UP Class 4000 "BigBoy"

Prototype information

The **class 4000** of the Union Pacific Railroad (UP), known as the **Big Boy**, was one of the largest and most powerful steam locomotives worldwide.

A total of 25 units of this type were built by the American Locomotive Company (ALCO), 20 in the year 1941 and five in the year 1944. It was designed by a team led by Otto Jabelmann, who had already designed the Big Boy predecessor, the class 3900. (The Manufacturer's designation was *Challenger* with the wheel arrangement (2'C) C2 ').
An unknown employee of the ALCO works came up with the name Big Boy, which he wrote with chalk on the smoke chamber. The name came into use quickly for the locomotives of the 4000 class.

The locomotives were specified by the Union Pacific Railroad especially for the freight duty in the Rocky Mountains, to eliminate the need for labor-intensive double heading and helper operations over the continental divide. The most difficult section on the Union Pacific transcontinental line of was the long climb over Sherman Hill (Albany County, Wyoming) south of Ames Monument, with a maximum gradient of 1.55%. The new locomotives needed to pull 3.600 short tons (about 3.300 t) up this gradient, but also had to be fast enough to cover the whole distance between Cheyenne (Wyoming) and Ogden (Utah) without changing locomotives.

The performance requirements showed the need for an articulated locomotive with the wheel arrangement (2'd) D2 ' (Whyte notation: 4-8-8-4). No other locomotive was ever built with this wheel arrangement. Like many of the new US articulated locomotives, the Big Boys were not Mallet locomotives in the strict sense, because they were not compound locomotives. In America this design is therefore referred to as simple articulated (articulated locomotive with simple expansion).

For firing using low-quality coal, the fire box was designed to be very large with almost 720 sq ft (67m²) heating surface. The locomotives had a mechanical coal feed using a stoker. Coal consumption at full load was up to 25 tons per hour. The locomotive no. 4005 was tentatively converted to oil firing, which proved not to be effective, and therefore it was converted back to coal.

With a total weight of 548.3 tonnes and a maximum continuous power of 6,290 hp pulling a train at 30 mph (48 km / h), the Big Boys were some of the heaviest and most powerful steam locomotives ever built. They were also the fastest articulated steam locomotives, with a speed of 112 km / h (70 mph). The design was engineered for up to 80 mph (129 km / h) in order to provide a high safety margin.

In order to use the Big Boys, the Overland Route line between Ogden (Utah) and Green River (Wyoming) had to be rebuilt in several places. Almost every curve was realigned so that two Big Boys could pass each other. The roadbed was also reinforced.

Source: Wikipedia

Sound Project Information

The sound operates both the thundering highball and the light coasting on flat grades. Use F15 to switch between modes.

The sound project is based on the Zimo Advanced Standard.

The Decoder must have SW Version 33.14 or higher.

The sound project is also designed for the new Zimo MX 697 sound decoder, which fits the NMRA G-scale plug and play connector. All other Zimo sound decoders also work well, except the old MX 690 series, which is not designed for complex sounds with coasting.

FA 7 and servo 1 can operate several electric couplers. The Kadee electric coupler can simply be plugged in to servo conector 1.

CVs 3, 4, 5, 57, 154 and 158 contain important values for the sound project. Please change these values very carefully!

Function numbering is default, i.e. the same as function key. All function are easy changeable to another key with the Zimo function key mapping,
Program the desired key number as your value in the CV 400+Fu number and the whole function is mapped to another key. Please take care, as it is possible to map multiple functions to the same key! Please read the instruction sheet
http://sound-design.white-stone.ch/Information.html

Function	Installation	Function output	Sound effect
F0	Lights on	FA 0v+0r	
F1	Bell		Bell
F2	Whistle l-l-s-l		Highway crossing
F3	Long Whistle		Whistles sounds as long as the key is activated
F4	Short Whistle		One short whistle
F5	Cab light	FA 5	
F6	Smoke generator on heater, load controlled Also replaceable with Zimo blowing smoker	FA 6 Ventilator operated blower	
F7	Cylinder valve		Blow down
F8	Sound on / off		Light engine
F9	Rail squeal		Sound of wheels squealing on sharp curves
F10	Stoker (automatic coal feeder)	FA 8 flickers automatically	Compressor for stoker
F11	Blower	Smoke ventilator is on	Steam blowing
F12	Coupler opening – loco moves back and forth	FA7 and servo 1 opens electrically	Uncoupling sound
F13	Coupling		Coupling sound
F14	Pop valve (safety valve)		Loud steam blast
F15	Full power / coasting		Switch between 2 sounds
F16	Tunnel fader (muting)		Fade in or out in 2,5 sec
F17			
F18	Injector		Feeding water in the boiler
F19	Dual Westinghouse air pump, fast		2 air pumps, different speeds
F20	Filling the tender with water		Water running
F21	Marker lights	FA9	
F22			
F26			
F27	Volume -		Volume
F28	Volume +		Volume

Random effect	noise		
Z1	Dual air pump fast	Every time the loco stops	
Z2	Dual air pump slow	Maintaining air pressure	
Z3	Blower	Ventilator blows smoke out of stack	
Z4	Injector	Steam injects water into the boiler	
Z5	Blow Down	Steam blast	
Z6	Stoker air motor		
Z7			
Z8	Safety valve	Loud popping noise	

Input	sound	
1	bell	
2	whistle	
3	Cam chuff trigger	

Changing CVs values used by the reset

CV# 1 = ---	CV# 205 = 255	CV# 256 = 255
CV# 3 = 20	CV# 206 = 255	CV# 260 = 0
CV# 4 = 20	CV# 207 = 255	CV# 267 = 43
CV# 29 = ---	CV# 208 = 255	CV# 269 = 20
CV# 35 = 0	CV# 209 = 255	CV# 272 = 130
CV# 36 = 0	CV# 210 = 255	CV# 273 = 15
CV# 37 = 0	CV# 211 = 255	CV# 274 = 100
CV# 38 = 0	CV# 212 = 255	CV# 275 = 150
CV# 41 = 0	CV# 213 = 255	CV# 276 = 180
CV# 42 = 0	CV# 214 = 255	CV# 277 = 50
CV# 43 = 0	CV# 215 = 255	CV# 283 = 200
CV# 44 = 0	CV# 216 = 255	CV# 286 = 100
CV# 45 = 0	CV# 217 = 255	CV# 287 = 70
CV# 46 = 4	CV# 218 = 255	CV# 288 = 30
CV# 57 = 140	CV# 219 = 255	CV# 301 = 13
CV# 60 = 60	CV# 220 = 255	CV# 302 = 16
CV# 63 = 51	CV# 221 = 255	CV# 303 = 21
CV# 65 = 0	CV# 222 = 255	CV# 311 = 0
CV# 114 = 127	CV# 223 = 255	CV# 312 = 7
CV# 115 = 66	CV# 224 = 255	CV# 313 = 116
CV# 116 = 145	CV# 225 = 255	CV# 314 = 25
CV# 124 = 3	CV# 226 = 255	CV# 345 = 15
CV# 132 = 72	CV# 227 = 255	CV# 346 = 2
CV# 133 = 20	CV# 228 = 255	CV# 351 = 204
CV# 137 = 153	CV# 229 = 255	CV# 353 = 32
CV# 138 = 204	CV# 230 = 255	CV# 354 = 40
CV# 139 = 255	CV# 231 = 255	CV# 395 = 150
CV# 146 = 255	CV# 232 = 255	CV# 396 = 27
CV# 147 = 255	CV# 233 = 255	CV# 397 = 28
CV# 148 = 255	CV# 234 = 255	CV# 430 = 21
CV# 150 = 255	CV# 235 = 255	CV# 432 = 9
CV# 151 = 255	CV# 236 = 255	CV# 434 = 9
CV# 153 = 255	CV# 237 = 255	
CV# 154 = 18	CV# 238 = 255	
CV# 158 = 127	CV# 239 = 255	
CV# 159 = 48	CV# 240 = 255	
CV# 160 = 8	CV# 241 = 255	
CV# 163 = 255	CV# 242 = 255	
CV# 167 = 255	CV# 243 = 255	
CV# 181 = 12	CV# 244 = 255	
CV# 195 = 255	CV# 245 = 255	
CV# 196 = 255	CV# 246 = 255	
CV# 197 = 255	CV# 247 = 255	
CV# 198 = 255	CV# 248 = 255	
CV# 199 = 255	CV# 249 = 255	
CV# 200 = 255	CV# 250 = 255	
CV# 201 = 255	CV# 251 = 255	
CV# 202 = 255	CV# 252 = 255	
CV# 203 = 255	CV# 253 = 255	
CV# 204 = 255	CV# 254 = 255	