# Southern Pacific Cab-forward


## Prototype information

The best known example of the cab-forward design in the United States, the Southern Pacific Cab-Forward (also known to a lesser extent as "Cab-in-fronts" and "Cab-aheads") placed the cab at the front by the simple expedient of turning the entire locomotive, minus the tender, by 180 degrees. This arrangement was made possible by burning fuel oil instead of coal.

The cab forward design was widely used by the Southern Pacific Railroad, which developed it to deal with the peculiar problems of its routes. The 39 long tunnels and nearly 40 miles (64 km) of snow sheds of the Sierra Nevada Mountains could funnel dangerous exhaust fumes back into the crew compartment of a conventional locomotive. After a number of crews nearly asphyxiated, the locomotive was run in reverse. This meant that the tender was leading the train, which introduced new problems. The tender blocked the view ahead and put crewmen on the wrong sides of the cab for seeing signals. The tenders were not designed to be pushed at the lead of the train, which limited speeds. Southern Pacific commissioned Baldwin Locomotive Works to build a prototype cab-forward locomotive, then ordered more units before the prototype had even arrived.

All of the cab-forwards were oil-burning locomotives, which meant there was little trouble involved putting the tender at what would normally be the front of the locomotive. The oil and water tanks were pressurized so that both would flow normally even on uphill grades. Visibility from the cab was superb, such that one crewman could easily survey both sides of the track. There were concerns about what would happen to the crew in the event of a collision, and at least one fatal accident occurred on the Modoc Line in Herlong, California when a moving locomotive struck a flat car. Turning the normal locomotive arrangement around also placed the crew well ahead of the exhaust fumes, insulating them from that hazard. One problematic aspect of the design, however, was the routing of the oil lines; because the firebox was located ahead of the driving wheels (instead of behind them, the usual practice), oil leaks could cause the wheels to slip. A nuisance under most conditions, it resulted in at least one fatal accident. This occurred in 1941 when a cab-forward with leaking steam and oil lines entered the tunnel at Santa Susana Pass, near Los Angeles. The tunnel was on a grade, and as the slow-moving train ascended the tunnel, oil on the rails caused the wheels to slip and spin. The train slipped backwards and a coupler knuckle broke, separating the air line, causing an emergency brake application and stalling the train in a tunnel that was rapidly filling with exhaust fumes and steam. The oil dripping on the rails and ties then ignited beneath the cab, killing the crew.

Wikipedia

## Sound project information

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

The Decoder must have SW Version 33.14 or higher.

The sound project is based on Zimo Advanced Standard.

All Zimo sound decoders works well, except the old MX 690 series, which cannot handle complex sounds with coasting.

FA 7 and servo1 can operate several electric couplers. The Kadee electric coupler can simply be plugged in on servo connector 1.

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

By default the function number is the same as function key. All the functions can easily be assigned to other keys, using 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 | Light on | FA 0v+0r | |
| F1 | Bell | | Bell |
| F2 | Whistle l-l-s-l | | App Highway crossing |
| F3 | Whistle long | | Playable as long as you push |
| F4 | Whistle short | | One short |
| F5 | Cab light | FA 5 | |
| F6 | Smoke generator on heater load controlled<br><br>Also replaceable with Zimo blowing smoker | FA 6 heater, on 15 min timer to prevent burnout<br><br>Fan output for cam operated blower | |
| F7 | Cylinder valve | | Blow down |
| F8 | Sound on / off | FA 8 flickers for Oil fire | Oil burner , Generator |
| F9 | Wheels screeching on curves | | Sound of Wheels screeching on curves |
| F10 | | | |
| F11 | Blower | Smoke fan is on | Steam blowing |
| F12 | coupler open engine twist back and for | FA7 and servo1 opens electric | Uncoupling sound |
| F13 | coupling | | Push coupler together |
| F14 | Pop valve (safety valve) | | Loud steam blast |
| F15 | Full power / coasting | | Switch between 2 sound modes |
| F16 | Tunnel fader (muting) | | Sound fades in or out in 2,5 sec |
| F17 | | | |
| F18 | injector | | Feeding water in the boiler |
| F19 | Dual Westinghouse air pump fast | | 2 air pumps at different speed |
| F20 | Filling water into tender | | Water splashing |
| F21 | Marker Lights | FA9 | |
| F22 | | | |
| F23 | | | |
| F24 | | | |
| F25 | | | |
| F26 | | | |
| F27 | Volume - | | Quieter |
| F28 | Volume + | | Louder |

| random effect | noise | |
|---|---|---|
| Z1 | Dual air pump fast | Every time the locomotive comes to a standstill |
| Z2 | Dual air pump slow | Maintaining air pressure |
| Z3 | Blower | Fan blows smoke out of stack |
| Z4 | Injector | Steam injects water into the boiler |
| Z5 | Blow Down | Steam blast |
| Z6 | Steam noise | |
| Z7 | | |

| | | |
|---|---|---|
| Z8 | Safety valve | Loud popping valve |

| **Input** | **sound** | |
|---|---|---|
| 1 | bell | |
| 2 | whistle | |
| 3 | Cam chuff trigger | |

## Changing CVs values used by the reset

CV# 1 = ---
CV# 3 = 20
CV# 4 = 20
CV# 17 = ---
CV# 29 = ---
CV# 35 = 0
CV# 36 = 0
CV# 37 = 0
CV# 38 = 0
CV# 41 = 0
CV# 42 = 0
CV# 43 = 0
CV# 44 = 0
CV# 45 = 0
CV# 46 = 4
CV# 57 = 140
CV# 60 = 60
CV# 63 = 51
CV# 65 = 0
CV# 114 = 127
CV# 115 = 66
CV# 116 = 145
CV# 124 = 3
CV# 132 = 72
CV# 133 = 20
CV# 137 = 153
CV# 138 = 204
CV# 139 = 255
CV# 146 = 255
CV# 147 = 255
CV# 148 = 255
CV# 150 = 255
CV# 151 = 255
CV# 153 = 255
CV# 154 = 18
CV# 158 = 13
CV# 159 = 48
CV# 160 = 8
CV# 163 = 255
CV# 167 = 255
CV# 181 = 12
CV# 195 = 255
CV# 196 = 255
CV# 197 = 255
CV# 198 = 255
CV# 199 = 255
CV# 200 = 255
CV# 201 = 255
CV# 202 = 255
CV# 203 = 255
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CV# 206 = 255
CV# 207 = 255
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CV# 249 = 255
CV# 250 = 255
CV# 251 = 255
CV# 252 = 255
CV# 253 = 255
CV# 254 = 255
CV# 256 = 255
CV# 260 = 0
CV# 267 = 43
CV# 269 = 20
CV# 272 = 130
CV# 273 = 15
CV# 274 = 100
CV# 275 = 150
CV# 276 = 180
CV# 277 = 50
CV# 281 = 5
CV# 283 = 200
CV# 286 = 100
CV# 287 = 70
CV# 288 = 30
CV# 301 = 13
CV# 302 = 16
CV# 303 = 21
CV# 311 = 0
CV# 312 = 7
CV# 313 = 116
CV# 314 = 25
CV# 345 = 15
CV# 346 = 2
CV# 351 = 204
CV# 352 = 255
CV# 353 = 32
CV# 354 = 40
CV# 376 = 128
CV# 395 = 150
CV# 396 = 27
CV# 397 = 28
CV# 430 = 21
CV# 432 = 9
CV# 434 = 9