XL SYSTEMS INC

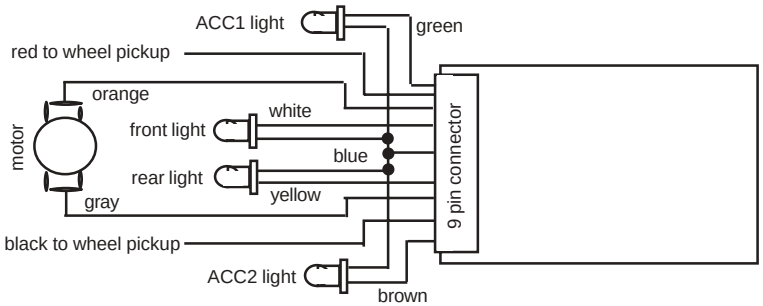
HO Universal Steam Sound Decoder

Item #0001911

- 10 types of synchronized chuff sounds with double chuff enabling
- 1.5 amp capacity
- 17 different types of whistles
- Programmable individual sound volumes
- Programmable either 2-digit or 4-digit addresses
- Programmable start voltage and top voltage
- Programmable acceleration and decelaration rates
- Programmable 14, 28, 128 speed steps
- Supports full read back of address and CV values
- Selectable factory default speed curve
- Advanced speed table control CV67-CV94
- Kick start voltage control CV65
- Directional Head lights
- Mars light and firebox flicker
- 28 accessory functions (F1-F28)
- Compatible with NMRA DCC standards
- Complies with Part 15 of FCC Rules
- Dimensions: 28.0mm x 17.0mm x 6.5mm

INSTALLATION

If your loco has a 9 pin JST plug you can simply unplug the original connector and plug in the decoder. If not, you have to remove the circuit board and hard wire in the decoder. The decoder will be inserted between the wheel pickups and the motor. After disconnecting the motor terminals from the pickups, connect the right side pickup wires to the red decoder wire, and connect the left side pickup wires to the black wire. Connect the right motor terminal to the orange wire, then connect the left motor terminal to the grey wire. **The motor terminals must be isolated from the wheel pickups.** The white wire is for the front headlight and the yellow wire is for the rear light. The blue wire is the light common, or if using LED's, the blue wire is LED positive. If your loco has a Mars Light, use the green wire ACC1 light for hook up. If you want your loco to have a firebox flicker, use brown wire ACC2 light for hook up. Use good soldering techniques, and use shrink wrap to isolate the connections. The decoder can't touch any metal part or bare wires. If you use LED lights or 1.5V bulb please series a 680 to 1000 ohm resistor. If your LED light doesn't work try swap wires.



OPERATION

The decoder has been programmed to address #3, 28/128 speed steps. Select address #3 and 28 speed step. Move up the throttle and the loco should move. The decoder has 20 types of chuff sounds (10 single and 10 double). You can use F24 to select them. Use F12 to turn on/ off sound. With our unique double chuff enable, (CV 122), you can also have 6 articulated chuff sounds. You can use F19 to select 14 different whistles. With MRC Prodigy Advance$_2$ DCC which has 28 functions, you can easily setup and access all the decoder's functions. This decoder should work with a DC power pack. However, can only have the default chuff sounds. If you want full control of all sounds on DC, please use the MRC Tech6 (item0001200) to operate the decoder.

SERVICE BRAKING

To apply service brake set throttle to zero and press F5. The loco will slow down fast and you will hear the brake squeal. You can pump the brake by turning F5 on and off to stop the loco at desired location. The brake rate is proportional to deceleration rate that you program in CV4. If you forget to turn off F5 and move the throttle up. The loco will move. However, when you release the throttle the service brake will apply again. The service brake can only operate when throttle is at 0.

BACK EMF LOAD CONTROL (PID CONTROLLER)

This decoder is equipped with adjustable back EMF load control feature. It is a PID closed loop feedback speed control. With back EMF load control the locomotive will maintain its speed regardless of pulling up hill or driving down hill. You may program the back EMF load control intensity, CV124, to a lower value to get less back EMF load control. This will enable the locomotive to slow down during uphill travel like real locomotive. The PID controller contains three components: proportional gain (CV113); the integral gain (CV114); and derivative gain (fixed). Designing (tuning) a PID controller is a kind of "rocket science". So optimized these gains at the factory but still give the customer final adjustments. We recommend that you do not change these settings. Too much gain may cause the motor to oscilate (become unstable). Too little gain may cause slow response. Additional knowledge of PID feedback control is required before attempting to adjust CV113 and CV114. If CV113 and CV114 are programmed incorrectly, the locomotive will not run smothly. Program CV125 to "1" will automatically restore the default PID controller settings. If the loco does not run smothly after program CV125=1, program CV124=0 to minimize the back EMF control.

SPEED TABLE CV67-CV94 FOR 28 SPEED STEPS

When CV29's bit 4 is set to "1" it will use the speed table formed by CV67-CV94 to control speed (motor voltage). It allows you to setup each speed for all 28 speed steps. First, program CV29 to 18 for short addresses (1-127) or program CV29 to 50 for long addresses (128-9999) to enable speed table control. Then select throttle to 28 speed steps and run your loco at speed step 1. Use program CV on the main to change CV67's value (1-255) to adjust step 1's speed. The kick voltage, CV65 is only applied when the speed step changes from 0 to 1. You should switch between 0 to 1 many times to check step 1's speed. When done with CV67, select speed step 2 and program CV68. CV68's value must be greater then CV67's. When done with CV67-CV94, use read back CV to make sure their values are in increasing order. Note: When using MRC Prodigy DCC to program addresses it will automatically disable the speed table (set CV29's bit 4 to "0"). Programming CV125 to 1 will also disable the speed table and reprogram CV67-CV94 to a default linear speed setting.

TROUBLE SHOOTING

Read back is optional. It depends on your dcc system. Your system may not be able to read back this decoder. MRC dcc can read back the decoder. All systems should be able to program it. This decoder can be Loco runing without chuff sound click F12. Whenever the decoder doesn't work please use the program track to program CV #125 with value 1 to restore the decoder to factory settings. This should bring the decoder to life with address #3. This decoder should perform well with all DCC systems. The maximum DCC output should be less than 18 V. If the locomotive does not respond to commands, it may have lost its address. Please reprogram the address and program CV19 to 0 (disable consist). If it responds slowly, you should clear its momentum by reprogramming CV3 and CV4 to 0. If step 1's speed is too high, you should program start voltage, CV2 to 0. If its top speed is too slow, program top voltage CV5 to 255. You should also clean the track to improve electrical pickup. Read your DCC system manual to learn how to program and operate the decoder. For more information about registers/CVs and their functions, please refer to the NMRA DCC Standard & Recommended Practices, RP-9.2.2. This is available directly from the NMRA or their website at **www.nmra.org**.

RETURN PROCEDURE

This decoder carries a 6 month warranty against factory defects. This warranty does not include abuse, misuse, neglect, improper installation, If it should become necessary to return the decoder for warranty repair / replacement, Please also include a check or a money order for $9.00 to cover return shipping and handling. If the decoder is no longer considered under warranty, then please include a check or a money order for $25.00 to cover the cost of repair or replacement and return shipping and handling. Before sending in the decoder please email us at **linzping@gmail.com** for service support. We may solve your program through email. Send the decoder to: XL Systems Inc 14 Dora Ln Holmdel NJ 07733

FCC COMPLIANCE

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions. (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

FUNCTION CHARTER

Function	Idle/Moving
F0	Headlight on/off
F1	Bell on/off
F2	Whistle
F3	Accessory light on/off, long air release
F4	Coupling 1
F5	Service brake squeal (must have lots momentun and fast reduce throttle to zero)
F6	Chuff sound on/off (drifting)
F7	Fire box open/close
F8	Water injector
F9	Metal crank sound on/off (moving), steam associated sound (idle)
F10	Water filling
F11	Blower hiss sound on/off(with delay)
F12	sound on/off
F13	Master volume reduce (CV49) by 1 / air release
F14	Master volume increase (CV49) by 1 / air release
F15	Associated loco sound
F16	Shoveling
F17	Coal augersound on/off(with delay)
F18	Safety valve air release
F19	Whistle type select (total 14 different ones)
F20	Air hose firing / uncoupling lever
F21	Flange noise
F22	Associated loco sound
F23	Flange noise
F24	Chuff type select (total 6 types)
F25	Long air release
F26	Sand dropping
F27	Associated loco sound
F28	Associated loco sound

LIGHT EFFECT PROGRAMMING CHART FOR CV#117/118/119

The decoder has 17 different lights effects. CV 117 controls both front and rear headlight effect. Use F0 to turn on or off the Headlights. CV118/CV119 control ACC1/ACC2 light effect. Use F3 to turn on or off ACC1 and ACC2. If you use a value inconsistent with actual headlights, (CV117), the headlights will default to normal on/off. For example trying to use a value of 14 in CV117 for firebox flicker, the headlights will default to normal on/off.

CV=	Light effect	CV=	Light effect
0	Normal on/off	9	Prime strato light
1	Dyno effect (fading)	10	Single strobe light
2	Cim, bright, off cycle	11	Double strobe light
3	Rule 17	12	Rotating beacon
4	Both healights on	13	Fred rear end flashing
5	Ditch light type A	14	Firebox flicker A
6	Ditch light type B	15	Firebox flicker B
7	Gyra light	16	Engine exhaust flicker
8	Marslight		

CV CHARTER

CV	Description	Range	Default
CV1	Short address	1-127	3
CV2	Start voltage	0-255	60
CV3	Acceleration	0-255	0
CV4	Deceleration	0-255	0
CV5	Top voltage	0-255	255
CV29	Basic configuration		2
CV7	Manufacturer version number		32
CV8	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 function will follow its own address. When CV21=1, all functions will follow the consist address	0-1	0
CV48	Chuff rate	0-100	64
CV49	Master volume control	0-63	63
CV50	Whistle type	0-13	5
CV51	Whistle volume	0-63	55
CV52	Bell type	0-3	0
CV53	Bell volume	0-63	55
CV54	Bell ring rate	0-50	10
CV55	Chuff volume	0-63	55
CV56	Brake volume	0-63	55
CV57	Safty valve volume	0-63	55
CV58	Air release volume	0-63	55
CV59	Blower hiss volume	0-63	55
CV60	Fire box door volume	0-63	55
CV61	Injector volume	0-63	55
CV62	Coupling volume	0-63	55
CV63	Water filing volume	0-63	55
CV64	Coal volume	0-63	55
CV112	Metal crank volume	0-63	55
CV113	Back emf load control proportional gain Kp	0-255	0
CV114	Back emf load control integal gain Kp	0-3	3
CV115	Auto brake squeal enable/disable	0-1	1(enable)
CV116	Light dim	0-63	55
CV117	Air pump type		
CV118	Accessary1 light effect	0-16	0
CV119	Accessary2 light effect	0-16	0
CV120	Light brightness	0-30	12
CV121	Chuff start point	0-7	3
CV122	Double chuff enable	0-1	0
CV123	Chuff type	0-1	0
CV124	Back EMF load control intensity (0=off)	0-255	0
CV125	Program it to1 will restore some the CV to factory default settng		0

About US

XL Systems Inc has designed and manufactured model rail road products for MRC for more than 20 years. All MRC DCC products are made by XL Systems Inc. All our DCC products are compatible MRC DCC products. We will introduce more new products to meet customer's beget. We also provide installation and special programming and modification for customer. If you have special needs please contact to us at: linzping@gmail.com or maxiulandcc@gmail.com.