



UNION PACIFIC BIG BOY 4-8-8-4



Thank you for your purchase of this Athearn Big Boy steam locomotive. Every effort has been made to make it an accurate replica, specific to a particular engine and its time in history. Additionally, we've tried to make sure the engineering of its mechanism and electronics is the best yet from Athearn.

We hope all this hard work brings you hours of pleasure, whether running it on your layout or examining its every detail.

Sincerely,

The Athearn Team

CONTENTS

History of the Big Boy 4-8-8-4	1,2
The Big Boy 4-8-8-4 Locomotive	3
Sound, DC or DCC Control Systems	4
Operating the Big Boy 4-8-8-4 Locomotive ...	5-8
Features	9,10
Lubrication & Maintenance	11,12
Big Boy 4-8-8-4 Function Table	12
CV Charts	13
Locomotive Diagrams & Parts List	15,16
Tender Diagrams & Parts List	17

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, Utah. In the early 1900s the mainline of the Los Angeles and Salt Lake, a Union Pacific 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 Wyoming's 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.

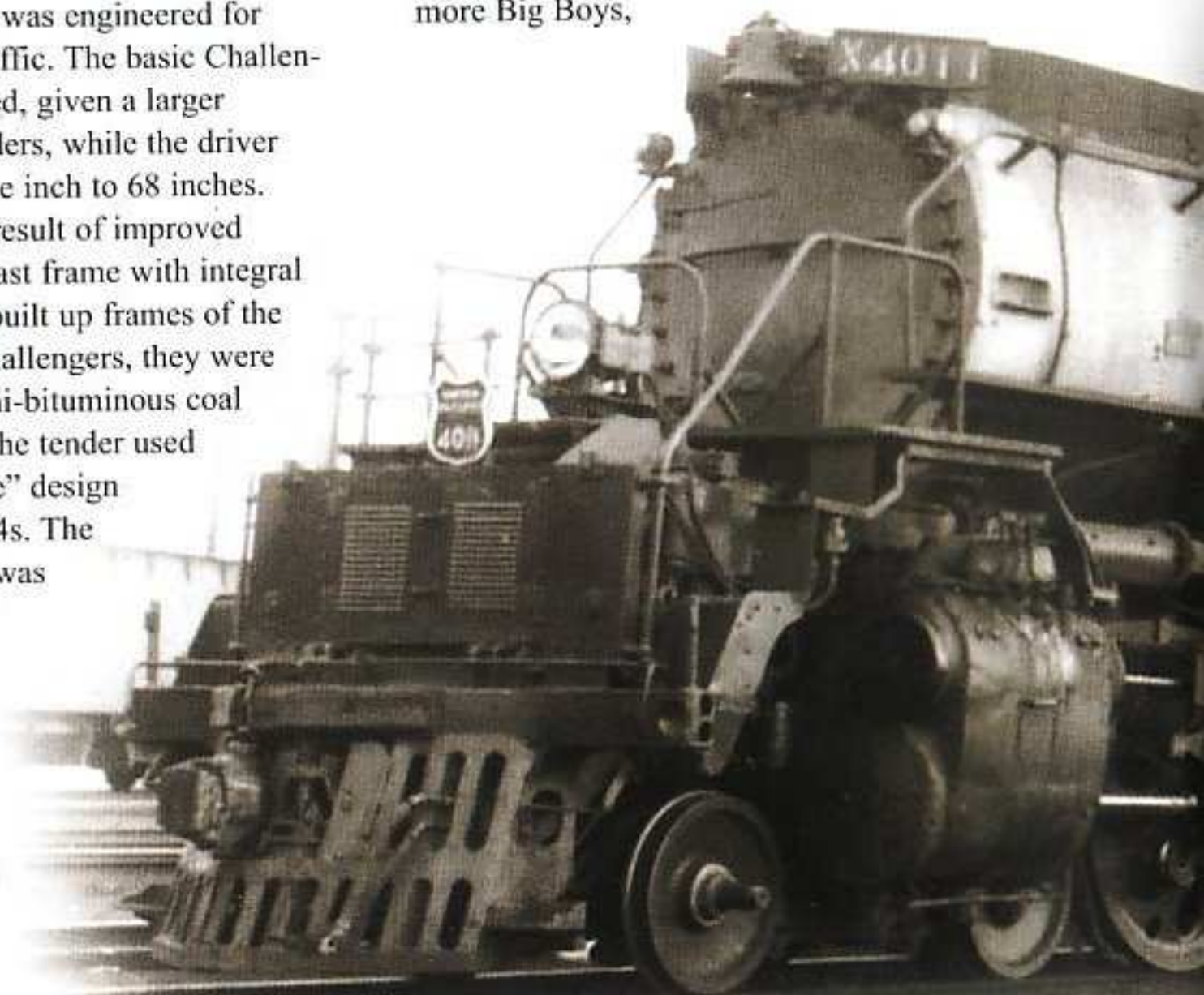
They had an advantage in that the new locomotive was intended for a limited operating area, where the mainline was engineered for high-speed and heavy traffic. The basic Challenger design was lengthened, given a larger firebox, and larger cylinders, while the driver diameter was reduced one inch to 68 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 4-8-8-4s, numbered 4000 through 4019, with the American Locomotive Company, (ALCO). 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 its 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,



numbered 4020 through 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 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 to Los Angeles from the beginning with some speed restrictions on the tighter curves found in several areas but in normal

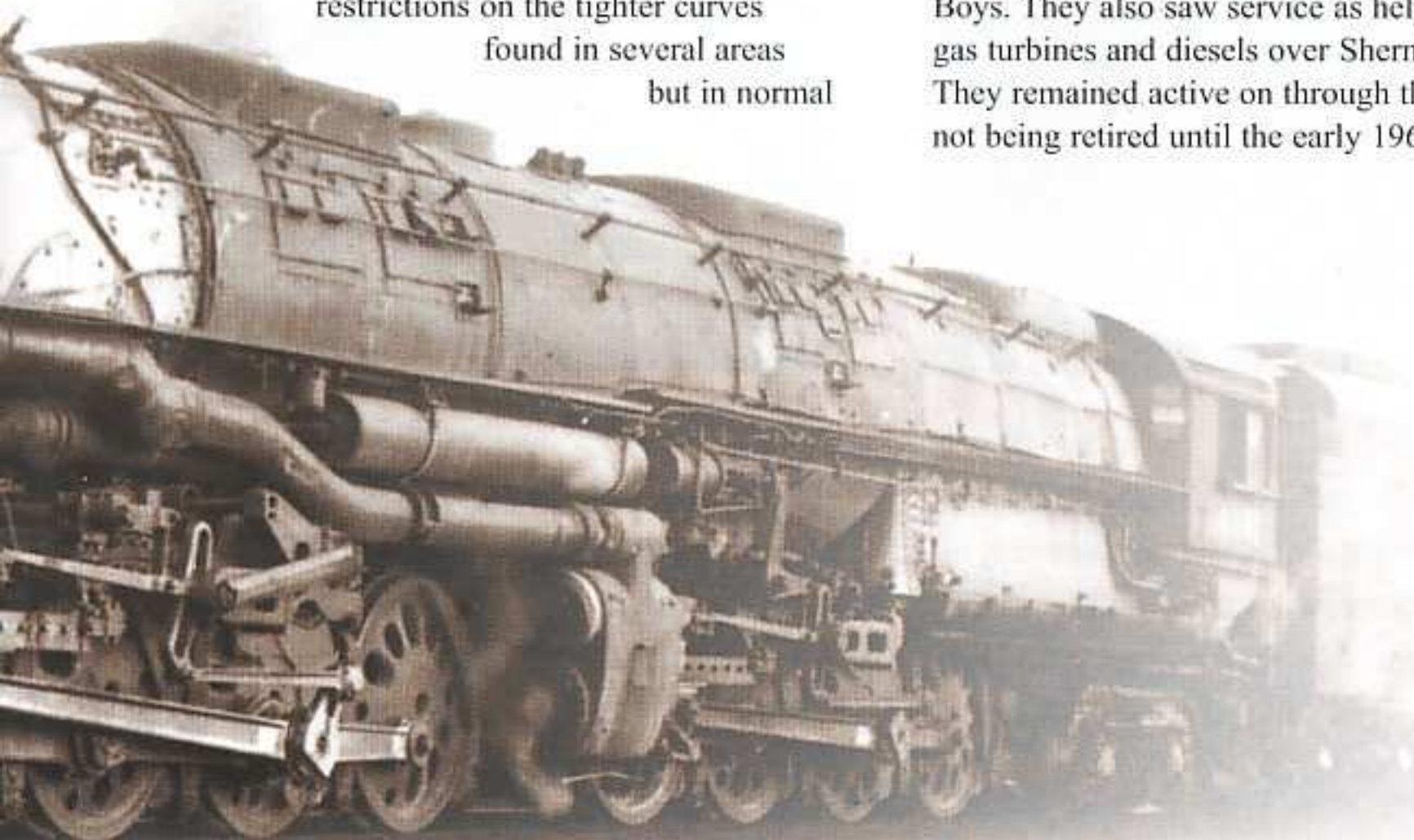
operations none ran into Nevada or California. During WWII, traffic on the route to Southern California was near the line's peak capacity and several Big Boys operated from Salt Lake City to Milford, Utah to see if their power could ease the crunch. Since this segment of the Union Pacific fueled locos with 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 poor water quality found in the desert.

Another experiment was the conversion of number 4005 to an oil burner just after the end of WWII. 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.

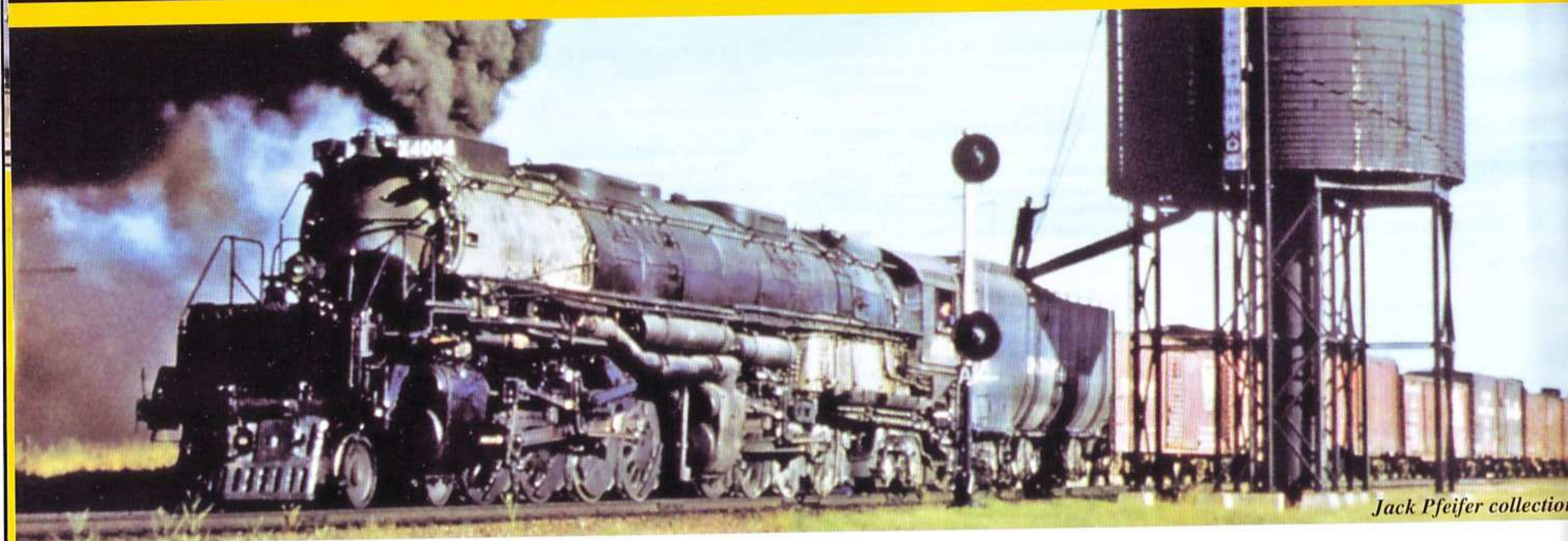
Despite the influx of diesels following World War Two, the Big Boys and Challengers remained the prime power on the Overland Route from Ogden to Cheyenne. Helpers were used on Sherman Hill including double-headed Big Boys. They also saw service as helpers, leading gas turbines and diesels over Sherman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

UNION PACIFIC BIG BOY 4-8-8-4

Road numbers	4000 - 4019	4020 - 4024
Tractive effort	137,375	137,375
Cylinders, diameter and stroke (4)	23.75" x 32"	23.75" x 32"
Driver diameter	68"	68"
Grate area	150 square feet	150 square feet
Steam pressure	300 psi.	300 psi.
Total evaporating heating surface	5,889 square feet	5,755 square feet
Superheater type	Type E	Type A
Superheating surface	2,466 square feet	2,043 square feet
Total engine weight	762,000 Lbs.	772,250 Lbs.
Weight on drivers	540,000 Lbs.	545,200 Lbs.
Boiler diameter	95"	95"
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 gallons	25,000 gallons
Tender length	47'	47'
Overall wheel base	117 ft. 7 in.	117 ft. 7 in.
Overall length	132 ft. 10 in.	132 ft. 10 in.
Total weight (full load)	1,189,500 Lbs.	1,208,750 Lbs.



3 THE BIG BOY 4-8-8-4

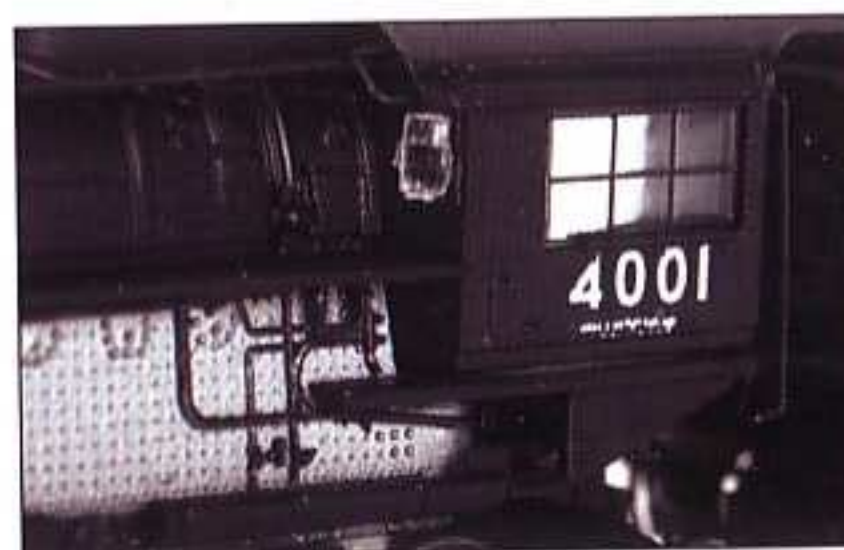


Jack Pfeifer collection



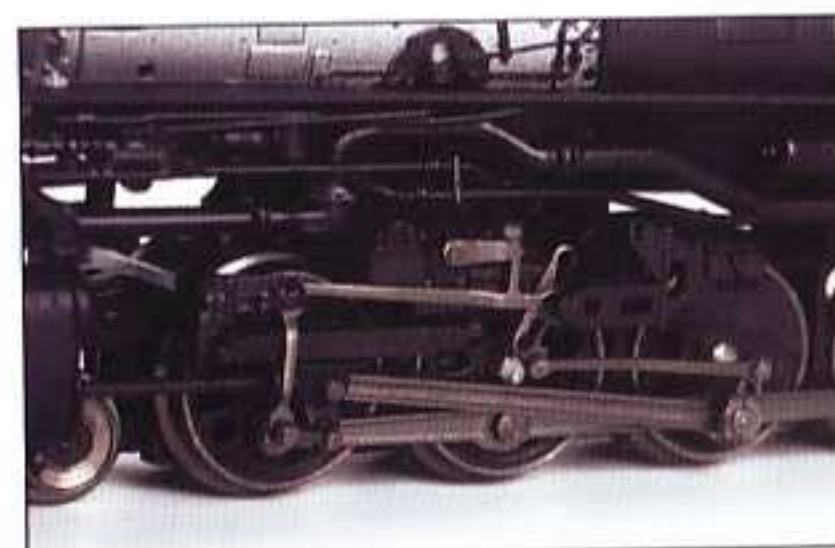
Tender

The tender accurately captures the massiveness of the 14-wheel "centipede" design while housing the DC/DCC control & sound system. It also provides electrical pickup.



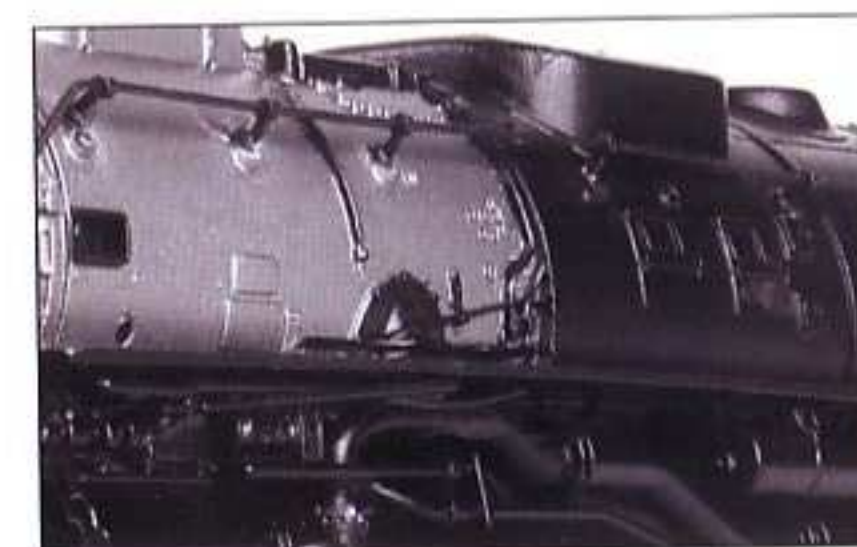
Cab

Despite its tiny size, the cab features backhead detail and amazingly thin windows.



Drivers

All drivers are flanged with the lead set on the first engine and the last set on the trailing engine using Neoprene traction tires to assure pulling power.



Boiler

Details abound along the long length of the massive boiler, with both engraved highlights and added parts.

The installation of sound in a locomotive adds a new dimension to operation. Sound makes a technically perfect 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.

Your Big Boy locomotive includes a factory installed Dual Function DCC Decoder with speaker. 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 in the correct mode without intervention from the user.



Curves

Although your Big Boy can negotiate tight curves, we strongly recommend a minimum operating radius of 11" (279.4 mm). It will look even better on 15" (381 mm) radius curves or greater.

DUAL FUNCTION

Your new Athearn N scale Big Boy Locomotive is factory equipped with a state-of-the-art Dual Function decoder. This means your locomotive will run on any regular DC train control (N power pack) or NMRA compatible DCC system.

CAUTION: Do not run your new Athearn N scale Big Boy Locomotive with power packs intended for G scale or other systems that exceed 18 V DC as you will damage the locomotive circuitry. Also, never operate your locomotive with a transformer designed for use with AC powered model trains, O-27 trains or AC-operated HO models. Some DCC systems come equipped with a switch for extra voltage for larger scales ("O" or "G") but if you use your



Smokebox

The front of the Big Boy is alive with details, from the turned brass bell flanked by number boards to the separate handrails and cooling coils. And the headlight and backup light operate only in the correct direction of travel.

locomotive on this setting damage will occur to the on-board electronics due to the higher constant track voltage (22 volts).

HAND-HELD WIRELESS CONTROLLER

A Hand-Held Wireless Controller is included with your locomotive for use only 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



Trailing Truck

The massive trailing truck is accurately reproduced with fine engraving and nicked metal wheels.

The Athearn N scale Big Boy Locomotive will operate on DC without the use of the Controller, however, only the steam chuff sounds will be available in this operational mode.



Hand-Held Wireless Controller

5 DC OPERATION



To set up your Hand-Held Wireless Controller and operate your locomotive with a DC power pack, follow these steps:

Step 1: Install the battery supplied in the Controller.

Step 2: Place the locomotive on the track making sure all wheels are aligned correctly to avoid short circuits, which can possibly damage your locomotive circuitry.

Step 3: Turn the switch on the power pack to ON.

Step 4: Slowly increase the power pack 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 Wireless Controller to change the locomotive direction while it is moving. This feature allows you to control another DC analog locomotive on the same track.

Note - Your new Athearn N scale Big Boy Locomotive always remembers its last direction of operation regardless of the position of the direction switch on the power pack.

When you use the power pack throttle to control the locomotive's speed, the top speed will be limited by the Wireless Controller's speed setting. When you use the Wireless Controller to control

the locomotive's speed, the top speed will be limited by the power pack's throttle setting.

If the locomotive's top speed is too low, do not set the power pack's throttle to maximum. Instead, set the throttle to 60% to 70% and use the Wireless Controller to manage the locomotive speed. This will give you the best operating range.

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.

If the Wireless Controller'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,

wire-screen scenery, etc.) we recommend that you hold the Wireless Controller's antenna wire close to, or touching, the active track of the layout if the locomotive is far from your position.

If you feel that the locomotive is not operating properly, move the throttle to 25% to 35% setting, or even to zero (depending on your power pack), then slowly move the throttle up again to control the locomotive.

If you hear the locomotive say "program" while running in the DC mode, do not press any buttons on the Wireless Controller. Move the power pack throttle to zero, bringing your train to a gradual stop. Then turn the power pack on/off switch to "off" to reset your locomotive. If you press any buttons on the Wireless Controller at this time

you can change some of your settings inadvertently. (Entering program mode might occur inadvertently when attempting to use the stop button [STP] while the locomotive is traversing a long dirty section of track. The locomotive may read this as a power down / power up sequence.)

HANDHELD WIRELESS CONTROLLER FUNCTIONS

Button 1: Bell Button

Starts or stops the bell sounds.

Button 2: Whistle Button

Operates the steam whistle.

Button 3: Speed Down Button

Decelerates the locomotive. Once the locomotive is stopped, pressing Button 3 creates the sound of an air release.

Button 4: Speed Up Button

Accelerates the locomotive. When the locomotive reaches its maximum speed, pressing Button 4 activates the sound of the firebox door opening and closing.

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 a built-in safety feature. Press Button 5 when the locomotive is in idle (25%—35% throttle setting) to activate the blower hiss sound.

Button 6: Stop Button

Brings the locomotive to a gradual stop. This is a built-in safety feature. Press STP while the locomotive is stopped and you hear the water injector sound.

***Note** - When using the Wireless Controller to control speed, direction, or stop (buttons 3, 4, 5, and STP) it will override the power pack throttle control. If you prefer to use the power pack throttle, use the Wireless Controller to bring the loco to a stop. Adjust your power pack throttle until you hear the locomotive idle, then flip your power pack direction switch. You will hear an audible air release confirming the power pack throttle is now the speed control.*

DC PROGRAMMING

While in DC mode, you can program the chuff rate up or down, chuff starting point, and 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.*

Step 1: Place the locomotive on the track making sure all wheels are aligned correctly to avoid short circuits, which can possibly damage your locomotive circuitry.

Step 2: Turn the switch on the power pack to ON.

Step 3: Slowly increase the power pack throttle until you hear the locomotive begin to idle. Once the idle sounds steady, leave the throttle in its position, and turn off the power pack main power switch.

Step 4: Use the Wireless Handheld Controller to enter the program mode. Press and hold 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, confirming you are now in the Program Mode.

Step 5: Press Button 4 (Speed Increase) or Button 3 (Speed Decrease) 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. **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.

Step 6: Press Button 2 (Whistle) to select different types of whistles. Once you hear the whistle you like, stop pressing the button.

Step 7: Press Button 1 (Bell) to select different types of bells. Once you hear the bell you like, stop pressing the button.

Step 8: Press Button 5 (Direction) to change the master volume of the sound system. There is no "off", but there are 3 levels of volume: low, medium and maximum.

Step 9: To reset the locomotive back to its factory defaults press the STP (Stop) 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 the reset-to-default setting is completed.

Step 10: When programming is completed, turn the main power pack switch to ON. This will reset the locomotive and lock in your programming.

***Note** - When operating in DCC mode if you activate the Load Control feature by switching CV123 from 0 to 1, DC mode operation will also be changed, disabling the Wireless Handheld Controller and making the power pack throttle your primary control. To operate the locomotive with the Wireless Controller, reprogram the locomotive using DCC to disable the Load Control feature by changing CV123 to value "0".*

DC TROUBLESHOOTING

Check these two points first:

Is the locomotive on the track and are all wheels properly aligned as not to cause a short circuit?

Is the battery correctly installed in the Wireless Controller?

Locomotive does not make sounds or respond when power is applied to track.

Check that power pack is plugged in and that wires to the track are connected properly. Turn throttle to zero position, turn the power pack power switch to OFF, wait a few seconds, then try again as in the DC section of the instructions.

7 OPERATING THE BIG BOY 4-8-8-4 LOCOMOTIVE (CONTINUED)

Sounds do not activate with Wireless Controller all the time.

Check battery power and change if needed. Different atmospheric conditions and/or metal pipes, conduits, and wire-screen scenery can cause range problems. Try holding the Wireless Controller antenna close to or on one of the active rails if the locomotive is far away from you.

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 its last use. Turn the throttle up slowly to place locomotive in idle. You can confirm the 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 idle. Turn the throttle voltage down slightly and try again. Once you are sure you are in idle, flip the direction switch again to reset the decoder. This can occur in DC mode with the "Load Control" feature in its "off" setting.

DCC FEATURES

The decoder provided with the Athearn N scale Big Boy Locomotive will operate with any NMRA compatible DCC system. The locomotive leaves the factory with address 3 as the default setting. 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 Configuration Variables (CV). A CV table is included in the operating instructions. Either 14 speed steps or 28/128 speed steps are supported by the system in your model. Available accessory and sound functions are as follows:

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

In addition to Function Ø (Directional Lighting) there are twenty-eight 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.

CAUTION: Some DCC systems come equipped with a switch for extra voltage for larger scales (usually O or G scales) 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). Do not run your new Athearn N scale Big Boy Locomotive with power packs intended for G scale or other systems that exceed 18 V DC as you may damage the locomotive circuitry. Also, never operate your locomotive with a transformer designed for use with any AC powered models, such as O-27 trains or AC-operated HO models.

DCC OPERATION

Your new Athearn N scale 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 (1-9999) 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)**
- **28 accessory functions (F1-F28)**
- **Advanced consisting (CV19)**
- **OPS mode programming**
- **NMRA DCC standard compatible**
- **Complies with Part 15 of FCC Rules**

The Athearn N scale Big Boy Locomotive can be operated with the steam sounds on or off, by double clicking the headlight button (FØ) on your DCC controller. When the steam sounds are turned off, all other sounds are also turned off.

Before attempting any programming, you should test run your locomotive first in its factory default address 3 to make sure it works correctly. Run it forward and backward and test the bell and whistle. Turn the light on and off. If everything works as expected, you can program the parameters you want.

To acquire your locomotive, select its current address 3 on your DCC system. Press any function button (other than F1 or F2) or bring the throttle up one click. Either of these actions will acquire the locomotive's address, and now you can follow the CV chart in this manual to program any new features you want into the locomotive. For best results, you should initially program your 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 using your DCC control system, please consult your DCC system's instruction book regarding programming or contact the manufacturer of your DCC system for proper guidance.

DCC PROGRAMMING

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. There are Program Track Boosters available which will provide the required power for programming sound decoders.

Because this locomotive has a dual function sound decoder on-board, it does not support the CV read back feature.

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 from NMRA or their website: www.nmra.org.

DCC TROUBLESHOOTING

Always check to make sure the locomotive is on the track and all wheels are properly aligned as not to cause a short circuit. Also, sometimes you may simply turn your power supply off and on, and the locomotive will run again.

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.

Locomotive responds to Bell/Whistle functions but does not move.

CV29 is not programmed correctly for either a 2 digit address or a 4 digit address. Input a value of "2" in CV29 for a 2 digit address, or a value of "34" in CV29 for a 4 digit address.

Locomotive idles but does not move or respond to commands.

Make sure you did not program the locomotive into an advanced consist (CV19). In your DCC system's "Program CV Mode," input a value of "0" into CV19. Any misguided programming of values in the DCC mode can cause a decoder to malfunction. Always try to first set the decoder back to its factory defaults by using CV125. If this does not work, try programming the following CVs with the following values:

CV1 = 3 CV17 = 0
CV18 = 0 CV19 = 0
CV29 = 2

If these steps don't work, try running the locomotive in DC mode. If the locomotive runs in DC mode, chances are it can be reprogrammed to operate in DCC mode, but there are severe problems with the decoder programming. To get the model back to factory settings, you will need to reset the decoder in the

DC mode. Perform the following steps using a DC power pack:

Step 1: Turn power packs master power switch to ON.

Step 2: Slowly bring up throttle until you hear hissing/idling sounds.

Step 3: Leaving throttle in its position, turn power switch off.

Step 4: Hold down the STP button on the Wireless Controller while turning power switch back on. You will hear the decoder say "program." Release Wireless Controller button, decoder will say "program" again. This confirms you are in the DC program mode.

Step 5: Wait 2 seconds, press the STP button again and listen for "program." Perform step 5 four more times (total of five times).

After you hear the decoder say "program" after the fifth time, you will hear a steam release. This will confirm that the decoder has been reset to its factory defaults (for both DC and DCC modes).

Step 6: Try running the locomotive again using your DCC control system.

Step 7: If you are still having trouble with your locomotive contact Athearn Trains for further assistance.

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.



9 FEATURES

Headlight

Controllable in both DC and DCC modes



Swivel Coupler

Optional operating coupler can be installed

Valve Gear and Side Rods

Fully functioning with both metal and Celcon components

**Drivers**

Nickled wheels with first and last sets sporting Neoprene traction tires

Firebox

Appropriately detailed for either coal or oil-fired versions

Tender Lead Truck

Replicates GSC design

Tender

Outfitted for coal or oil per the specific locomotive modeled

"Centipede" Tender Chassis

Unique design allows lateral play for accommodating curves and turnouts.



The Athearn N scale 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 & maintenance is required to insure the flawless operation of this fine model. Following these simple procedures will give you years of trouble-free enjoyment.

CARE, CLEANING & STORAGE

Dust and debris are among the leading contributors to poor operation of any model locomotive mechanism. To maintain 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 as they may mar the finish. When not in use it is recommended that the locomotive and tender be stored in the protective clear plastic wrapper and sleeve in which it was originally packed. Also, when storing the Wireless Controller always remove the battery.

WHEEL CLEANING

Your locomotive receives electric power from both rails through all drivers and tender wheels. This, coupled with the long overall wheelbase, provides for excellent electrical contact. However, over time, dirt from the rails will accumulate on the wheel surfaces and will need to be removed to assure consistently satisfying operation. Inspect the underframe regularly, and make sure 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 prevent proper electrical contact. Use a cotton swab to apply either alcohol or a good quality track cleaning solution. Carefully apply the solvents, taking care not to spill any on 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.

LUBRICATION

This locomotive will arrive pre-lubricated from the factory and will not need additional lubrication until it has been run for many, many hours. 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 plastic used for the gears and drive line 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 motors: *Light oil*
- Bearings on worm gear shafts: *Light oil*
- Bearings on the tender wheels: *Light oil*
- Side rods at the crank pins: *Light oil*
- Gear tower: *Light gear grease*

You can access each of these areas by following the exploded drawings. If you are not comfortable with disassembling this locomotive for lubrication, take it to the hobby shop where you purchased it, or any other hobby store that sells Athearn models.

COUPLER INSTALLATION

The Athearn N scale Big Boy model comes with non-operating 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.

An operating front coupler is provided, and can be installed on the pilot. Refer to the exploded view drawings in this manual and simply unscrew and remove the non-operating coupler. The operating coupler provided (part 118) fits in the same cavity and is secured with the same screw (part 121).

REPLACING THE TRACTION TIRE

To provide tractive effort that rivals the prototype, one traction tire is factory installed on the last set of drivers. The tire is made of Neoprene rubber and should last for many, many hours of operation. Replacement traction tires (part 82) are available from your local hobby shop.

To replace a worn or loose traction tire:

Step 1: Remove the crank pin nuts from the traction tire equipped driver.

Step 2: Loosen the remaining crank pin screws from the other drivers.

Step 3: Remove the eccentric crank, main rods, bushing and drive rod from the crank pin on the traction tire equipped driver.

Step 4: Slide off the traction tire and replace with a new tire.

Step 5: Reverse the procedure of disassembly.

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

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.

BIG BOY FUNCTION TABLE

Function	Idle/Moving
F0	Light on/off, press once. Double click F0 = Master volume control
F1	Bell on/off
F2	Whistle
F3	Air Release
F4	2 types of coupling/uncoupling sounds
F5	Brake squeal (repeat press will increase length)
F6	Conductor while idle / toggle chuff or 2 types of rail clack while moving
F7	Fire box door open and close
F8	Whistle type select (19 versions)
F9	Metal crank 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 (4 versions)
F20*	Bell ring rate
F21*	Bell volume
F22	Whistle volume control
F23	Chuff volume control
F24	Chuff type (4 versions)
F25	Air brake release
F26	Associated locomotive sounds
F27	Associated locomotive sounds
F28	Scraping coal shovel

Note: There are only a few DCC Systems on the market that can access functions higher than F12.

**Note: F1 [Bell] does not have to be activated when using F19, F20, and F21.*

The Bell will come on automatically.

13 DCC CONFIGURATION VARIABLES

BIG BOY CV CHART

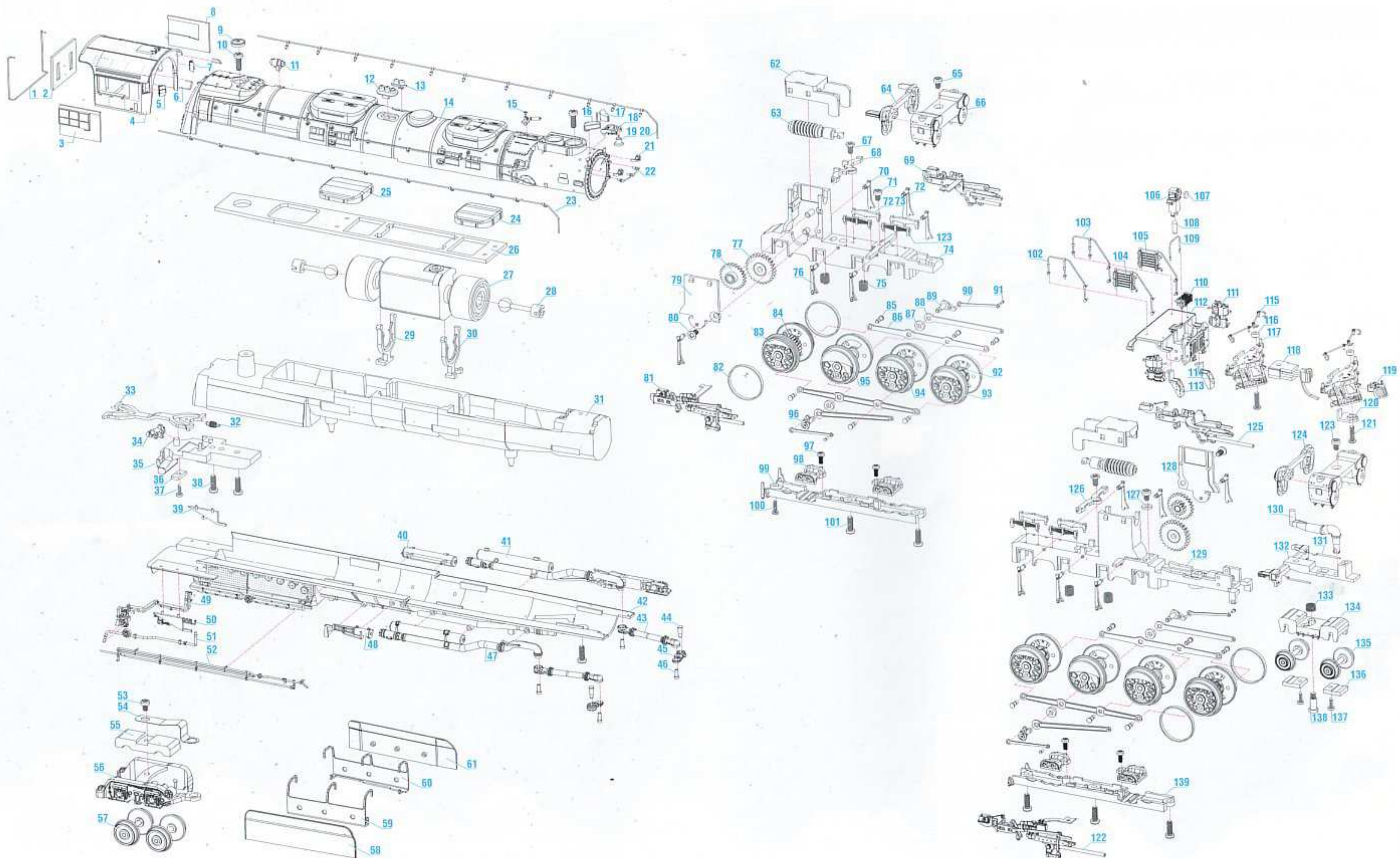
CV	Register	Description	Range	Default
CV1	R1	Short address	1-127	3
CV2	R2	Start voltage	0-32	0
CV3	R3	Acceleration	0-32	8
CV4	R4	Deceleration	0-32	8
CV5	---	Top voltage	0-32	32
---	R6	Page number	---	---
CV29	R5	Basic Configuration	---	2
CV7	R7	Manufacturer version number	---	32
CV8	R8	Manufacturer ID	---	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 CV-21=0, all accessory functions will follow their own address. When CV-21=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 (19 versions)	0-18	5
CV51	---	Whistle volume	0-3	3
CV52	---	Bell type (4 versions)	0-3	0
CV53	---	Bell volume	0-3	3
CV54	---	Bell ring rate	0-50	10
CV55	---	Chuff type (4 versions)	0-3	0
CV56	---	Chuff volume	0-3	3

BIG BOY CV CHART (CONTINUED)

CV	Register	Description	Range	Default
CV57	---	Brake squeal volume	0-3	1
CV58	---	Air release volume	0-3	3
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
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



15 LOCOMOTIVE EXPLODED VIEW

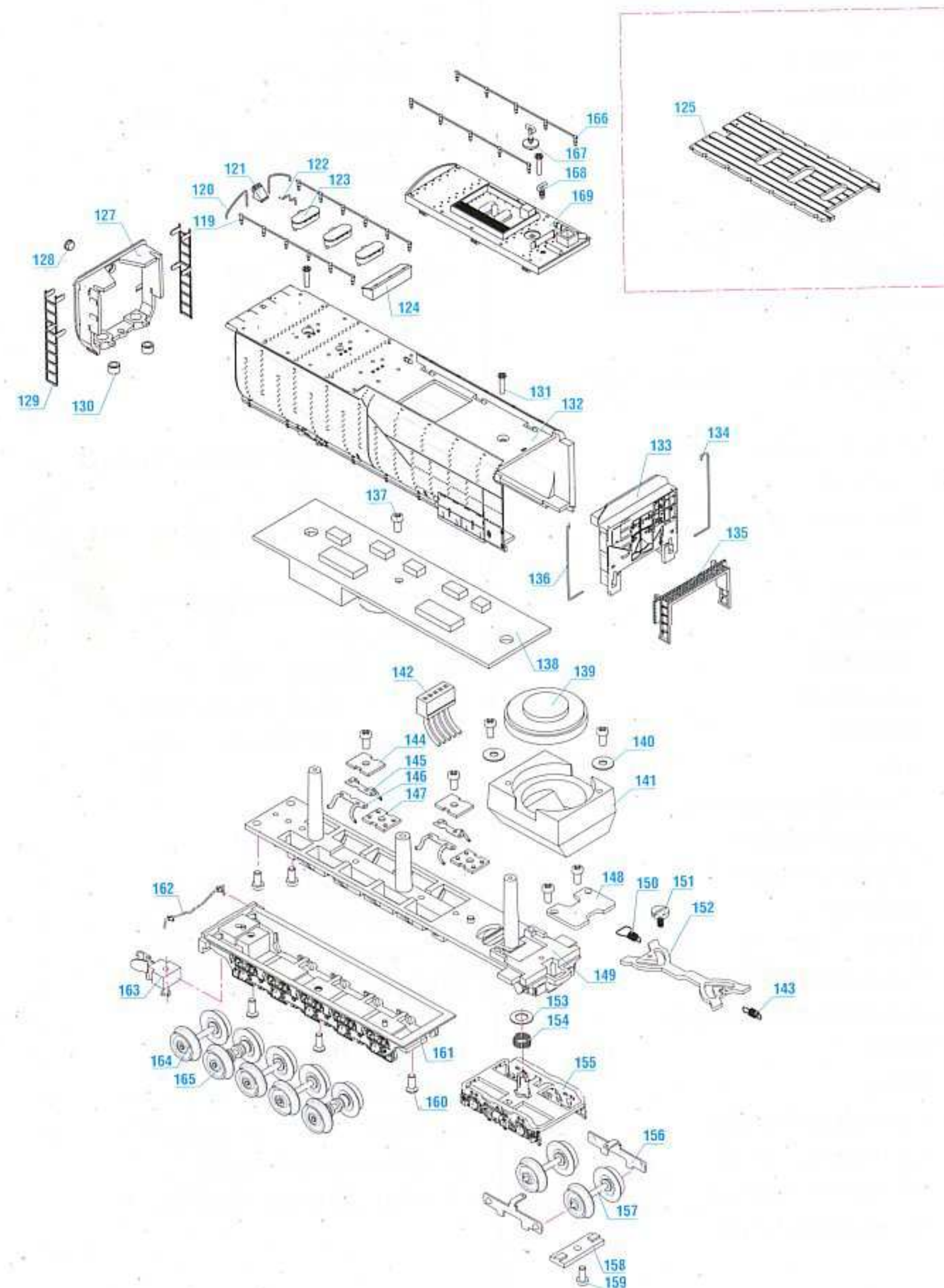


LOCOMOTIVE PARTS LIST

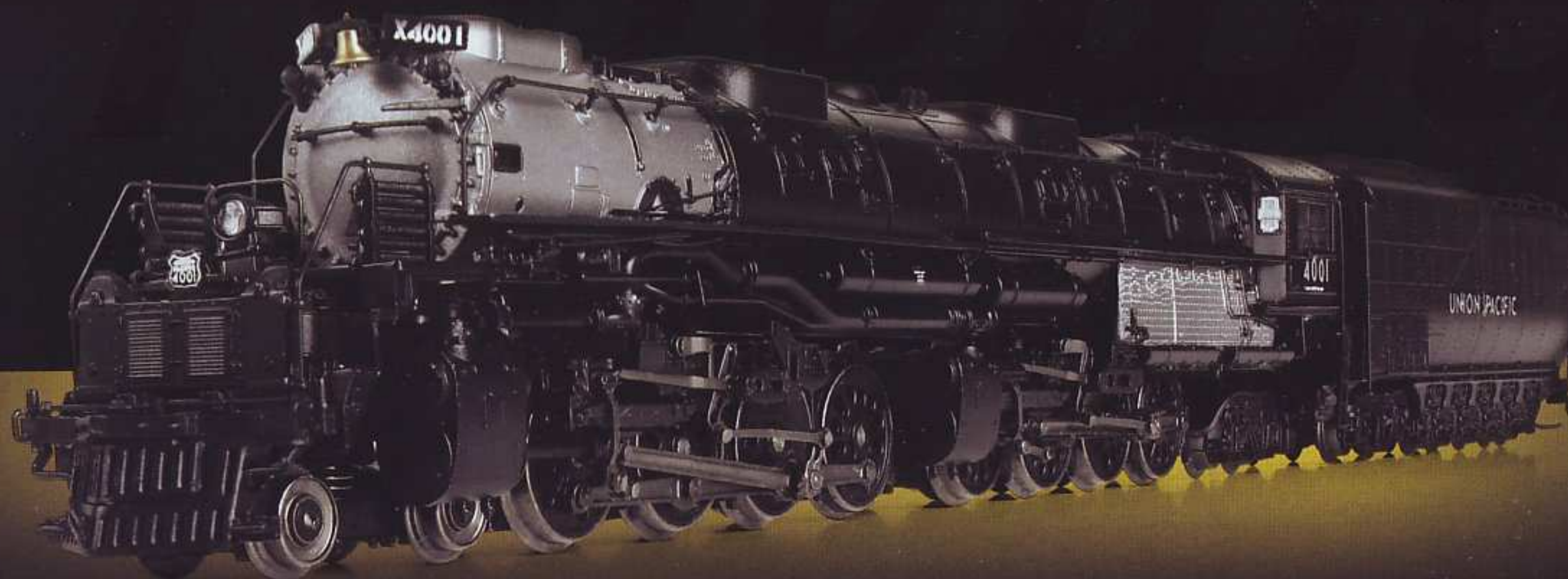
16

NO	DESCRIPTION	QTY	NO	DESCRIPTION	QTY	NO	DESCRIPTION	QTY	NO	DESCRIPTION	QTY
1	CAB HANDRAIL	2	36	WIRE FIX PLATE	1	71	SCREW	2	106	HEADLIGHT	1
2	CAB END DOOR WINDOW GLASS	1	37	SCREW	1	72	LEAF SPRING 1	4	107	HEADLIGHT LENS	1
3	CAB WINDOW GLASS RIGHT	1	38	SCREW	2	73	LEAF SPRING 3	2	108	BULB	1
4	CABIN	1	39	TRIANGULAR DETAIL UNDER CAB LEFT	1	74	REAR GEAR BOX	1	109	HANDRAIL ON DECK	1
5	CAB WINDOW GLASS FRONT RIGHT	1	40	AIR TANK REAR LEFT	1	75	SPRING FOR WHEEL AXLE	4	110	COOLING PIPE (B)	1
6	CAB FRONT HANDRAIL	2	41	PIPING FOR REAR CYLINDER LEFT	1	76	BRAKE DETAIL 2	6	111	COMPRESSOR	2
7	CAB WINDOW GLASS FRONT LEFT	1	42	BOILER BOTTOM	1	77	COMPOUND GEAR (Z=24/12)	2	112	PILOT DECK	1
8	CAB WINDOW GLASS LEFT	1	43	LINK BAR FOR FRONT CYLINDER	2	78	IDLER GEAR	2	113	PILOT LADDER (RIGHT)	1
9	BOILER SCREW COVER	1	44	PIN FOR FRONT CYLINDER	2	79	REAR GEAR COVER	1	114	PILOT LADDER (LEFT)	1
10	SCREW	3	45	PIPING FOR FRONT CYLINDER	2	80	SCREW	2	115	COUPLER LIFT BAR	1
11	GENERATOR (SINGLE)	1	46	PIN FOR LINK BAR	4	81	EXPANSION LINK ASSEMBLY REAR RIGHT	1	116	BRASS SLEEVE	1
12	WHISTLE #2 (TRIPLE)	1	47	PIPING FOR REAR CYLINDER RIGHT	1	82	TIRE	4	117	PILOT	1
13	WHISTLE #1 (DOUBLE)	1	48	REVERSE CYLINDER	1	83	1ST & 4TH RECESS WHEEL ASSEMBLY	2	118	OPTIONAL OPERATING FRONT COUPLER	1
14	BOILER TOP	1	49	PIPING OUTSIDE FIREBOX #1	1	84	SHAFT GEAR	2	119	DUMMY SWIVEL COUPLER	1
15	SAFETY VALVE	1	50	TRIANGULAR DETAIL UNDER CAB RIGHT	1	85	PIN FOR SIDE ROD	12	120	SUPPORT FOR DUMMY SWIVEL COUPLER	1
16	NUMBER BOARD RIGHT	1	51	PIPE UNDER CABIN RIGHT	1	86	SIDE ROD	4	121	SCREW	1
17	NUMBER BOARD LEFT	1	52	PIPING OUTSIDE FIREBOX #2	1	87	CRANK WASHER	4	122	EXPANSION LINK ASSEMBLY FRONT RIGHT	1
18	BELL SUPPORT	1	53	SCREW	1	88	MAIN ROD	4	123	LEAF SPRING 2	2
19	BELL	1	54	SPRING PLATE FOR TRAILING TRUCK	1	89	CRANK RIGHT	2	124	FRONT CYLINDER COVER LEFT	1
20	BOILER HANDRAIL LEFT	1	55	WEIGHT	1	90	SMALL ROD #2	4	125	EXPANSION LINK ASSEMBLY FRONT LEFT	1
21	MARKER LIGHT	2	56	TRAILING TRUCK	1	91	SHORT PIN	4	126	FRONT EXPANSION LINK SUPPORT	1
22	DUMMY SWIVEL COUPLER	1	57	TRAILING WHEEL ASSEMBLY	2	92	BUSH	8	127	WASHER	1
23	BOILER HANDRAIL RIGHT	1	58	SMOKE DEFLECTOR RIGHT	1	93	1ST & 4TH WHEEL ASSEMBLY	2	128	FRONT GEAR COVER	1
24	WEIGHT 3	1	59	SMOKE DEFLECTOR SUPPORT RIGHT	1	94	2ND WHEEL ASSEMBLY	2	129	FRONT GEAR BOX	1
25	WEIGHT 2	1	60	SMOKE DEFLECTOR SUPPORT LEFT	1	95	3RD WHEEL ASSEMBLY	2	130	PIPING UNDER SMOKE BOX	1
26	PCB FOR LOCO	1	61	SMOKE DEFLECTOR LEFT	1	96	CRANK LEFT	2	131	PISTON TRACK SHAFT	2
27	MOTOR ASSEMBLY	1	62	WORM COVER	2	97	SCREW	4	132	FRONT PISTON TRACK FIX SUPPORT	1
28	JOIN HEAD FOR MOTOR	2	63	WORM ASSEMBLY	2	98	PICK UP BOX ASSEMBLY	4	133	SPRING FOR LEAD TRUCK	1
29	MOTOR SADDLE (SMALL HOLE)	1	64	REAR CYLINDER COVER LEFT	1	99	REAR GEAR BOX BOTTOM COVER	1	134	LEAD TRUCK	1
30	MOTOR SADDLE (BIG HOLE)	1	65	SCREW	2	100	SCREW	1	135	LEAD WHEEL ASSEMBLY	2
31	BODY WEIGHT	1	66	FRONT CYLINDER	2	101	SCREW	5	136	LEAD TRUCK COVER	2
32	SPRING FOR DRAW BAR	1	67	SCREW	2	102	PILOT HANDRAIL RIGHT (2)	1	137	SCREW	2
33	DRAW BAR BETWEEN LOCOMOTIVE & TENDER	1	68	REAR EXPANSION LINK SUPPORT	1	103	PILOT HANDRAIL LEFT (2)	1	138	SCREW FOR LEADING TRUCK	1
34	CAB UNDER PART LEFT	1	69	EXPANSION LINK ASSEMBLY REAR LEFT	1	104	PILOT HANDRAIL RIGHT (1)	1	139	FRONT GEAR BOX BOTTOM COVER	1
35	FRAME	1	70	BRAKE DETAIL 1	6	105	PILOT HANDRAIL LEFT (1)	2			

17 COAL TENDER AND OIL TENDER EXPLODED VIEW & PARTS LIST



NO	DESCRIPTION	QTY	NO	DESCRIPTION	QTY
119	Tender Handrail Top	2	146	Pick Up Plate Right	2
120	Tender Handrail Rear Top	2	147	Isolator Plate	2
121	Tender Backup Light Base	1	148	Coupler Cover	1
122	Tender Backup Light Wire	1	149	Tender Chassis	1
123	Tender Manholes	3	150	Spring A for Draw Bar	1
124	Tender Toolbox	1	151	Tender Coupler Pin	1
125	Tender Wood Plank	1	152	Draw Bar	1
126	Coal Load	1	153	Washer	1
127	Tender Cover Rear	1	154	Tender Spring	1
128	Tender Light Rear	1	155	Tender Trailing Truck	1
129	Tender Ladder	2	156	Tender Pick Up Plate	2
130	Tender Screw Sleeve	2	157	Tender Trailing Wheel Assembly	2
131	Screw	2	158	Truck Fix Plate	1
132	Tender Body	1	159	Screw	1
133	Tender Cover Front	1	160	Screw	2
134	Tender Handrail Front Left	1	161	Tender Truck	1
135	Tender Front Platform	1	162	Tender Lift Bar	1
136	Tender Handrail Front Right	1	163	Micro-Train Coupler (1015)	1
137	Screw	9	164	Centipede Wheel Assembly	3
138	Tender PC Board	1	165	Centipede Wheel w/ Bearings Assembly	2
139	Speaker	1	166	Oil Bunker Handrail	2
140	Washer	2	167	Oil Bunker Part #1	1
141	Speaker Base	1	168	Oil Bunker Part #2	1
142	Plug	1	169	Oil Bunker	1
143	Spring A for Draw Bar	1	170	Tender side handrail	2
144	Fix Plate	1	171	Tender Body	1
145	Pick Up Plate Left	2			



ENJOY YOUR BIG BOY STEAM LOCOMOTIVE.

- The Athearn Team