
- Blackened metal RP25 wheels.
- Eccentric cranks operating on both sides in correct direction.
- Front and rear engines (cylinders and coupled drive wheel sets) both pivot in order to manage 18" radius curves.
- Pilot has open/closed positions. Coupler pocket can be inserted to mount coupler.
- Adjustable cab windows.
- Headlights and tender lights have directional light change, while the number boards are permanently illuminated.
- Five-pole, skewed armature motor with two fly-wheels with very smooth-running features.
- Cab hatches can be either closed or open.
- See-through running boards.

- Each undecorated version includes all parts for that specific version.
- Locomotive is smoke-unit-ready. No soldering needed.
- 6-pin connector plug between loco and tender.
- Current pick-up on all 16 driver wheels and 8 tender wheels.
- Consumer-friendly disassembly features for spare part replacement.
- Detailed instruction sheets with exploded view drawings and history booklet.
- Cabin is closed with opening door feature.

Prototype Specific Features

- Coal load.
- Coal rack for additional coal storage.
- Wood tender deck.
- Smoke deflectors.
- Ashpans applied to coal fueled versions only.
- Closed cab with opening door feature.



Sound and DCC Features

The installation of sound in a locomotive adds a new dimension to operation. Sound makes a technically perfect static model come alive and enhances the experience of operation. You will find that you will no longer "run" the engine but, rather, operate it in the context of your layout. Whether you are using conventional DC control or a DCC system, the incorporation of advanced electronic technology will provide the ultimate railroading experience.

The Genesis™ Big Boy Locomotive includes a factory installed Dual Function DCC Decoder with speakers. The board is mounted in the tender. The DCC decoder automatically senses the power supply type (either DC or NMRA compliant DCC system) that is being used and will operate without intervention from the user.

Hand-Held Wireless Controller

Included with the Big Boy locomotive is a hand-held wireless controller. When operating with conventional DC, this control unit is designed specifically to allow control of the speed and direction of the locomotive as well as these six individual sound functions:

- Bell
- Whistle
- Water Injector
- Air Release
- Blower Hiss
- Fire Box Door

These are more sound features than have been previously available to the conventional DC user in any format. The Genesis™ Big Boy Locomotive will operate on DC without the use of this hand held, however, only the steam chuff sounds will be available in this operational mode.



The 12-volt transmitter battery, # A23-12, is available at any electronics or office supply store.

DCC Features:

The decoder provided with the Genesis™ Big Boy Locomotive will operate with any NMRA compatible DCC system. The default setting is address 3. The decoder is rated at 2 amps and will support either 2 or 4 digit addresses. The decoder functions are fully programmable by the adjustment of CVs. A CV table is included in the operating instructions. Either 14 speed steps or 28/128 speed steps are supported by this system. Available accessory and sound functions are as follows:

- Directional Lighting
- Whistle (12 types)
- Coupling
- Sound On/Off
- Water Injector
- Cylinder Cock/Flange squeal
- Conductor's Voice or rail clack
- Bell (4 types)
- Air Release
- Brake Squeal
- Fire Box Door
- Sand Release
- Blower Hiss

In addition to Function Ø (Directional lighting) there are nineteen additional sound functions to allow the operator to capture the full range of unique sounds found on an operating steam locomotive. You can now fully immerse yourself in the complexities of prototype operation and add a new level of realism to your railroading experience.

Dual-Function decoder is made by Model Rectifier Corporation for Athearn, Inc.

OPERATION

Your new Genesis™ Big Boy Locomotive comes factory equipped with a state-of-the-art Dual Function decoder. This means your locomotive will run on any NMRA compatible DCC system or on any regular DC Train Control (HO power pack).

Caution: Do not run your new Genesis™ Big Boy Locomotive with power packs intended for “G” scale [do not exceed 18 V DC] as you may damage the locomotive circuitry. Also, never operate your locomotive with a transformer designed for use with AC powered model trains, O-27 trains or some European HO models. Some DCC systems also come equipped with a switch for extra voltage for larger scales [“O” or “G”] but if you use your locomotive on this setting damage will occur to the on-board electronics due to the higher constant track voltage [22 volts].

When running on a DC power pack, this locomotive features a wireless radio control. This makes accessing the sound functions and running the locomotive more convenient when following your train around the layout. The transmitter (battery included) that comes with your locomotive has the following functions:

1. Button 1 [Bell Button] will start or stop the bell sounds.
2. Button 2 [Whistle Button] will operate the steam whistle.
3. Button 3 [Speed down Button] will decelerate the locomotive. Press Button 3 when the locomotive is stopped and you will hear an air release sound.
4. Button 4 [Speed up Button] will accelerate the locomotive. When the locomotive has reached its maximum speed, pressing Button 4 will activate the sound of the fire box door opening and closing.
5. Button 5 [Direction Button] should be used after bringing the locomotive to a stop. If pressed while the locomotive is moving, the locomotive will slow down to a gradual stop, change its direction and then gradually speed up. This is also a built in safety feature. Press Button 5 when the locomotive is in idle (25%–35% throttle setting) to activate the blower hiss sound.
6. Button STP [Stop Button] will bring the locomotive to a gradual stop. This is a built in safety feature. Press Button STP while the locomotive is stopped and you will hear the water injector sound.

NOTE: If you turn the "Load Control" feature on (CV #123 from 0 to 1) while using this locomotive on a DCC layout, this changes the operation of this locomotive in the analog DC mode. To operate this locomotive on analog DC, you must use the transmitter as your main control, your powerpack just supplies the constant track voltage. Adjust your throttle control to your desired top speed setting, [do not exceed 18 vdc]. The locomotive will start to idle, now use your transmitter to control the speed and direction of your locomotive. If you want to use your powerpack's throttle control to run this locomotive, please have someone with a DCC system disable the "Load Control" feature by changing CV #123 to a value "0"..

DC Operation-(Analog Mode)

To set up your Hand Held Controller and operate your locomotive with a DC power pack, follow these easy directions:

1. Install the battery in the transmitter.
2. Connect the wires from your DC power pack's "variable track terminals" to your track.
3. Place the locomotive on the track making sure all wheels are aligned correctly to avoid short circuits, which can possibly damage your locomotive circuitry and power pack.
4. Turn the switch on the power pack to ON.
5. Slowly adjust the throttle until you hear the locomotive begin to idle. Only during idle can you use the direction switch on the power pack to change the locomotive's direction. Either the headlight or back-up light will illuminate to indicate the locomotive's direction. Once the locomotive begins moving, you cannot use the direction switch on the power pack to change direction. You can only use the transmitter to change the locomotive direction while it is moving. This feature allows you to control another analog locomotive on the same track. **NOTE: Your new Genesis™ Big Boy Locomotive will always remember its last direction of operation regardless of the position of the direction switch on the power pack.**
6. When you use the power pack's throttle to control the locomotive's speed, the top speed will be limited by the transmitter's speed setting. When you use the transmitter to control the locomotive's speed, the top speed will be limited by the power pack's throttle setting.
7. If the locomotive's top speed is too low, do not set the power pack's throttle to maximum. We recommend you set the throttle to 60%-70% and use the transmitter to control

the locomotive speed. This will give you the best operating range.

8. *Never* exceed 18 volts DC to the track in analog operation. Excessive track voltage may damage the locomotive's circuitry. *Never try to operate the locomotive on AC power.*
9. If the transmitter's range begins to decrease, the battery needs to be replaced. On larger layouts, or if your layout is in a room that has a lot of radio interference, (metal pipes, screen wire scenery, etc.) we recommend that you hold the transmitters antenna wire close to, or touching, the running rails of the layout if the locomotive is traveling far from your position.
10. We recommend you always use the power pack's throttle to control the locomotive's speed. Not only will you get a smoother speed control, but the battery life will be extended.
11. Whenever you feel that the locomotive is not operating properly you should move the throttle to zero or 25%-35% throttle setting (depending on your power pack) and slowly move the throttle up again to control the locomotive.
12. If you hear the locomotive say "Program" while running in the analog DC mode, do not press any buttons on the transmitter. Power down with the power pack's throttle to zero, bringing your train to a gradual stop. Then turn the power pack's on/off switch to "off" to reset your locomotive. (Entering program mode might occur if you are attempting to use the stop button [STP] while the locomotive is traversing a long dirty section of track. The locomotive will read this as a power down/ power up sequence.) If you press any buttons on the transmitter at this time you can change some of your settings inadvertently.

Programming in DC Operation-(Analog Mode)

While in analog mode, you can program the chuff rate [up or down], chuff starting point, and you can also select different bells or whistles.

NOTE: Please wait at least 2 seconds between button presses when in the Program Mode. Multiple, rapid pressing of buttons will confuse the system.



1. Place the locomotive on track
2. Turn the power switch on the power pack to ON
3. Slowly turn the throttle until the idle sounds come on. Once the idle sounds steady out, leave the throttle as is, and turn the power pack's power switch to off.
4. Enter the program mode by pressing and holding the Stop Button [STP] while you turn the power switch back on. When the locomotive says "Program," quickly release the stop button. The locomotive will say "Program" a second time, this will confirm that you are now in the Program Mode.
5. Press Button 4 [Speed up Button] or Button 3 [Speed down Button] to increase or decrease the chuff rate. Each press of the button adjusts the chuff rate by one unit. You will hear a steam release after each press of the button as an audible confirmation.
6. Press Button 2 [Whistle Button] to toggle between the different types of whistles. Once you hear a type of whistle you like, stop pressing the button.
7. Press Button 1 [Bell Button] to toggle between the different bell types. Once you hear a bell you like, stop pressing the button.
8. Press Button 5 [Direction Button] to change the master volume of the locomotive. There is no "off", but there are 3 levels of volume control—low, middle, and maximum.

9. To reset the locomotive back to it's factory defaults; Press the Stop Button [STP] 5 times. Wait at least 2 seconds between presses. After each press the locomotive will say "program," After the 5th press, you will hear "program" followed by a steam hiss. This confirms that the reset process is completed.
10. Once finished programming, turn the power switch on the power pack to OFF. This will reset the locomotive and lock in your programming. To resume operation, follow the steps under "DC Operation."

NOTE—When programming the chuff rate, it is recommended that after each press of the buttons, leave the program mode and run the locomotive. If the chuff rate is still not to your liking, re-enter the Program Mode and try the next setting. It takes some experimentation on the part of the user to get these rates as close as possible.

Manual Volume Control

Located on the top of the tender, towards the rear, there are 3 oval hatches. Remove the middle hatch and use a small flat-bladed jeweler's screwdriver to adjust the volume. Adjustment this volume control lowers or raises the overall volume of the locomotive, not individual sound volumes.

TIPS for Analog Operation

1. Turn up the throttle until sounds start and locomotive idles.
2. Select the locomotive's direction either with the direction switch on the power pack or by the transmitter.
3. Slowly start your locomotive moving by using the power pack's throttle to set desired top voltage setting.
4. Once underway, press and hold Button 4 [Speed up Button] or Button 3 [Speed down Button] until you reach the desired speed.



5. If the top voltage setting at maximum speed is too low, use the power pack's throttle to adjust the top voltage setting.
6. To conserve battery life, use the throttle to control locomotive speed and use the transmitter to activate sounds.
7. When finished running your locomotive, turn your power-pack throttle to OFF and turn off the power pack's power switch. Any programming changes made in DC analog mode will affect any prior DCC mode settings.

NOTE- Whenever you use the transmitter to control speed, direction, or stop, [button numbers 3,4,5, and STP], this will over ride your power pack's throttle control. If you want to regain use of the power pack's throttle, use the transmitter to bring the loco to a stop. Then bring your power pack's throttle knob to approx. the idle setting, then flip your power packs direction switch. You will hear an audible air release, that lets you know that the power packs throttle is now in control.

DCC Operation- Digital Mode

Your new Genesis™ Big Boy Locomotive will operate on any NMRA compatible Digital Command Control [DCC] system. The dual-function decoder has the following features:

- Synchronized steam chuff with random sounds
- 2 amp capacity
- Programmable for either 2 digit, (1-127) or 4 digit, (1-9,999) addresses
- Programmable start voltage
- Programmable acceleration rate
- Programmable deceleration rate
- Programmable top voltage
- Programmable chuff rate
- Programmable volume
- Programmable 14-28/128 speed steps
- Directional lighting (FØ)
- 19 accessory sound functions, (F1-F19)
- Advanced consisting (CV19)
- OPS mode programming
- Compatible with NMRA DCC standard
- Complies with Part 15 of FCC Rules

NOTE- If you know someone with a DCC System, you can have them program the individual sound volume configuration variables [CV] to your liking.

The Genesis™ Big Boy Locomotive can be operated with the steam sounds on or off, by double clicking your headlight button (FØ). When the steam sounds are turned off, all associated sounds are also turned off.

Before attempting any programming, you should test run your locomotive first on address #3 (factory default), to make sure it works correctly out of the box. Run it forward and backwards,

test the bell and whistle. Turn the light on and off. If everything works correctly, then you can program the parameters that you want.

To acquire your locomotive, select it's current address on your DCC system (address #3 if it is just out of the box). Press any function button (other than F1 or F2) or bring the throttle up one click. These steps, after turning on your DCC system, acquire the locomotive's address, and now you can run it.

Once these steps have been performed, follow the included CV chart to program any new programming features you want into the locomotive. For best results, you should initially program your new Big Boy locomotive on a program track. You must know how to properly use your DCC system's programming mode to program any decoder. If you are unsure of programming a decoder with your system, please consult your DCC system's instruction book regarding programming or contact the manufacturer of your DCC system for proper guidance.

Programming for DCC Operation - Digital Mode

This decoder supports all program methods including register mode, paged mode, CV programming, direct mode and programming on the main (OPS mode programming). Program the locomotive the same way you would program any other NMRA compatible decoder with your DCC system.

NOTE- Some DCC systems do not have enough power on the Program Track for programming sound decoders. If your system is one of these, there are Program track Boosters available from aftermarket DCC supplier. NOTE- Because this locomotive has a dual function sound decoder on-board, it does not support CV read back features.

Additional Information

The dual-function decoder installed in this locomotive should perform well when used with any NMRA compatible DCC system. You should be familiar with your DCC system's programming and operating functions to get the most enjoyment out of any decoder equipped locomotive. For more information about Register/CVs and their functions, please refer to the NMRA DCC standards and recommended practices, RP-9.2.2. This is available directly from NMRA or on their website at www.nmra.org.

FCC Compliance

This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions:

- 1) This device may not cause harmful interference

- 2) This device must accept any interference received, including interference that may cause undesirable operation.

Troubleshooting

Always check the three steps below first if you encounter any trouble with your Big Boy Locomotive.

1. Make sure the plug between the locomotive and tender are securely connected.
2. When placing the locomotive on the tracks make sure all wheels are properly aligned as not to cause a short circuit.
3. Make sure battery is correctly installed in the transmitter, [DC analog use only].

Analog use:

1. **Locomotive does not make sounds or respond when power is applied to track.** Check that power pack is plugged in, and that wires to track are connected properly. Turn throttle to zero position, turn the power packs power switch to off, wait a few seconds, then try again as in the analog operation section of the instructions.
2. **Sounds do not activate with transmitter all the time.** Check battery power and change if needed. Different atmospheric conditions and/or metal pipes, conduits, and screen wire scenery can cause range problems. Try holding the transmitter antenna close to or on one of the running rails if the locomotive is far away from you.
3. **Locomotive does not idle, [starts moving at a low voltage], or locomotive makes idling sounds but does not move.** The decoder has a memory, and may not have been shut down correctly after it's last use, in the DC analog mode only. Turn the throttle up slowly to place locomotive in "True Idle". You can confirm the "True Idle" setting by changing the direction switch on your power pack. You will hear an audible steam noise and the headlight will change direction. If the headlight does not change direction, you are not in "True Idle". Turn the throttle voltage down slightly and try again. Once you are sure you are in "True Idle", flip the direction switch again to reset the decoder. This can occur in the DC analog mode with the "Load Control" feature in it's "off" setting.

DCC use:

1. **Locomotive runs on address #3, but will not take a 4 digit address.** Some DCC systems do not have enough power on the program Track to program sound decoders.
2. **Locomotive responds to Bell/Whistle functions but does not move.** CV #29 is not programmed correctly for either a 2 digit address or a 4 digit address. Input a value of "2" in



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CV29 for a 2 digit address, or a value of “34” in CV29 for a 4 digit address.

- 3. Locomotive idles but does not move or respond to functions.** Make sure you did not program the locomotive into an advanced consist, [CV #19]. In your DCC system’s “Program CV Mode”, input a value of “0” into CV #19.
4. Any misguided programming of values in the DCC mode can cause a decoder to malfunction. Always try to first set the decoder back to it’s factory defaults by using CV #125. If this does not work, try programming the following CV’s with the following values; CV1=3, CV17=0, CV18=0, CV19=0, CV29=2. If this does not work, try running the locomotive in the Analog D.C. Mode. If the locomotive runs in analog, chances are it will run in the DCC Mode, but the programming of the decoder is way off.
5. Reset the decoder in the Analog DC Mode. Perform the following steps using a DC power pack:
 1. Turn power packs on/off switch to on.
 2. Slowly bring up throttle until you hear hissing/idling sounds.
 3. Leaving throttle in it’s position, turn power switch off.
 4. Hold down program button, [#6/STP], on transmitter while turning power switch back on. You will hear decoder say “Program”. Release transmitter button, decoder will say “Program” again. This confirms you are in the analog DC program mode.
 5. Wait 2 seconds, press the program button, [#6/STP], again and listen for “Program”.
 6. Perform step #5 four more times, [total of 5 times].
 7. After you hear the decoder say “Program” after the 5th time, you will hear a steam release. This will confirm that the decoder has been reset to it’s factory defaults, [for both DC and DCC modes].
 8. Try running the locomotive again on DCC.
 9. Sometimes you may simply turn your power supply off and on again, and the locomotive will run again,
 10. If you are still having trouble with your Big Boy contact Athearn Trains for further assistance.

Lubrication and Maintenance of the Genesis™ 4-8-8-4 Big Boy

The Genesis™ Big Boy Locomotive has been carefully engineered to provide years of trouble free operation. However, as with all things mechanical, a small amount of care and maintenance is required to insure the flawless operation of this fine model. These simple procedures will provide the necessary information to give you years of trouble-free enjoyment.

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.

When not in use it is recommended that the locomotive and tender be stored in the protective sleeve in which it was packed. Also, store the wireless controller in the locomotive box with the battery removed.

When inspecting the underframe, make sure that all lint and dust are removed from the back of all wheel sets. Dirt build up in this area will foul the pick-up wipers and not allow proper electrical contact, negatively impacting performance.

Wheel Cleaning

The Genesis™ Big Boy Locomotive receives electric power from all drivers as well as eight of the tender wheels from both rails. This, coupled with the long overall wheelbase, provides for excellent electrical contact. There should be few cases of erratic performance due to poor contact. However, over time, dirt from the rails will accumulate on the wheel surfaces and will need to be removed to assure peak operation. The use of a cotton swab to apply either alcohol or a good quality

track cleaning solution is recommended. Carefully apply the solvents, taking care not to spill any on the painted surfaces. Alternatively, either an ink eraser or ‘Bright Boy’ abrasive block can be used to remove dirt deposits by carefully burnishing the wheel surfaces. When cleaning the wheels, also remove any dirt build up from the metal surfaces on the back rims of the wheels. This will assure that the wiper contacts will maintain good contact with the wheels.

Lubrication

This locomotive will arrive pre-lubricated from the factory and will not need additional lubrication until it has been run for quite some time. When it comes time to lubricate the locomotive, use only light weight oil and gear grease that is *plastic compatible*. Use a minimum amount. The plastics used for many of the components, such as the gears and drive lines, make them inherently self lubricating. Remember that too much lubrication can be more detrimental to the locomotive than too little.

The main points of lubrication, and type of lubricant are as follows:

- Axle bearings on the drivers — light oil
- Armature bearings on the motors — light oil
- Oil light bearings on the worm gear shafts — light oil
- Bearings on the centipede tender wheels — light oil
- Side rods at the crank pins — light oil
- Gear towers — light gear grease

By following the exploded drawings, access to each of these areas should be easily accomplished. If you are not comfortable with disassembling this locomotive for lubrication take it to one of the many Model Railroad hobby shops that can provide this service.

Smoke Unit Installation

The Genesis™ Big Boy Locomotive is designed to accept Seuthe #9 or #10 smoke generator units. These are not provided with the locomotive and may be added by the pur-

chaser at their discretion. If it is decided that smoke units will be installed, carefully follow the installation and operating instructions provided by the smoke unit manufacturer. Genesis does not warranty any defects in these smoke units or damage that may occur to the locomotive through their use.

Installation is very easily accomplished: Slide the smoke unit down the smoke stack until it engages the electric contacts inside the boiler. Add a minimal amount of smoke fluid to the unit and operate the locomotive normally. It may take a short amount of time when running to heat up the smoke unit before smoke is produced. This is normal.

Coupler Installation

The Athearn Genesis™ Big Boy model comes with the swivel coupler installed on the pilot. As on the prototype engines, you can have the coupler exposed on the pilot, or swing it around so that the pilot has no coupler in use. The "coupler" on this part is a dummy (non-operating) coupler.

An operating coupler can be installed on the pilot. Simply unscrew and remove this dummy coupler. Once removed, you will note that there are two threaded nuts. An operating coupler should fit in the rear most hole with no clearance problems, and the coupler and it's box can be attached using screw #212 (supplied, see drawing). If, however, your choice of coupler does have clearance problems when mounted in the rear threaded nut, simply mount it to the threaded nut further forward.

Replacing the Traction Tire or Replacing the Traction Tire Equipped Driver

To provide tractive effort that rivals the prototype, two traction tires are factory installed on last set of drivers of the rear engine. Replacement traction tires #210 are available from your local hobby retailer.

To replace a worn or loose traction tire:

- Remove the crank pin nuts from the traction tire equipped driver.
- Loosen the remaining crank pin screws from the other drivers.
- Remove the eccentric crank, main rods, bushing and drive rod from the crank pin on the traction tire equipped driver.
- Slide off the traction tire and replace with a new tire.
- Reverse the procedure of disassembly.



Jack Pfeifer photo

To replace a driver:

- Remove the crank pin screw and nuts from the side rods.
- Remove the side rods and eccentric cranks.
- Remove the retaining plate from the bottom of the engine by removing the three retaining plate screws.
- Remove the wiper assembly.
- Remove the driver assembly.
- Replace with new driver assembly making sure that the quartering matches the other drivers on the engine.
- Assemble in the reverse order that was used in the disassembly.

Use of the exploded drawings in this booklet will greatly assist in the above listed procedures.

Replacement parts are available from Athearn Trains to the original purchaser for warranty repairs only. A warranty registration form must be on file at Athearn Trains to honor any parts requests.



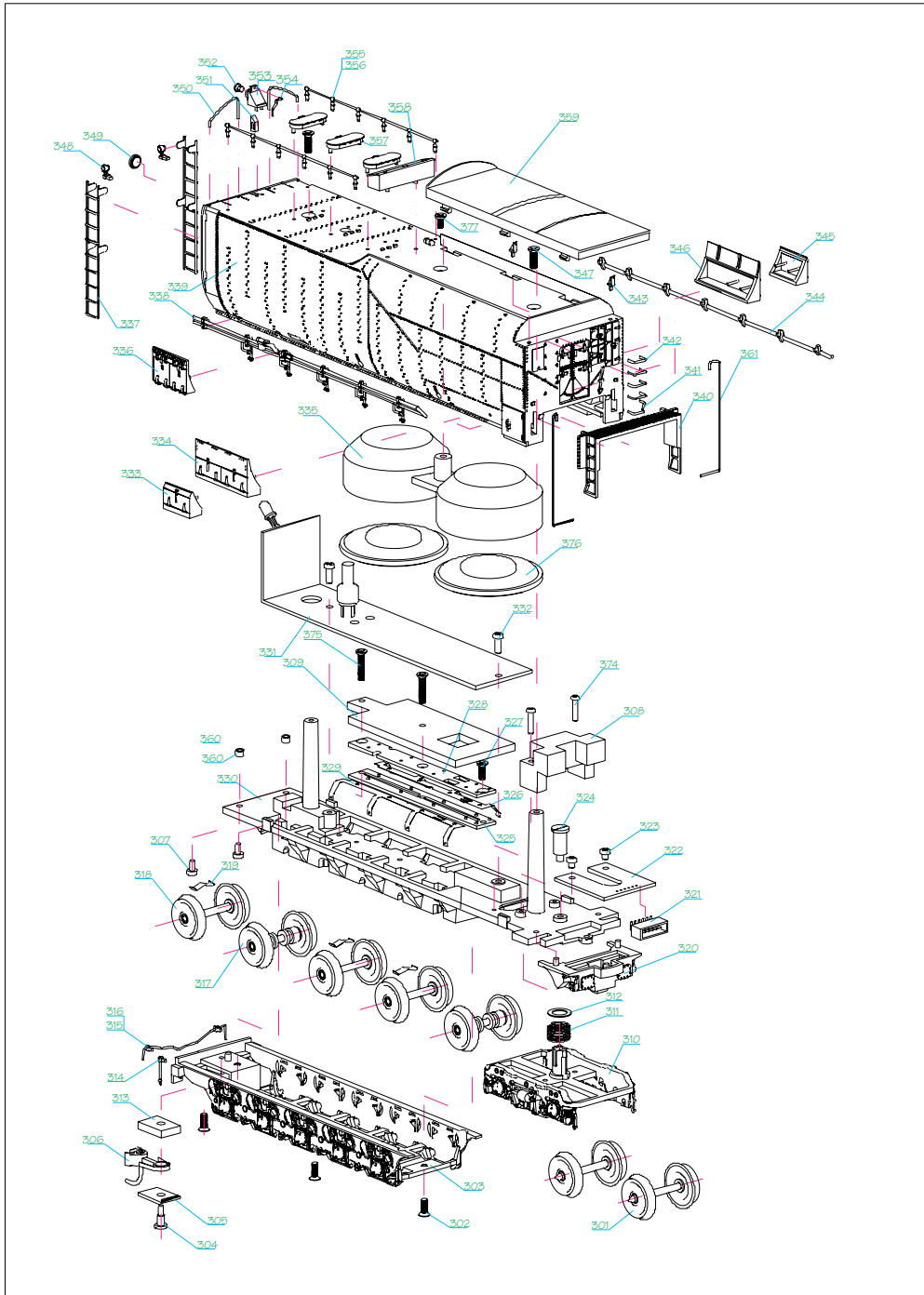
CHARTS & DRAWINGS

Function	Idle/Moving
Double click F0	Sound on/off
F1	Bell on/off
F2	Whistle
F3	Air release (2 types)
F4	Coupling/Uncoupling sounds (2 types)
F5	Brake squeal (repeat press will increase length)
F6	Conductor while idle /toggle chuff or 2 different types of rail clack while moving
F7	Fire box door open and close
F8	Whistle type select
F9	Metallic cylinder sound on/off while moving, steam associated sound while idle
F10	Water
F11	Blower hiss
F12	Master Volume Control
F13	Coal auger
F14	Air hose firing
F15	Associated Locomotive Sounds
F16	Shoveling
F17	Crash sound
F18	Injector
F19	Bell type select
F20	Bell ring rate
F21	Bell volume
F22	Whistle volume control
F23	Chuff volume control
F24	Chuff type
F25	Air brake release
F26	Associated Locomotive Sounds
F27	Associated Locomotive Sounds
F28	Scraping coal shovel
NOTE: Presently there are only a few DCC systems on the market that can access function numbers higher than F12	

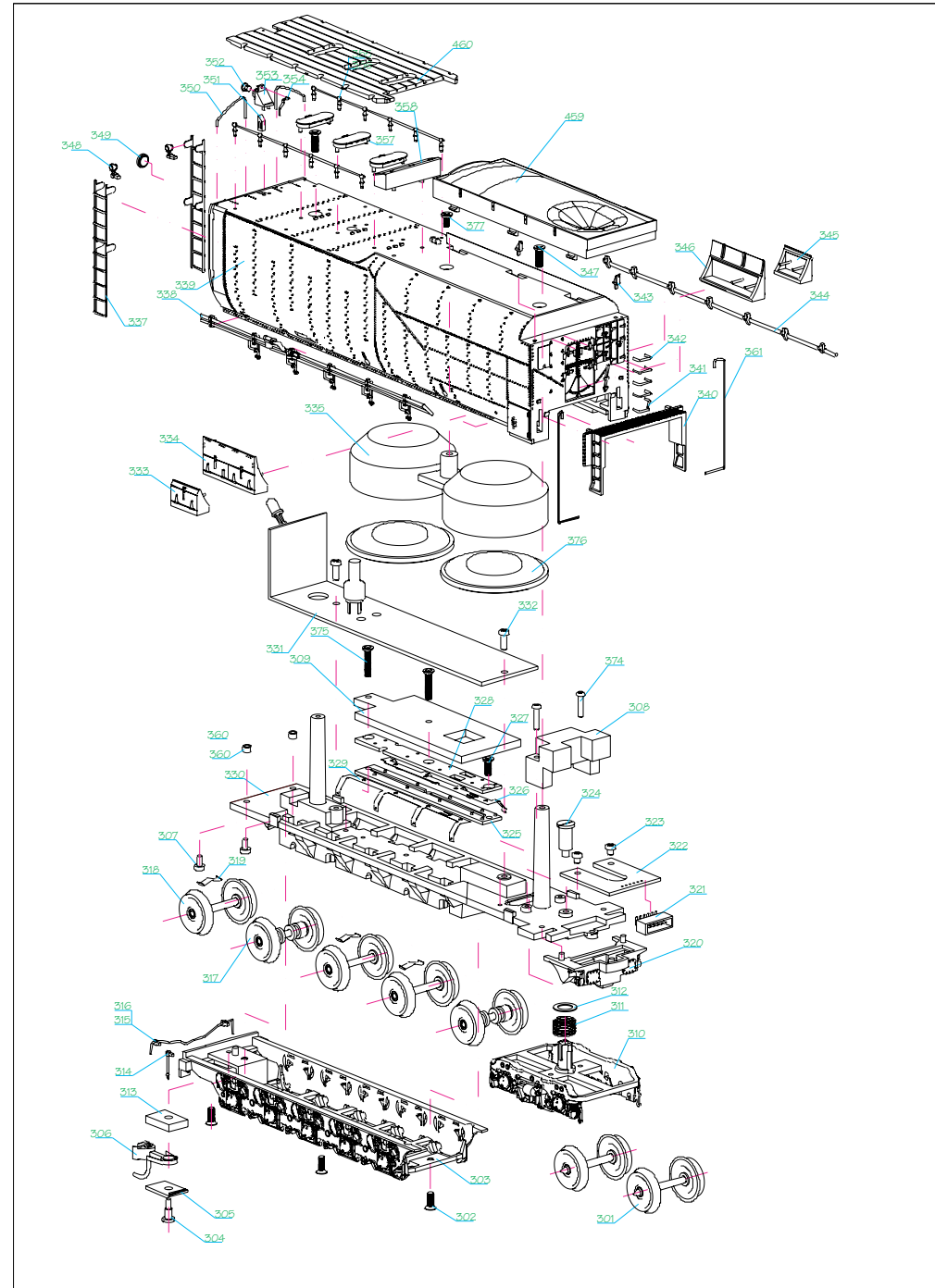
CV	Register	Description	Range	Default
CV1	R1	Short address	1-127	3
CV2	R2	Start voltage	0-32	0
CV3	R3	Acceleration	0-32	8
CV4	R4	Deceleration	0-32	8
CV5	---	Top voltage	0-32	32
---	R6	Page number	---	---
CV29	R5	Basic configuration	---	2
CV7	R7	Manufacturer version number	---	32
CV8	R8	Manufacturer ID	---	143
CV17	---	Long address upper byte	192-231	192
CV18	---	Long address lower byte	0-255	3
CV19	---	Advanced consist address	0-127	0
CV21	---	When CV21=0, all accessory functions will follow their own address. When CV21=1, all functions will follow the consist address	0-1	0
CV49		Master Volume Control (0=off,1=low,2=mid,3=max)	0-3	2
CV50	---	Whistle type	0-18	5
CV51	---	Whistle volume	0-3	3
CV52	---	Bell type	0-3	0
CV53	---	Bell volume	0-3	3
CV54	---	Bell ring rate	0-50	10
CV55	---	Chuff type	0-3	0
CV56	---	Chuff volume	0-3	3
CV57	---	Brake squeal volume	0-3	1
CV58	---	Air release volume	0-3	3

CV	Register	Description	Range	Default
CV59	---	Blower hiss volume	0-3	3
CV60	---	Fire box door volume	0-3	3
CV61	---	Injector volume	0-3	3
CV62	---	Coupling volume	0-3	3
CV63	---	Air pump volume	0-3	0
CV64	---	Rail clack volume	0-3	3
CV105	---	User identification number	0-255	0
CV106	---	User identification number	0-255	0
CV112	---	Conductor volume	0-3	3
CV113	---	Directional light enable	0-1	1 (enable)
CV114		Air pump type	0-3	1
CV118	---	Shoveling volume	0-3	3
CV119	---	Coupling fire volume	0-3	3
CV120	---	Chuff rate	0-30	12
CV121	---	Chuff start point adjustment	0-7	3
CV122		Double chuff enable	0-1	1 (enable)
CV123		Load Control on/off (1=on)	0-1	0 (disable)
CV124		Speed curve select (0=linear, 1=slow increase at slow speed, 2=fast increase at slow speed)	0-2	0
CV125	---	Factory default setting: Program it to 1 will restore all the CV to default setting	---	0

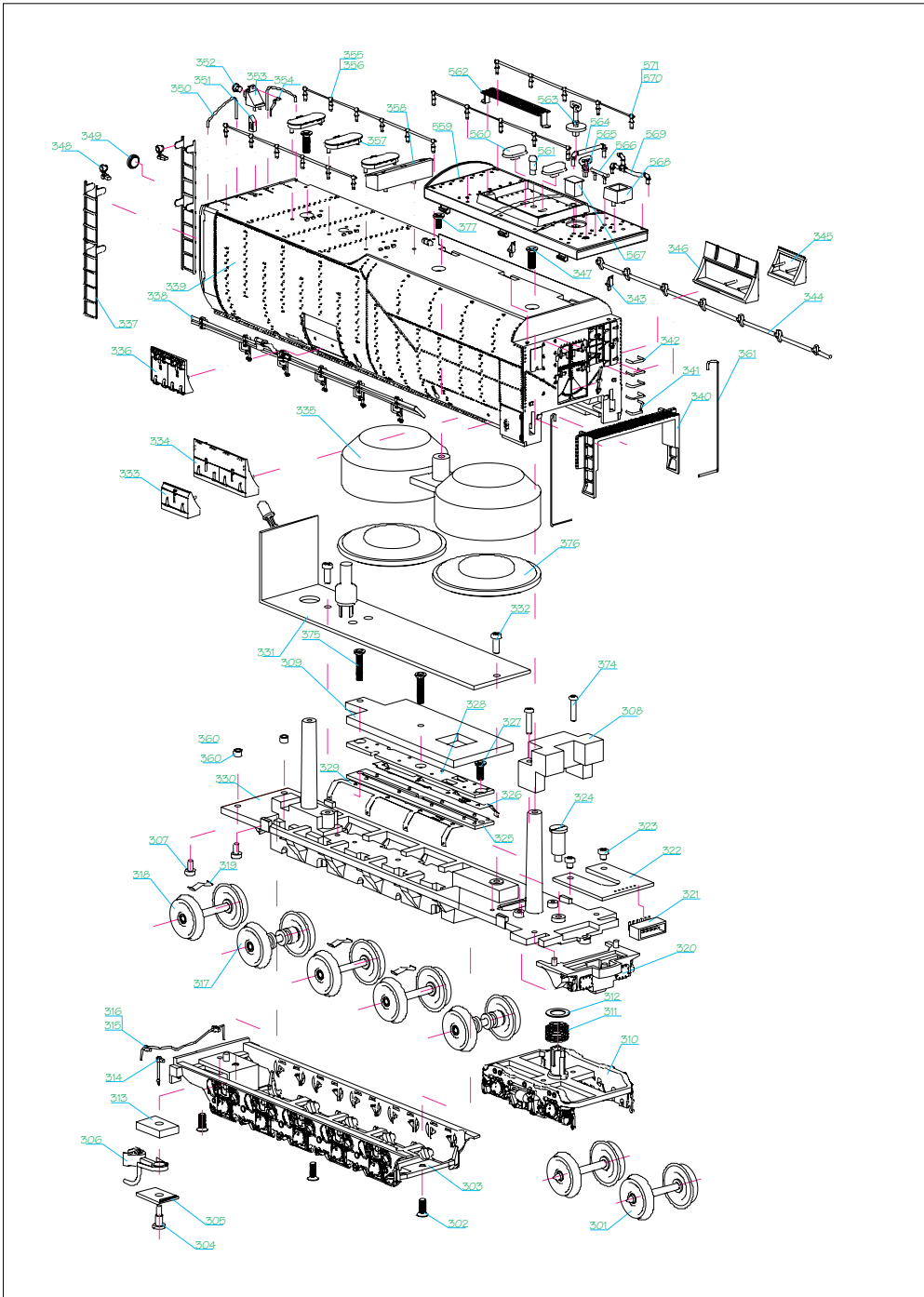
COAL TENDER



COAL TENDER with WOOD DECK

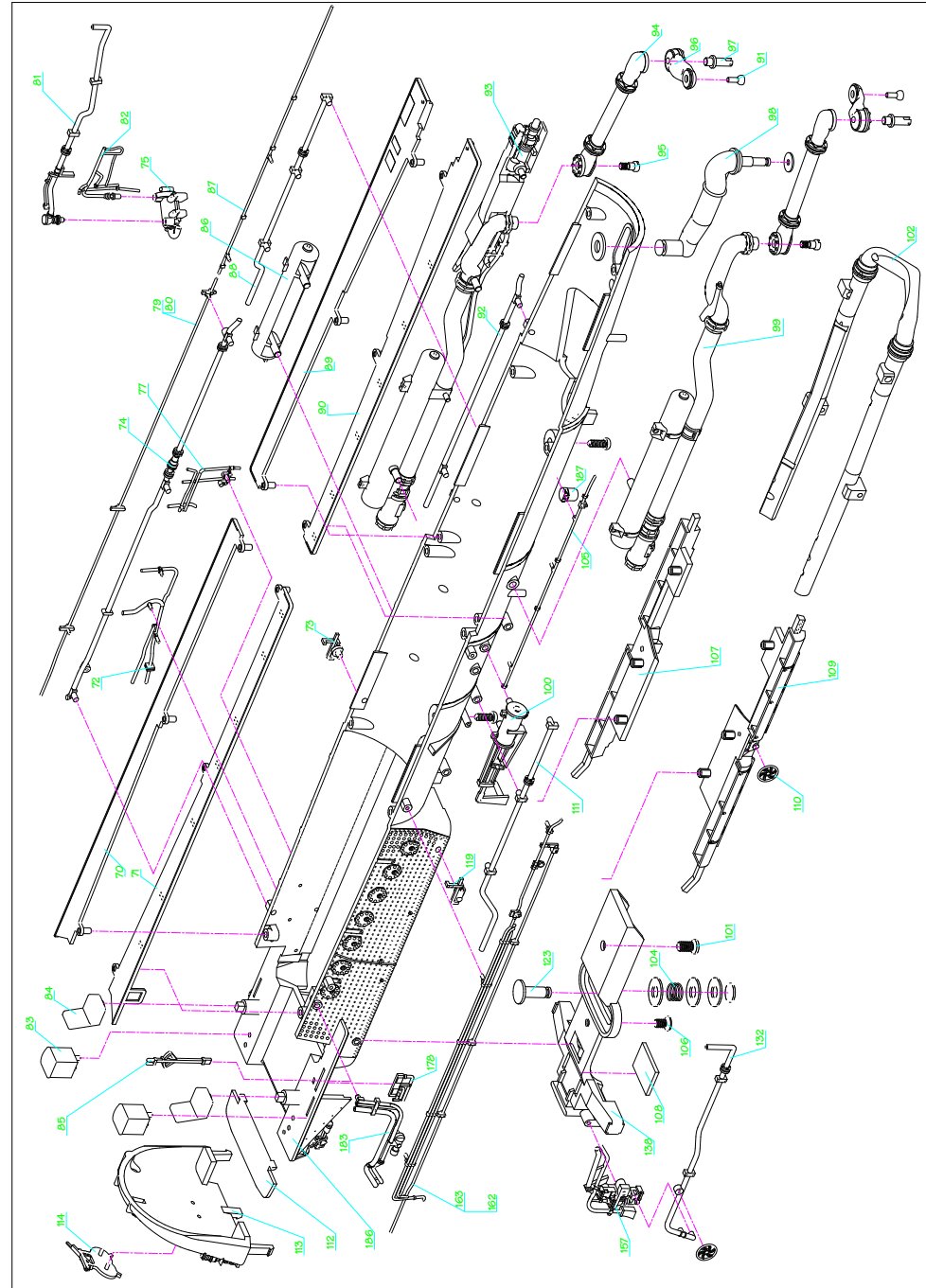
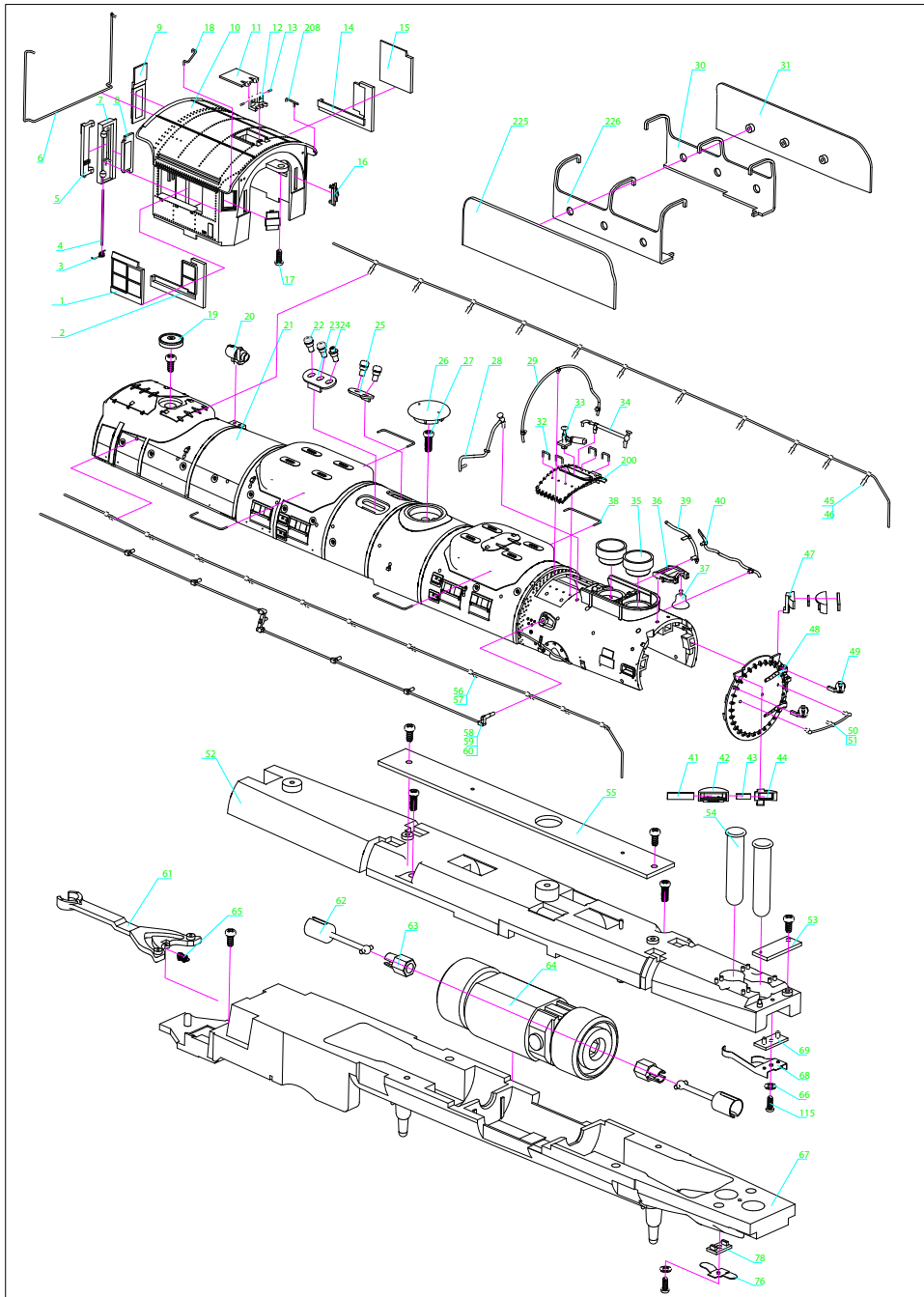


OIL TENDER



Item #	Description	QTY	Item #	Description	QTY
301	Tender lead truck wheel and axle assy.	2	342	Tender front grab irons-type 1	4
302	Centipede side frame mounting screw	3	343	Tender front detail	2
303	Centipede side frame	1	344	Side pipe-right	1
304	Tender coupler screw	1	345	Right tool box-short	1
305	Tender coupler box cover	1	346	Right tool box-long	1
306	Rear coupler	1	347	Tender hold down screw	2
307	Screw	2	348	Tender marker lamps	2
308	Front Tender Weight	1	349	Tender rear light lens (clear)	1
309	Rear Tender Weight	1	350	Tender deck rear handrail	2
310	Tender lead truck side frame	1	351	Tender light bar (clear)	1
311	Tender lead truck spring	1	352	Back-up light lens (clear)	1
312	Tender lead truck washer	1	353	Back-up light base	1
313	Tender coupler box	1	354	Back-up light conduit	1
314	Tender air hose	1	355	Tender deck handrail wire	2
315	Coupler cut lever assy.	1	356	Tender deck handrail	2
316	Coupler cut lever wire	1	357	Water fill hatches	3
317	Centipede wheel with bearings assy.	2	358	Tender deck tool box	1
318	Centipede wheel assy.	3	359	Coal bunker (full)	1
319	Equalizing spring	3	360	Brass sleeve	2
320	Tender end chassis detail	1	361	Tender side handrail	2
321	Tender plug socket	1	362	Tender Body	1
322	Tender plug-in PCB	1	374	Front Tender Weight Screws	2
323	Tender plug-in PCB mounting screws	2	375	Centipede pick-up mounting screw-Long	2
324	Tender draw bar attachment post	1	376	Speaker	2
325	Centipede pick-up bottom insulator	1	377	Speaker Housing Mounting Screw	1
326	Centipede pick-up wipers-right	1	459	Coal bunker (partially full)	1
327	Centipede pick-up mounting screw-short	1	460	Wood tender deck	1
328	Centipede pick-up top insulator	1		Parts specific to Tender with Oil Bunker	
329	Centipede pick-up wipers-left	1	559	Oil bunker	1
330	Tender bottom	1	560	Oil filler hatches	2
331	DCC circuit board	1	561	Oil filler vents	1
332	DCC board mounting screw	2	562	Oil bunker walk way	1
333	Left tool box-short	1	563	Oil dip stick	1
334	Left tool box-long	1	564	Oil pipe #1	1
335	Speaker Housing	1	565	Oil bunker detail #1	1
336	Left tool box-medium	1	566	Oil bunker detail #2	1
337	Rear tender ladder	2	567	Sand box	1
338	Side pipe-left	1	568	Oil bunker detail #3	1
339	Tender body for Engine #3985	1	569	Oil pipe #2	1
340	Tender apron	1	570	Oil bunker hand rail wire	2
341	Tender front grab irons-type 2	1	571	Oil bunker hand rail assy.	2

LOCOMOTIVE



LOCOMOTIVE PARTS LIST

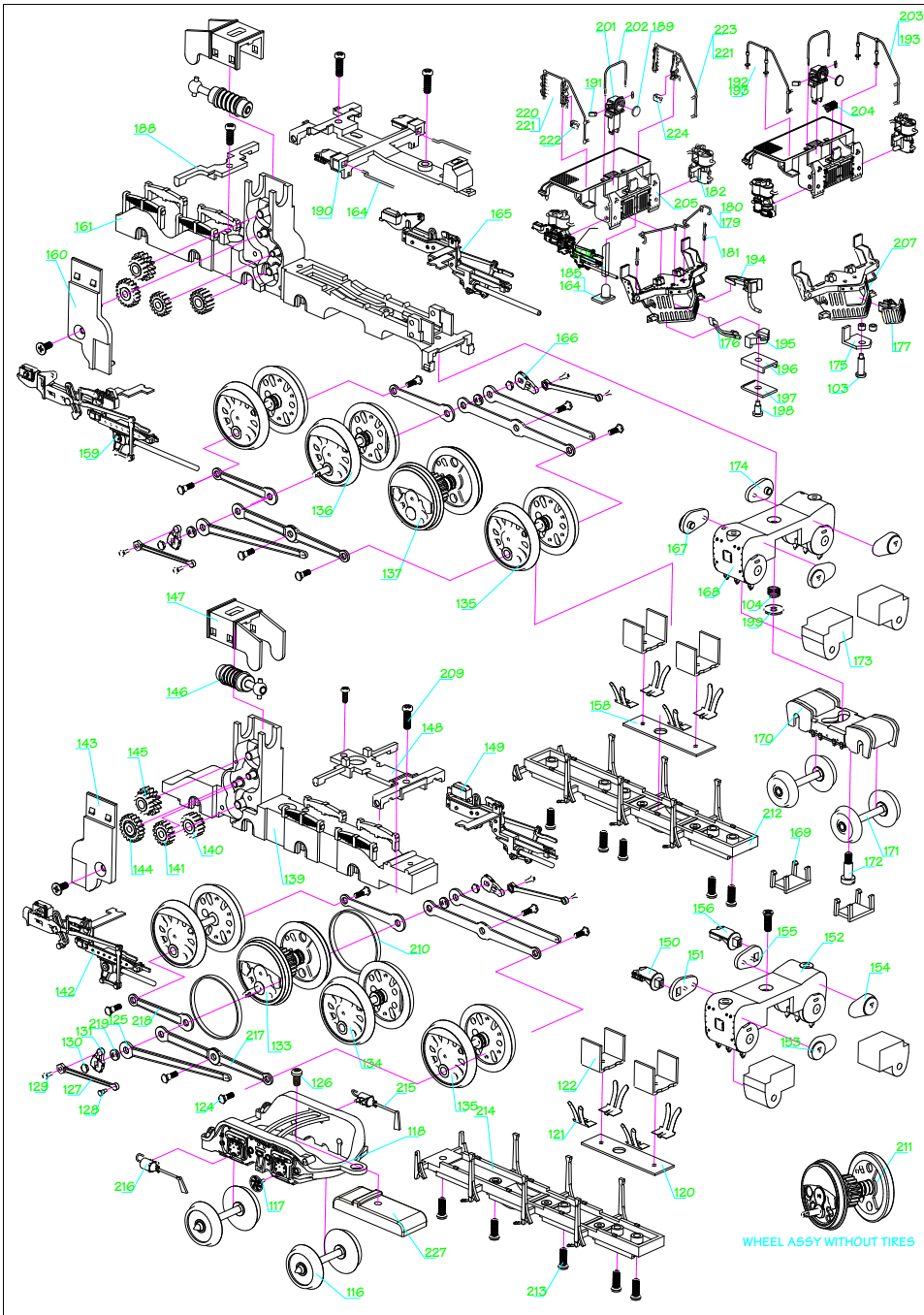
Item #	Description	QTY
1	Cab Sliding Window Glazing (R)	1
2	Cab Fixed Window Glazing (R)	1
3	Cab Door Spring	1
4	Cab Door Hinge Pin	1
5	Cab Door Support	1
6	Cab Rear Handrail	1
7	Cab Door	1
8	Cab Door Glazing (L)	1
9	Cab Door Glazing (R)	1
10	Cab	1
11	Roof Hatch	1
12	Roof Hatch Hinge	1
13	Roof Hatch Hinge Pins	2
14	Cab Fixed Window Glazing (L)	1
15	Cab Sliding Window Glazing (L)	1
16	Cab Front Window Glazing	2
17	Screw	8
18	Cab Grabiron (R)	1
19	Boiler Half (Top)	1
20	Generators	1
21	Boiler Top #1	1
22	Safety Valves	2
23	Safety Valve Base (3 Valve)	1
24	Safety Valve	1
25	Safety Valve Base (2 Valve)	1
26	Steam Dome Cover	1
27	Boiler Screw	6
28	Piping (B-R)	1
29	Piping (E)	1
30	Steel Support (L)	1
31	Smoke Deflector (L)	1
32	Small Handrail	4
33	Whistle	1
34	Piping (B-L)	1
35	Smoke Stack	2
36	Bell Bracket	1
37	Bell	1
38	Sand Dome Handrail	4
39	Piping (D)	1
40	Piping #10	1

Item #	Description	QTY
41	Numberboard Lens (Clear)	2
42	Numberboard Front Housing	2
43	Numberboard PCB	2
44	Numberboard Mounting Bracket (R)	1
45	Long Wire - Boiler Handrail (L)	1
46	Body Handrail (L)	1
47	Numberboard Mounting Bracket (L)	1
48	Smoke Box Door	1
49	Marker Lights	2
50	Stanchions - Smoke Box Handrail	1
51	Wire for Smoke Box Handrail	1
52	Smoke Unit PCB	1
53	Main Frame (Upper)	1
54	Smoke Unit (Not Supplied)	2
55	Locomotive PCB	1
56	Long Wire - Boiler Handrail (R)	1
57	Body Handrail (R)	1
58	Lever	1
59	Wire #1 for Lever	1
60	Wire #2 for Lever	1
61	Draw Bar	1
62	Link Rod	2
63	Hex Coupling Shaft	2
64	Motor/Flywheel Assembly	1
65	Draw Bar Centering Spring	1
66	Washer	2
67	Main Frame (Lower)	1
68	Smoke Unit Contact Strip	1
69	Insulator Plate for Smoke Unit	1
70	Rear Walkway (L)	1
71	Rear Walkway (R)	1
72	Piping Under Cabin (C-3)	1
73	Detail Part (L)	1
74	Piping #5	1
75	Piping Under Cab	1
76	Smoke Unit Plug	1
77	Piping Under Cabin (C-4)	1
78	Insulate Plate	1

Item #	Description	QTY
79	Piping #4	1
80	Wire for Piping #4	1
81	Piping #9	1
82	Piping Under Cabin (C-5)	1
83	Cab Jump Seats	2
84	Car Seat	2
85	Johnson Bar	1
86	Airtank	1
87	Piping #3	1
88	Piping #12	1
89	Front Walkway (L)	1
90	Front Walkway (R)	1
91	Ball Head Shaft	2
92	Piping #6	1
93	Piping for Rear Cylinder (L-1)	1
94	Link Bar for Front Cylinder	2
95	Screw for Piping	2
96	Piping for Front Cylinder	2
97	Column	2
98	Boiler Side Part	1
99	Piping for Rear Cylinder (R-1)	1
100	Power Reverse Cylinder	1
101	Screw	1
102	Boiler Bottom Piping	1
103	Screw	1
104	Trailing Truck Spring	2
105	Piping #1	1
106	Screw	1
107	Ash Pans #1 (L)	1
108	Frame Cover	1
109	Ash Pans #1 (R)	1
110	Hand Wheel (under body)	2
111	Piping	1
112	Drop Plate	1
113	Backhead	1
114	Firebox Door	1
115	Screw	2
116	Trailing Truck Wheel & Axle Assy	2
117	Trailing Truck Hand Wheel	1

Item #	Description	QTY
118	Trailing Truck Frame	1
119	Detail Part (R)	1
120	Rear Engine Pick-up Wiper Assembly	1
121	Pick-up Wiper	8
122	Pick-up Insulators	4
123	Pin	1
124	Crank Pin Screw	12
125	Main Rod	4
126	Screw	2
127	Eccentric Rod	4
128	Eccentric Rod Rivet	4
129	Eccentric Crank Rivet	4
130	Crank Pin Nut	4
131	Eccentric Crank (R)	2
132	Piping #7	1
133	Rear Engine Wheel Assembly #1 (Geared) with Traction Tires	1
134	Rear Engine Wheel Assembly #2	1
135	Rear Engine Wheel Assembly #3	1
136	Front Engine Wheel Assy #1	1
137	Front Engine Wheel Assy #2-Geared	1
138	Frame	1
139	Rear Engine Frame & Gear Tower	1
140	Idler Gear #3	2
141	Idler Gear #2	2
142	Rear Engine Valve Gear Assy (R)	1
143	Rear Engine Gear Tower Cover	1
144	Idler Gear #1	2
145	Compound Gear	2
146	Worm Gear Assembly	2
147	Worm Gear Assembly Retainer	2
148	Rear Engine Valve Gear Hanger	1
149	Rear Engine Valve Gear Assy (L)	1
150	Rear Engine Piston Valve Guides (R)	1
151	Rear Engine Cylinder Part (R)	1
152	Rear Cylinder Casting	1
153	Front & Rear Engine Cylinder Part #2	2

RUNNING GEAR and PILOT



Item #	Description	QTY
154	Front & Rear Engine Cylinder Part #1	2
155	Rear Engine Cylinder Part (L)	1
156	Rear Engine Piston Valve Guides (L)	1
157	Piping Under Cabin (C-1)	1
158	Front Engine Pick-up Assembly	1
159	Front Engine Valve Gear Assy (R)	1
160	Front Engine Gear Tower Cover	1
161	Front Engine Frame & Gear Tower	1
162	Wire for Piping #2	1
163	Piping #2	1
164	Piston Valve Shaft	2
165	Front Engine Valve Gear Assy (L)	1
166	Eccentric Crank (L)	2
167	Cylinder Part	1
168	Front Cylinder Casting	1
169	Pilot Truck Axle Retainers	2
170	Pilot Truck Frame	1
171	Pilot Truck Wheels & Axles	2
172	Screw for Pilot Truck	1
173	Cylinder Weight	4
174	Cylinder Part	1
175	Coupler Support #2	1
176	Pilot Air Hose	1
177	Dummy Swivel Coupler	1
178	Boiler Bottom Part (R)	1
179	Coupler Lift Bar Assembly	1
180	Coupler Lift Bar Wire	1
181	Flag Holder	2
182	Air Compressor	2
183	Piping Under Cabin (C-2)	1
184	LED Access Plug	1
185	LED Headlight	1
186	Boiler Bottom	1
187	Boiler Side	1
188	Gearbox Top Part #2	1
189	Headlight Lens-Clear	1

Item #	Description	QTY
190	Gearbox Top Part #1	1
191	Headlight Numberboard Lens	2
192	Pilot Handrail Right #2	1
193	Wire #1 for Pilot Handrail	1
194	Coupler	1
195	Coupler Support	1
196	Front Coupler Box	1
197	Front Coupler Box Cover	1
198	Pilot Coupler Box Screw	1
199	Pilot Truck Washer & Spring	1
200	Plug	1
201	Headlight #1	1
202	Handrail on deck	1
203	Pilot Handrail Left #2	1
204	Cooling Pipe (B)	1
205	Pilot Shield	1
206	Headlight Bar	1
207	Pilot	1
208	Cab Grabiron (L)	1
209	Screw	2
210	Traction Tires	2
211	Wheel Assembly without Traction Tires	1
212	Gear Box Cover (Front)	1
213	Screw	11
214	Gear Box Cover (Rear)	1
215	Brake Cylinder with Lever (L)	1
216	Brake Cylinder with Lever (R)	1
217	Side Rod #1	4
218	Side Rod #2	4
219	Washer	1
220	Pilot Handrail Right #1	1
221	Wire #2 for Pilot Handrail	2
222	Small Detail (R)	1
223	Pilot Handrail Left #1	1
224	Small Detail (L)	1
225	Smoke Deflector (R)	1
226	Steel Support (R)	1
227	Trailing Truck Weight	1



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