SM18 User's Guide:

Bachmann Large Scale Socket

Phoenix Sound Systems, Inc.
3514 West Liberty Road
Ann Arbor MI 48103
www.phoenixsound.com
support: +1 (734) 662-6405
e-mail: phoenixsound@phoenixsound.com

Introduction

Dear Model Railroading Friends,

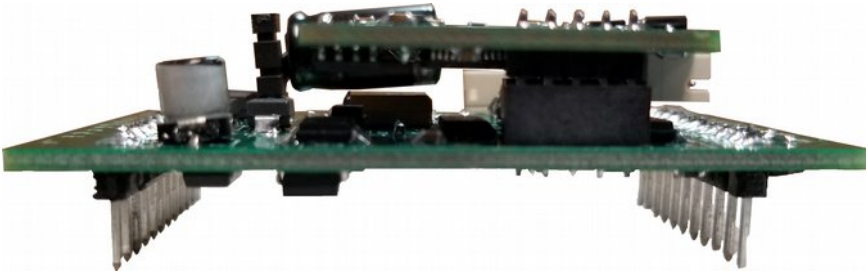
Thank you for choosing Phoenix Sound Systems for your railroading enjoyment. The SM18 marks our first All-in-one sound and motor decoder for DCC Operation. The SM18 is designed for simple plug in self installation in locomotives equipped with the Bachmann standard Large Scale Socket

The SM18 system, like all of our systems from the 2K2 onward, can be loaded and customized using a PC. You will need to upgrade your PC software to version *1.2.106* and ROM library files to version *R12* or newer to load and save SM18 compatible files.

The SM18 is protected against incorrect wiring and over-voltage gremlins. However, if you notice static electric sparks when you touch things you should ground yourself by touching something conductive before handling your board. Also be careful not to put the board on metal surfaces or model parts when powered. Basic electrical component handling precautions are always a good idea.

Happy Modeling.

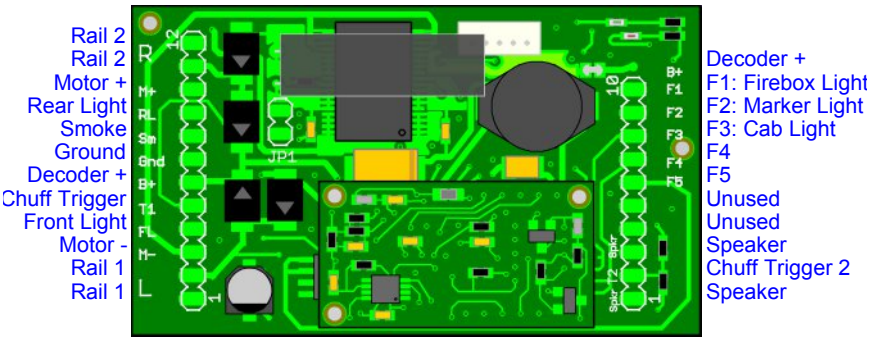
The SM18 System



The SM18 system is a combined motor and sound decoder consisting of two stacked circuit boards. The smaller upper board handles sound while the larger lower board controls the motor, lighting and function outputs of the system.

Decoder Pin Connections

DO NOT PLUG THIS MODEL INTO AN ARISTOCRAFT SOCKET LOCOMOTIVE. USE IN AN ARISTOCRAFT SOCKET VOIDS THE WARRANTY AND MAY RESULT IN DECODER FAILURE.



The Bachmann Large Scale Socket and Aristocraft socket may appear similar, in fact they have the same physcial layout, however they are *not* interchangeable. The J2 connections on aristocraft sockets were never standardized and vary among the main aristocraft circuit board designs. For example, socket pin J2:1 may connect to the speaker on one but on another it may be connected to the decoder B+. Other decoders which may plug into the Aristocraft socket have no connections to the J2 pins.

Easy Installation

SM18

Simply remove the appropriate cover piece of the locomotive (coal load on most and the central domes on the 2-6-6-2). Remove the Bachmann Dummy Board. Plug in the SM18 in the socket where the Dummy Board was located. Replace the locomotive cover. You are done.

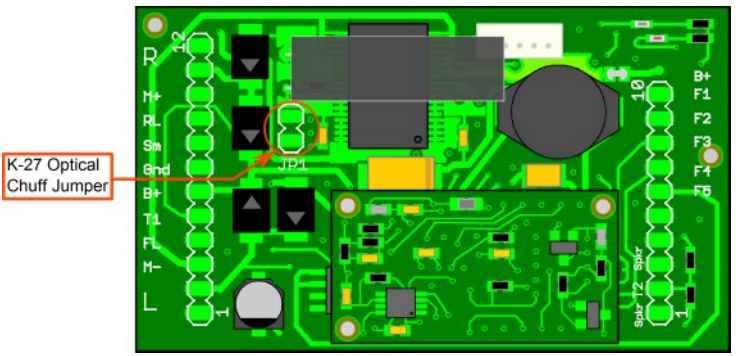
> Please note that the Bachmann socket arrangement has different pin counts on each end and can only be inserted in one orientation.

Speaker

Most Bachmann Socket equipped locomotives have the speaker factory installed. In the case of the K-27 and 2-6-6-2 there is a speaker mount but no speaker. These are sized for a 3 inch round speaker (Phoenix part number 820-770) which can then be wired to the solder pads on the locomotive circuit board labeled “speaker”.

K-27 Optical Chuff Jumper

The K-27 was the first Bachmann locomotive equipped with the optical chuff sensor; consequentaly following locomotives were fitted with a slightly different circuit to enhance the sensor repsonse based upon the K-27 experience. As a result, when using the optical chuff sensor in the K-27 a jumper must be disabled on the SM18 base board. Simply lift the shunt off of the two pins it is jumping. We recommend putting the shunt back on only one of the pins so that it does not get misplaced. The jumper is located next to the large horizontal capacitor on the circuit board, roughly in line with the J1:8 and J1:9 poisitons, as shown below.



DCC

DCC Function Defaults

Address: 3

Function	Assigned Effect
F0	Headlight/Reverse Light Enable
F1	Bell
F2	Manual Whistle
F3	Output F1 [Bachmann Firebox Light]
F4	Smoke On/Off
F5	Output F3 [Bachmann Cab Lights]
F6	Output F4
F7	Volume Up
F8	Volume Down
F9	Blow Down
F10	Station Announcement
F11	Chatter
F12	Shutdown

Control Variables (DCC CV)

The SM18 firmware supports the following Control Variables, which can be modified through by programming,in service mode, ops mode or in the Phoenix Computer Interface CV Programmer.

DO NOT USE OPS MODE FOR ADDRESS CHANGE COMMANDS

CV	Description	Default	Range
1	Short Address	3	0-99
2	Vstart	1	0-255
3	Acceleration Rate	10	0-255
4	Deceleration Rate	10	0-255
5	Vhigh	255	0-255
6	Vmid	128	0-255
7	Manufacturer Version # {Read Only}	18	n/a
8	Manufacturer ID {Read Only}	107	n/a
11	DCC Timeout (seconds)	10	0-255
17	Long Address	192	0-255
18	Long Address	3	0-255
29	Configuration *(See Chart 2)*	6	0-255
35	Function F1 *(See Chart 1)*	0	0-8
36	Function F2 *(See Chart 1)*	0	0-8
37	Function F3 *(See Chart 1)*	3	0-8
38	Function F4 *(See Chart 1)*	8	0-8
39	Function F5 *(See Chart 1)*	1	0-8
40	Function F6 *(See Chart 1)*	2	0-8
41	Function F7 *(See Chart 1)*	0	0-8
42	Function F8 *(See Chart 1)*	0	0-8
43	Function F9 *(See Chart 1)*	0	0-8
44	Function F10 *(See Chart 1)*	0	0-8
45	Function F11 *(See Chart 1)*	0	0-8
46	Function F12 *(See Chart 1)*	0	0-8
49	0 = Speed from Triggers; ≠ 0, speed from DCC	0	0-255

50	The DCC Value where motion starts.	0	0-255
51	The DCC Rate (Speed vs. Throttle)	100	0-200
53	Seconds in idle before shutdown. 0 = Never	0	0-300
65	Kick start	0	0-255
67-94	User Speed Table *(Disabled by default)*	-	0-255
224	Headlight Full Intensity (percentage)	100	0-100
225	Headlight Dim Intensity (percentage)	30	0-100
226	Auto-Dim Headlight Mode (Rule 17). Enabled ≠ 0	0	0-255
255	Motor Controller Firmware Version {Read Only}	82	n/a

Chart 1: Function Output Assignment (CV 35-46)

Value	Description
1	Output F3: J2:8 [Cab Light - Bachmann Plug In]
2	Output F4: J2:7
3	Output F1: J2:10 [Firebox Light - Bachmann Plug In]
4	Output F2; J2:9 [Marker Light - Bachmann Plug In]
5	Output F5; J2:6
6 & 7	*Unused*
8	Smoke; J1:8

Chart 2: CV29 NMRA Configuration Values

Bit	Value	OFF (Value 0)	On
Bit 0	1	Normal Driving Direction	Reverse Driving Direction
Bit 1	2	14 Speed Steps	28/128 Speed Steps
Bit 2	4	Digital operation only	Digital & Analog Operation
Bit 3	*8*	*Unused By Phoenix Sound Systems Decoders*	
Bit 4	16	Internal Speed Curve	User Speed Table (CV67-CV94)
Bit 5	32	Short Address mode (CV1)	Long Address mode (CV 17/CV18)
Bit 6	*64*	*Reserved By NMRA for future use*	
Bit 7	*128*	*Decoder type, set as Multifunction (0), not user alterable*	

Warranty

The materials and operation of the SM18 supplied by Phoenix are guaranteed to perform correctly for one year when installed and operated according to the instruction manual. In the unlikely event that your system fails, please call or e-mail us so that we may evaluate the situation and save any unnecessary shipping. We prefer to pre-evaluate returns because frequently there is a simple explanation for any perceived problem you may be experiencing. Repairs and or replacements covered by this warranty are at no cost. However return shipping may be charged, especially if you return your system in an engine, tender, box car or the like. A service fee may be assessed if it is determined that the failure was not due to any Phoenix supplied components.

Phoenix Sound Systems, Inc. cannot be liable for damage to the system during shipping to our facilities due to mishandling, inadequate packaging or similar circumstances beyond our control. Please be sure to package the SM18 system in a secure, static safe manner.

Please read the handbook and any included installation notes prior to installation and operation of your system. Contact us if you have questions or are unsure about any aspect of installation or operation.

Physical modification of the circuit boards in any fashion voids this warranty. Physical modifications include but are not limited to:

- Drilling of holes in the printed circuit board for any purpose.
- Removal, replacement or modification of any components.