Newest Technology, Lowest Prices

SOUND, LIGHT, MOTOR CONTROLLER MANUAL

V4 (10 key handheld)

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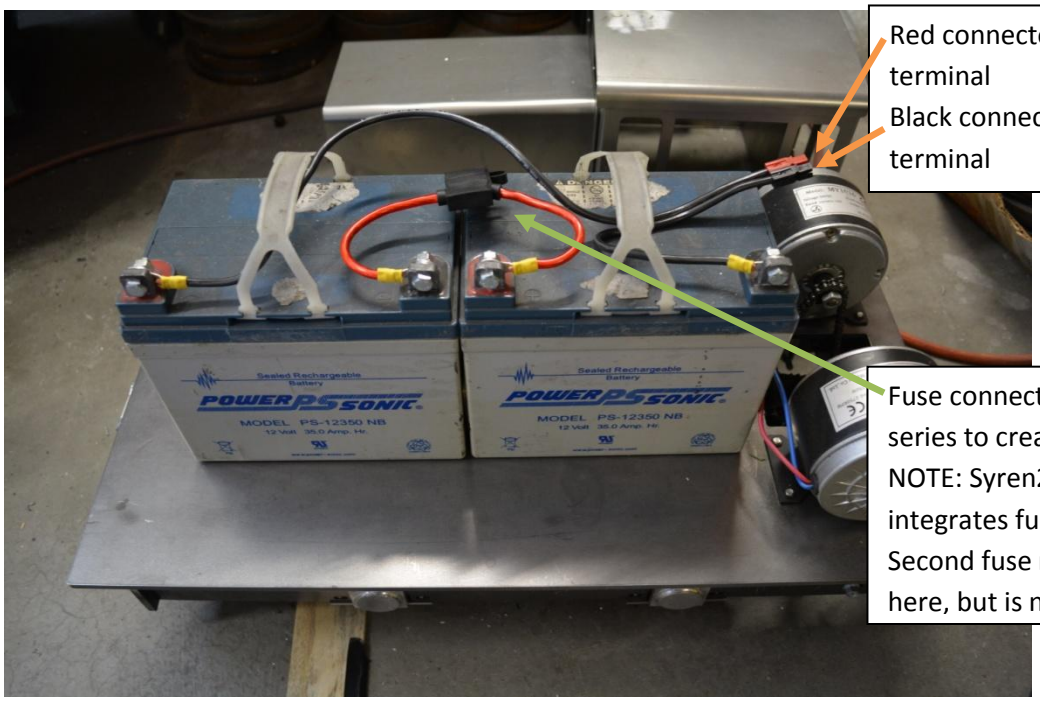
WARNING: Input 24V nominal, 14V minimum, 30V maximum. DO NOT REVERSE THE POLARITY OF THE INPUT VOLTAGE. IRREPARABLE DAMAGE WILL RESULT.

Recommended power source is two identical 12 volt sealed lead acid batteries, recommended minimum of 18ah, no maximum size.

Typical battery setup shown



Features

Synchronous regenerative drive:

Going one step farther than just regenerative braking, a SyRen motor driver will return power to the battery any time a deceleration or motor reversal is commanded. This can lead to dramatic improvements in run time when running on hilly terrain. This drive scheme also saves power by returning the inductive energy stored in the motor windings to the battery each switching cycle, instead of burning it as heat in the motor windings. This makes part-throttle operation very efficient.

Ultra-sonic switching frequency:

SyRen 25 and Syren 50 feature a PWM frequency of 32kHz, which is well above the maximum frequency of human hearing. Unlike some other motor drivers, there is no annoying whine when the motor is on, even at low power levels.

Thermal and overcurrent protection:

SyRen 25 and Syren 50 feature dual temperature sensors and overcurrent sensing. It will protect itself from failure due to overheating, overloading and short circuits.

Safe reversing:

If the system is commanded to go into reverse the system will immediately come to a stop and will not respond to any throttle commands until the throttle is returned to zero.

Programmable sound volumes:

Many of the functions of the sound system can be programmed from the handheld controller in seconds to quickly customize your experience.

Real Locomotive Sounds:

Tsunami's sounds are recorded by sound engineers from real locomotives. Digital recordings from the actual prototypes, sometimes requiring travel to faraway places, are used to faithfully reproduce these sounds for you to enjoy in your locomotive.

Diesel Sound Effects:

Each Tsunami diesel decoder includes over 14 digital sound effects for multiple airhorns, engine exhaust, bell, dynamic brakes, radiator fans and more. The engine exhaust notches up or down automatically in response to the throttle.

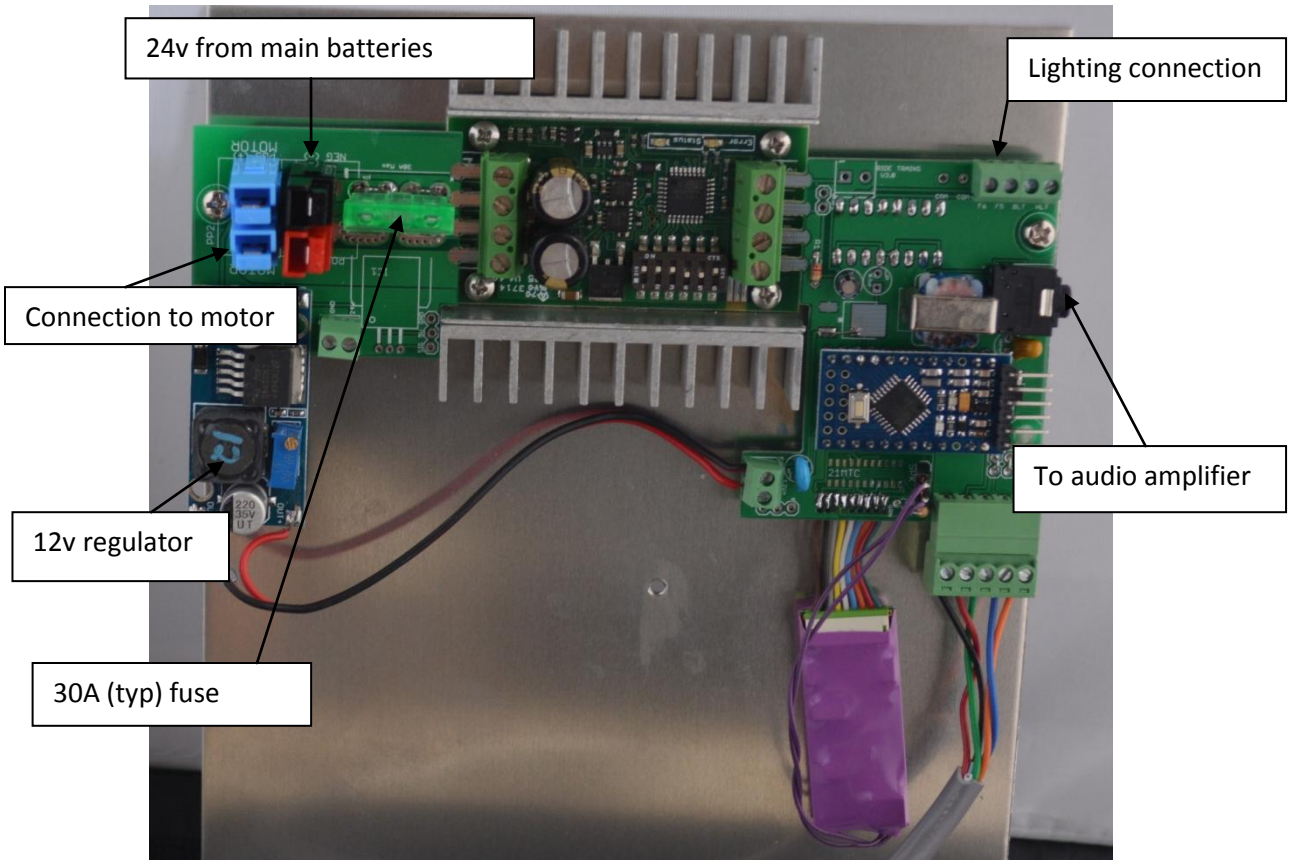
Steam Sound Effects:

Tsunami steam decoders can produce as many as 24 sound effects, including the bell, whistle, airpump, dynamo, snifter valve, injectors, firebox blower, side rod clank, brake squeal, exhaust chuff and more. The Auto-Exhaust™ (default) feature may be set to accommodate different drive wheel sizes, and the cadence adjusted to correspond to a 2-cylinder, articulated or geared locomotive, or optionally use a cam for the perfect chuff.

Connections

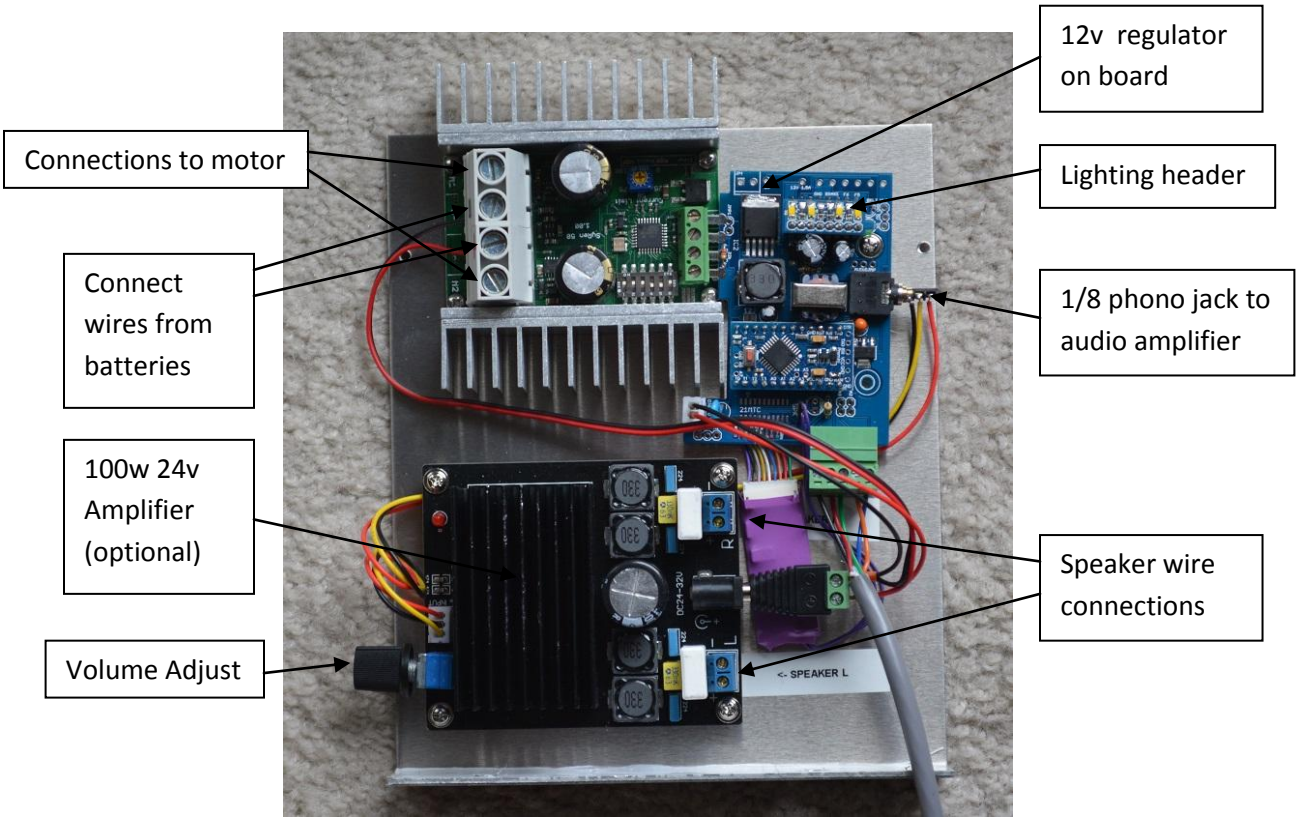
Syren25 system

Most connections to the system are set up in a way that they cannot be done incorrectly. All power connections on the Syren25 system are via PowerPole connectors rated to 45 amps. The loose battery cables and fuse are an exception due to the many different styles of batteries available.



Syren50 system

Motor and battery connections are made directly to the Syren50 controller. Use appropriately sized fuse and wires for your application. The Syren50 has a current limit adjustment on board that should be set to match your motor rating.



The main panel connections are illustrated here. The battery and motor connections must be made directly to the Syren50.

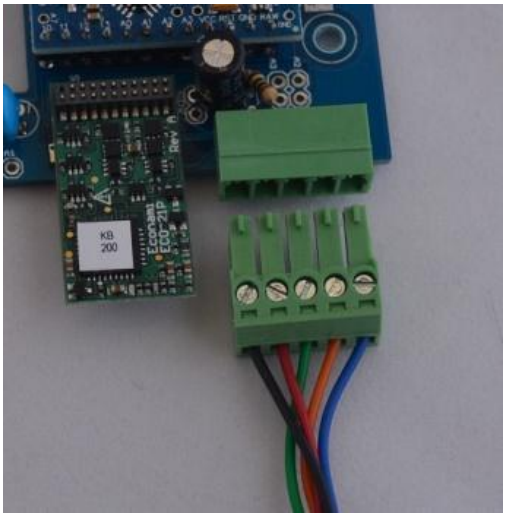
The lighting outputs are 100mA maximum controlled on the common side, optimized for LED's. An output card is available to control lights up to 3 amps.

Handheld Controller

The handheld controller is the brains of the system. It provides a synchronized DCC signal and digital signal to the Syren controller and sound board.

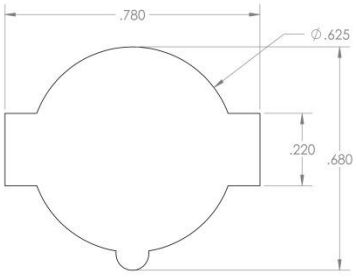
WIRING CONNECTIONS

The connecting wires to the handheld are shown on the supplied screw terminal strip. This comes pre-wired and tested if you have purchased a full system from us. If you are using the handheld separately, **USE CAUTION CONNECTING POWER**. AC, REVERSED CONNECTION, OR EXCESSIVE VOLTAGE WILL DAMAGE THE CONTROLLER AND VOID YOUR WARRANTY. The DCC connections are an AC signal, the connection is not polarity sensitive. The signal output follows the throttle and is normally used to drive the Syren controller. The board converts this to a 0-5v voltage for the Syren. The connections to green 5 pin connector are Black (Ground) Red (+12v) Green (5V serial) Orange (DCC+) Blue (DCC-)



The end of this cable is meant to be installed through thin sheet metal and will snap into a 13/16" hole.

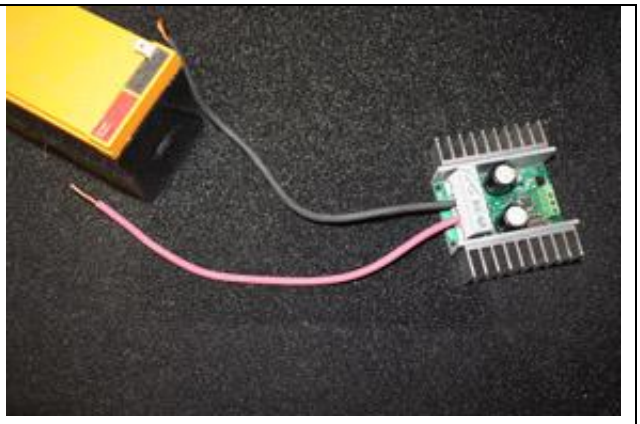




Profile of panel connector

Battery Terminals

B+ and B



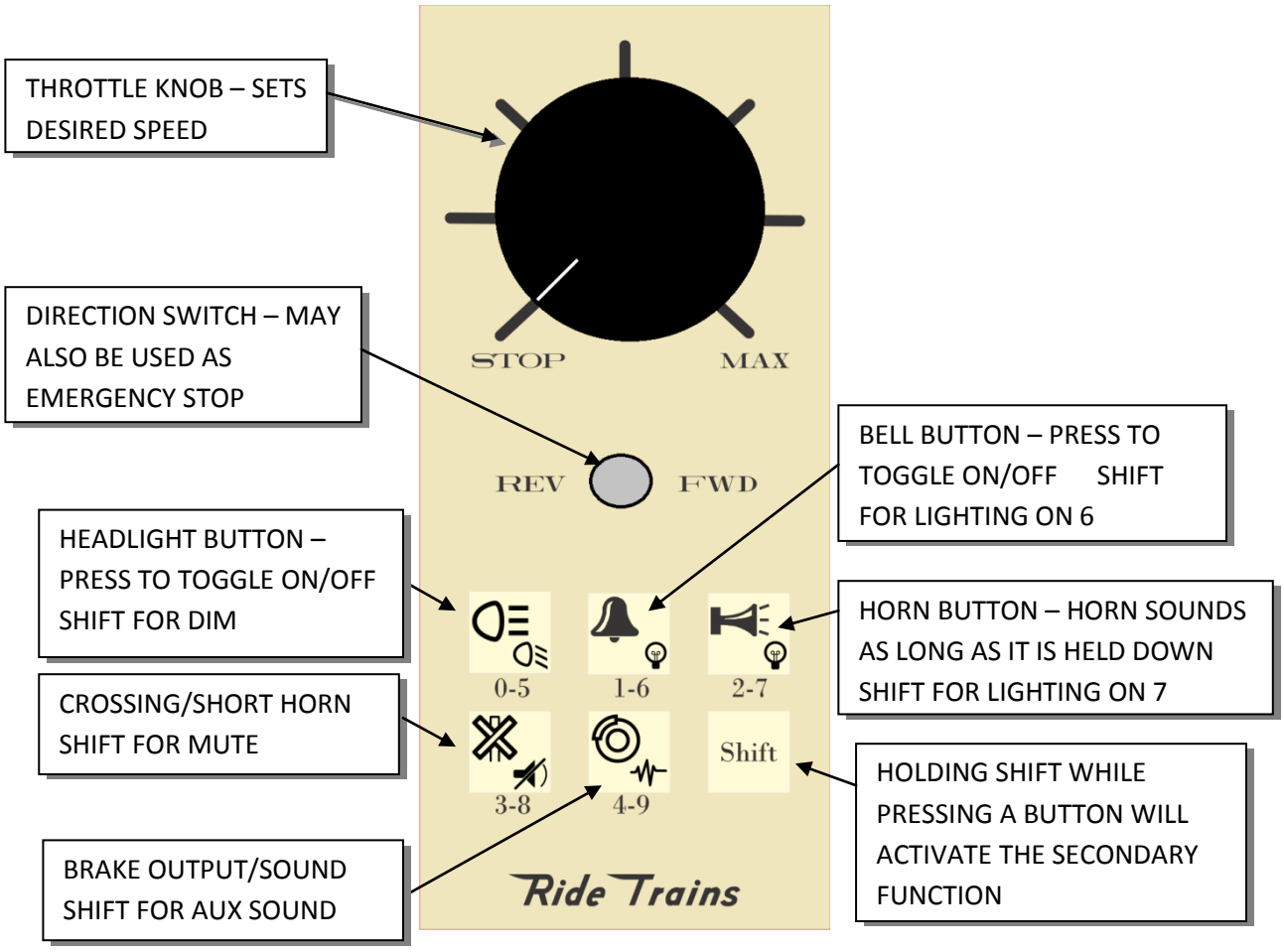
The battery connects to terminals B+ and B-

The battery or power supply is connected to terminals B- and B+. B- connects to the negative side of the battery (usually black.) B+ connects to the positive side of the battery (usually red or yellow.) Often it is convenient to connect the battery through a connector instead of directly to the motor driver. This makes it easy to unplug the battery for charging, and prevents plugging in the battery backwards.

Warning! Be very careful to wire and plug in the battery and connector correctly. Connecting the battery backwards will destroy the SyRen and will void the warranty.

HANDHELD INTERFACE

The handheld interface has been designed with an emphasis on safety and ergonomics.

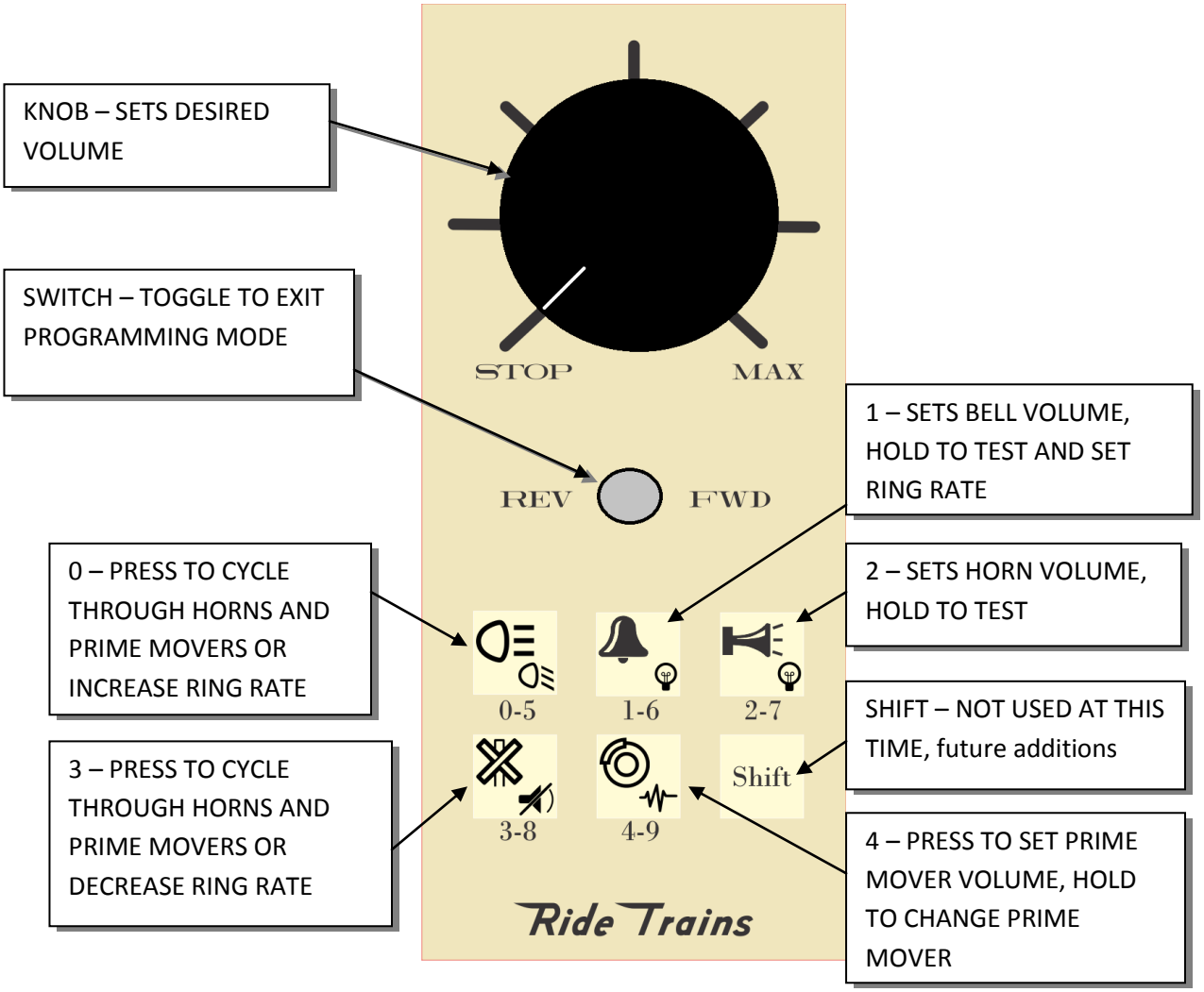


The system has several safety features built in. Should the direction switch be toggled while the locomotive is in motion it will come to a stop and not respond to any further throttle inputs until the throttle knob is returned to the stop position. To activate an E-stop the direction switch may be toggled rapidly three times. This will shut down the prime mover sounds. The handheld should be power cycled after performing an e-stop. Very slow response times may otherwise result.

PROGRAMMING INTERFACE

WARNING! THE 4-9 BUTTON IS USED TO SET THE PRIME MOVER VOLUME. YOU ARE HOLDING THIS BUTTON AS YOU ENTER PROGRAMMING MODE. IT IS EASY TO SET THE PRIME MOVER VOLUME TO ZERO. To prevent unexpected results, be certain to turn the knob up to your desired sound level and set the prime mover volume before exiting. Do not confuse the background noises such as generator and air compressor with the prime mover.

With the throttle turned to stop, sound un-muted and direction switch set to forward, press and hold Brake (4) and THEN immediately press shift, and hold both until the red light shows behind the shift button. In this mode you may set the volume of the horn, bell, and prime mover. You may also select the horn and bell ring rate. While in programming mode buttons 2 and 5 can be considered up and down buttons, and the throttle can be considered a volume knob. There is no feedback between the sound chip and the controller so occasionally several attempts must be made for the desired effect. If a desired volume doesn't 'take', change the knob slightly and try again.



To change the horn, the knob is set to the desired volume and the button one is pressed and released. After a delay of at least one second, button one is held down again to sound the horn. The horn is generally very loud on the real thing. If the horn doesn't sound or the volume has not changed, move the knob slightly and repeat the procedure. Once the horn volume is set the horn can be selected. Without moving the knob (important!) press button 0 to choose the next horn. Press and hold button 2 to test the new horn. Repeat until the desired horn is found. Button 3 may be used to go back.

To change the bell, the knob is set to the desired volume and the same procedure as the horn is followed. Once the bell volume has been set the ring rate can be changed, while holding button 1, buttons 0 and 3 can be used to adjust the rate. If an Economi chip is installed this will cycle through ring rates AND types of bells.

To change the prime mover volume, set the knob to the desired volume and press button 4-9. The volume change should be immediately apparent.

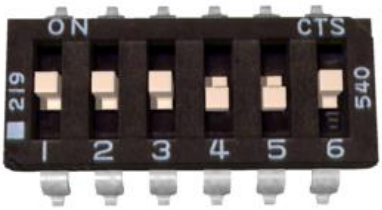
Advanced Programming Mode

Hold Light (0) and then press SHIFT and hold both for two seconds When in advanced programming mode the light behind SHIFT will flash. Use this mode with care. To set the maximum speed, set the knob to the desired top speed and press button 4. You cannot set the maximum speed at less than 25% of full speed. To activate the tilt/deadmans switch (if installed) press button 2. To deactivate it use button 1. Use button 3 to set master volume. No confirmation of the change will be indicated. Exit the mode by pressing toggling direction. Test the desired changes before running.

Advanced Programming mode quick reference	
0	Used to enter mode
1	Disable deadman switch (if installed)
2	Enable deadman switch (if installed)
3	Set Master volume
4	Set Maximum Speed (based on current throttle position)

SYREN SETUP

AS SHIPPED: Analog One-direction with forward/reverse select on S2



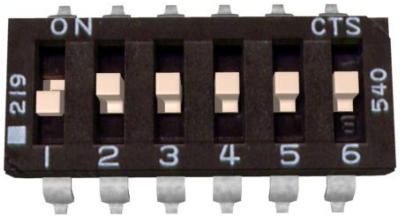
Analog One-direction mode with forward/reverse select on S2

The system is shipped in this mode. A signal on S1 of 0v corresponds to the motor being fully stopped. 5v corresponds to full power. A second signal is fed to S2. If the signal on S2 is greater than 2.5 volts, the SyRen will drive the motor forward. If the signal on S2 is less than 2.5 volts, the SyRen will drive the motor backwards. *CAUTION* the Syren will drive the motor(s) at full speed in this mode if nothing is connected to the inputs.

USING THE SYREN WITH A STANDARD RADIO RECEIVER

Occasionally you may have need to adjust the Syren controller from as-shipped settings. Use caution when doing this as unexpected results may occur, up to and including your locomotive leaving suddenly at full speed. Consult the full Syren manual for more information. If you want to use an R/C receiver, it is typically done with the controller in mode 2, RC mode with autocalibrate and failsafe on. Some cheap radio systems have been known to not send pulses fast enough to be compatible with the failsafe timeout. I recommend not using such systems. I use a Futaba FASST system and have tested it in many extreme environments and at great distances and have never lost control of the locomotive.

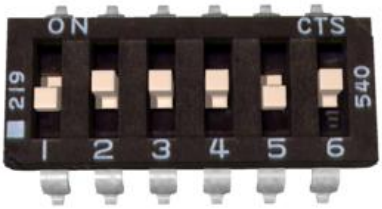
Option 1: Standard R/C mode



Standard R/C Mode

A standard R/C pulse is fed into S1. A 1500us pulse is zero speed, a 1000 us pulse is full reverse and a 2000 us pulse is full forward. Because different transmitter manufacturers use different default pulse widths, if it seems like you are not getting full power, it may be necessary to increase the transmitter's ATV to 120%.

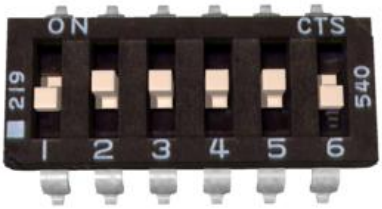
Option 2: R/C Auto-Calibrate Mode



R/C Auto-Calibrate Mode

R/C Auto-Calibrate mode is used to interface to R/C systems that do not use 1500us as their center point. Examples are pistol-style transmitters with a “70/30” throttle and airplane style throttles where a single-direction control is desired. In R/C auto-calibrate mode, the position the control stick is when the driver is powered up is taken as the neutral point. During operation, the driver will detect the minimum and maximum control inputs, and use those to set the control range. If the driver is initialized with the control stick at either extreme, the driver will operate in single-direction mode.

Switch 6: R/C Failsafe Timeout



R/C Failsafe Timeout Disabled

In all the R/C modes, if switch 6 is set to the UP position, then Timeout Failsafe mode is active. This will bring the motor to a stop if the servo signal is interrupted. Once several valid control signals are sent, the motor will restart. This is useful to prevent to robot driving away if it encounters interference, drives out of range, or if the transmitter is inadvertently de-activated. Many robot competitions require this feature.

If switch 6 is set in the DOWN position, then Timeout Failsafe mode is de-activated. This means that the SyRen will continue to drive the motor according to the last command until another command is given. If the control link is possible unreliable – like a radio - then this can be dangerous due to the robot not stopping. However, it is extremely convenient if you are controlling the SyRen from a microcontroller. In this case, commanding the controller can be done with as little as three lines of code.