

B60X CONVRTR Configuration Variables (CV)

Use an AirWire programming throttle, like the T6000, to setup either the attached sound decoder or the B60X CVs. Only a few CVs are used by the B60X and these are usually programmed at the same time as when programming an attached decoder.

When programming the locomotive address, the throttle will automatically send the proper sequence of CVs to the attached decoder regardless of the number of digits in the address.

The B60X accepts both SERVICE PROGRAM commands and OPS PROGRAM commands.

However, do not use OPS PROGRAM to change the locomotive address.

CV #	Factory Value	Value Range	Description
1	3	0-99	1-99 Primary Address
8	135	135	CVP Manufacturer ID
17	0	0-605	Loco Address Hi-Byte
18	0	0-605	Loco Address Lo Byte
29	2	0-605	Decoder configuration
200	0	0-16	Frequency Used

B60X Warranty Information

This warranty covers substantial defects in materials and workmanship in the B60X module.

What This Warranty Does Not Cover

This warranty does not cover any problems which result from improper installation, modifications, battery polarity reversal, improper operation, leaking batteries, excessive battery voltages, excessive decoder current draw, incorrect connections to decoders, abuse, accidents, or acts of God such as excessive heat, wildfires, floods, damage caused by exposure to moisture and rain, lightning, earthquakes, volcanic events, tidal waves or hurricanes.

Warranty Duration

The coverage of this warranty lasts for 90 days. After this period, standard repair rates apply. Depending on the problem, CVP reserves the right to repair or replace.

Help, Repairs and Returns

If you purchased your B60X from one of our AirWire900 dealers, please call them first. They are your best and quickest source for answers to questions about B60X. They are also experts in installation and offer such services should it be required. If you purchased your B60X *direct* from CVP Products, please give us a call.

If you are asked to return an item to CVP for service, you must follow the instructions on the website listed under the bright red box labeled "REPAIR SERVICES" on the cvpusa.com home page. There you will find the repair submission form, and the shipping address.

Do not send items to us for repair without first obtaining authorization and an RMA.

B60X CONVRTR Electrical Ratings

Maximum Input Battery Voltage	22 Volts DC
Minimum Input Battery Voltage	11 Volts DC*
Minimum Surge Current without Tripping	55A
Maximum Continuous Current (thermally limited)	6A at 100°C
Over-Current Trip (Min/Max)	55A to 98A
Reverse Polarity	Not Protected
FCC ID Number X7J-A10040601	Part 15 Compliant

*Decoder dependent - it might need a higher input voltage to operate reliably

NEW

AirWire900®

B60X™ CONVRTR

Installation And User Guide

For Bachmann 4-6-0 Steam*

With 3rd Party DCC Sound Decoder

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AIRWIRE®
900

CVP Products
www.cvpusa.com

Package Contents
B60X CONVRTR
Two Harness Pigtails
JST-SKT Battery Pigtail
Charger Pigtail
This User Guide

*** Requires the factory installed RC/DCC socket in the engine's tender. Fits other Bachmann steam engines having the same socket.**

Before You Begin: Get The Extra Stuff

The following items are needed in addition to the B60X Convrtr. Some are optional [OPT].

DCC Sound Decoder: The Soundtraxx TSU4400-STEAM is required for use with the B60X Convrtr. It has sufficient amperage to drive the Bachmann 4-6-0 motor and lights. The Soundtraxx steam decoder requires very little programming which is best if you are new to DCC sound decoders. If you run into any issues or have a question regarding the sound decoder, call or send an email to Soundtraxx. They provide excellent support for their products with fast and accurate responses.

Soundtraxx

<https://www.soundtraxx.com>

Do not use ESU/LOKSOUND decoders since they do not support a user programmable CV11.

Soundtraxx TSU4400-STEAM



Circuit board colors may vary

14.8V 3400mAh rechargeable battery: The BAT3 from CVP is recommended. The CVP BAT3 is a small 4-cell, 14.8V, 3400mAh, Lithium-Ion rechargeable battery.

Li-Ion Smart Battery Charger: The CHARGER1 Li-Ion Smart Charger, from CVP is recommended. The Drop-In decoder comes with a plug that is attached to the charger.

3M VHB Double-Sided Tape: extra strong used for attaching the battery. It does not disintegrate like classic double sided foam tape. Get it at office supply stores, Home Depot or Amazon.

Small 6 inch Plastic Tie-Wraps: For bundling wires. Get them at Home Depot.

Soldering Iron: Bigger is not better for these jobs. We use Hakko and Weller (Apex) temperature controlled irons. They might cost more but they will last a lifetime. See the Weller W60P3-ND sold by Digikey. www.digikey.com

No-clean flux solder: This is the preferred solder for small soldering jobs. Solder joints are clean and shiny without any brown, sticky or burned rosin flux residues. Use 63/37 solder having a 0.020" diameter. The Digikey part number is WBNCC633720-4OZ. www.digikey.com. Also check ZORO.com for the same item. Their price is usually less than Digikey.

Small Wire Cutters: Diagonal wire cutters with small narrow jaws are best.

Jewelers Screwdriver with 0.08 in (2mm) flat blade. Used on decoder terminal screws.

Long, Thin Shaft Phillips Screwdriver: You must have a thin-shafted, #1 phillips-head screwdriver that is at least 4 inches long to reach the screws in the tender. This one is from General and has a 4 inch long, narrow shaft with a #1 Philips tip. It is also magnetized which comes in handy for pulling the screws from deep recesses.



Resetting CONVRTR-60 To Original Factory Settings

CV8 is used to reset the B60X back to original factory settings of loco address 3 and frequency 0. You must use a programming throttle like the T6000 or T5000.

The B60X's reset command WILL NOT reset the attached decoder.

If you know your B60X present radio frequency, set your throttle on the same frequency. If you do not remember the radio frequency, you must first use the forgotten frequency command to reset the radio frequency. Below is the keystroke sequence to issue a B60X reset command.

Press MENU, Press and Hold ENT, press MENU again, press 4 (SVC PROGRAM), press 8 (the reset CV), and press ENT. Press 1,3,5 then press ENT. Press ESC to end programming. Notice that your throttle is automatically set for the default loco number of 3 and the default frequency of 0.

Remember, the attached DCC decoder is still on its original locomotive address. Now is the time to set both the B60X and the attached loco decoder to their desired address.

Troubleshooting Tips

Locomotive Was Running But Suddenly Stops and Won't Restart

- 1) Battery is depleted. Recharge the battery.
- 2) Jamming. Make sure that another throttle is not jamming your frequency and/or address.
- 3) Mechanical failure inside the locomotive.
- 4) Some kind of fault with the attached DCC decoder

Locomotive Won't Run At All After Installation

- 1) Battery is depleted. Recharge the battery
- 2) Jamming. Make sure another throttle is not jamming your frequency or address.
- 3) Throttle not set to proper frequency or address. Set the throttle correctly or use the JUMP MODE to program the B60X to the desired frequency. If you are not sure what the frequency is, follow the instructions in the section labeled, 'Forgotten Frequency.'
- 4) Some kind of wiring fault is continuously tripping the B60X's protection. The most common cause is a pinched wire shorting to an adjacent wire or simply incorrect wiring. There may also be a problem with the attached motion/sound decoder.

Operational Considerations

Beware of Lurking Locomotives When Using SERVICE PROGRAM Mode

SERVICE PROGRAM mode is a broadcast command that can be heard and understood by any other AIRWIRE decoder or CONVRTR-60 sharing the same frequency as the CONVRTR-60. If another decoder receives the command, it too will be programmed. Play it safe and make sure to turn off power to all locomotives not being programmed.

Beware of Other Transmitters

The CONVRTR-60 decoder operates in an unlicensed band shared by many other transmitters. These transmitters can create interference, cause intermittent throttle operation or failure of one or more of your decoder's 17 frequencies. The sources of these external interfering signals can be from your own home or from adjacent homes and businesses. They can also be from other CVP wireless equipment.

Here's a list of devices known to have caused interference problems to AirWire900 equipment: wireless devices attached to computers, TV/Radio/Entertainment-center, remote controls, cordless telephones, alarm systems, baby monitors, unlicensed personal communication devices, lawn sprinkler controllers, remote starter switches, cordless light switches, outdoor lighting controllers, toys, wireless headphones, and games. Of course, if you have additional wireless throttles, make sure each is on its own frequency; two throttles on the same frequency will jam each other.

If you find a strong interfering signal on one or more of your frequencies, don't use those frequencies. You must select another, different frequency.

Changing/Setting The B60X CONVRTR Frequency

As delivered, the B60X is set to frequency 0. If you want to use a different frequency, follow the series of steps below. For easier remembering, select a frequency derived from the loco number. For example, use the first digit or the last digit of the cab number. This makes it easy to remember what frequency the loco is using.

The procedure below uses the **OPS PROGRAM** mode of your programming throttle. A T6000 is used for this example. Verify that all other locos sharing the same frequency are turned off or they too will be changed.

Press MENU, Press and Hold ENT, press 0 (OPS PROGRAM), press 2,0,0 (the frequency CV), press ENT. Press the keys to enter the desired frequency (from 0 to 16), then press ENT. Press ESC to end programming. Notice that your throttle is automatically set for the new frequency.

Forgotten Frequency? - Resetting B60X Frequency

There may come a time when the B60X no longer responds to what you believe is the correct frequency, or you can not remember the correct frequency. If this occurs, follow this procedure called the "Jump Mode." This feature will temporarily force the B60X to frequency 0 where you can make a permanent frequency change.

Warning: make sure there are no powered on locomotives assigned to frequency 0 or they too will have their frequency changed.

1. Turn off all AirWire throttles. This is very important.
2. If the locomotive power is on, turn it off. Count to 10. Now turn on the locomotive power.
3. Wait a minimum of 60 seconds before continuing.
4. Turn on your throttle. Make sure it is set to frequency 0.
5. Use SVC PROGRAM to set CV200 to the desired frequency.
6. Push ESC to end programming.

B60X LED Indicators For Troubleshooting

Lift up the coal load so you can see B60X LED indicators. They can provide you with some hints as to the causes of poor, erratic, or non-operation.

The PWR Green LED will always be on if power of the correct polarity is applied and turned on. Even if the voltage is above or below normal, this LED will be on. If it is off, when you think it should be on, check that the power switch is set for RUN. Confirm the battery is charged.

The GP Red LED offers several indications that can serve as an effective aid to troubleshooting.

Steady On: it says the throttle frequency matches the B60X frequency.

Slow Flash: B60X is in count down mode prior to entering Jump Mode (see above). You must turn on a throttle with a matching frequency to cancel Jump Mode. The GP LED will go dark after one minute.

Dark: there is no throttle present that matches the B60X frequency setting and it has now entered Jump Mode and is temporarily set to frequency 0. To cancel this mode, power cycle the B60X and make sure the throttle is set to the B60X's frequency.

Erratic blinking on and off: the throttle is set to a power level that is too low or the throttle is too far away or both.

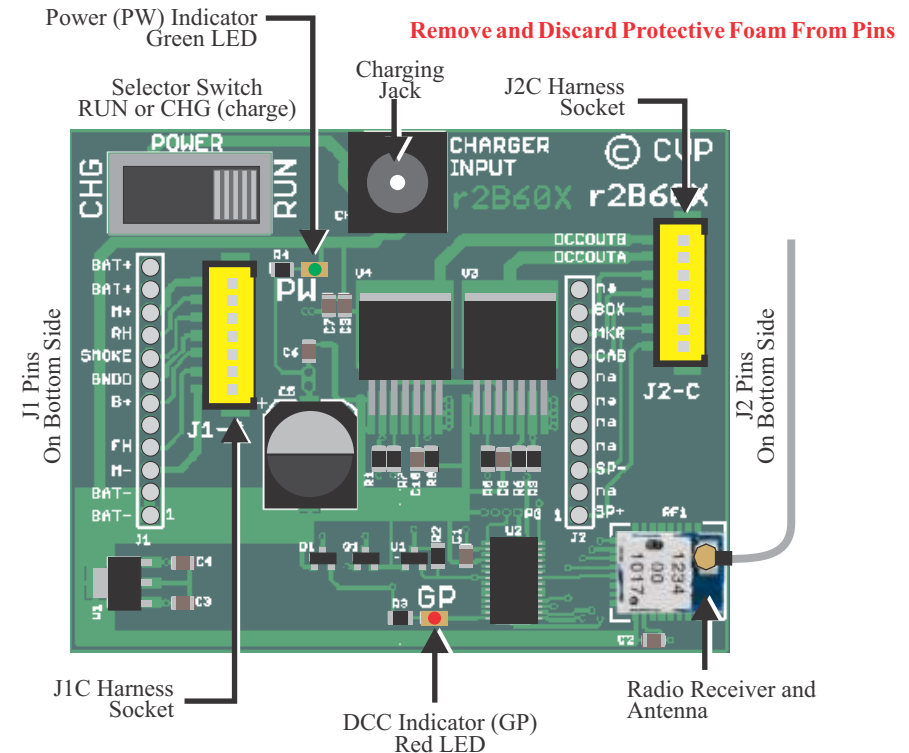
Soundtraxx Technical Support

CVP does not provide technical support for the Soundtraxx sound decoder. If you have any TSU4400 troubles contact Soundtraxx. They will be happy to help.

(970)259-0690 support@soundtraxx.com

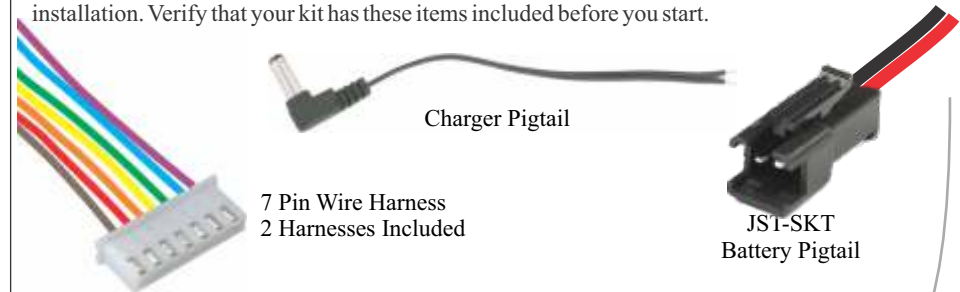
B60X CONVRTR Familiarization

Caution: The B60X CONVRTR plugs into the factory installed socket located in the locomotive's tender. If your locomotive does not have the "DCC/RC" socket, this product cannot be used.



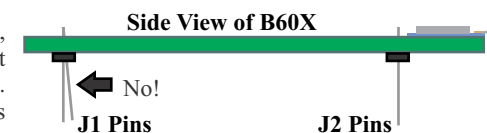
Included Wire Harnesses and Connectors

The B60X CONVRTR kit includes the required wiring harnesses and pigtails needed for installation. Verify that your kit has these items included before you start.



Check For Bent Pins

After removing the protective foam, insure that all J1 and J2 pins are straight and perpendicular to the circuit board. Gently bend pins with needle-nose pliers until all are straight.



A single bent pin will prevent proper insertion of decoder into locomotive DCC socket. After the decoder is inserted into the socket, check for pins that did not go in. A bent pin will miss the socket. If this happens, remove the decoder, straighten the pin and reinsert.

Attaching Charger Plug Pigtail To Charger

The charging pigtail needs to be permanently attached to the charger output wires. First, open up the charger box. Inside will be the charger with alligator clips and the AC power cord.



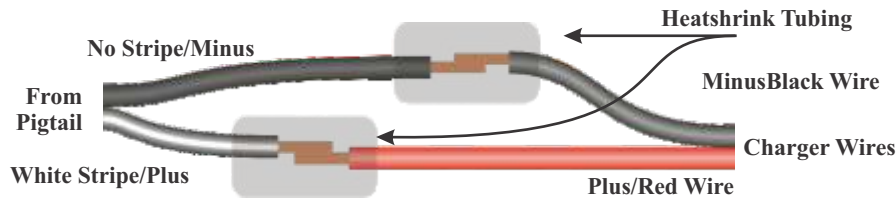
Locate the charger pigtail that came with your AirWire Drop-In decoder. The 2-conductor pigtail comes with stripped wires on one end and a right angle plug on the other.



Wire polarity is very important. On the pigtail, the plus wire is the wire with the white stripe. The minus wire is the solid black wire. On the charger, the red wire is plus and black is the minus wire.

Take the pigtail and separate the 2 wires for about 2 inches. Cut the plus wire so it is 1 inch shorter than the minus wire. Remove about 1/2 inch of insulation from the plus wire. Twist the strands together and apply solder to the twisted end of the plus wire. This is called tinning and keeps the twisted wires from unraveling. Next, remove about 1/2 inch of the insulation from the minus wire. Twist the strands together and touch a tiny bit of solder to the twisted wire.

Take the charger wires and split the red and black wires apart for about 3 inches. Cut off the alligator clips and cut the minus (black) wire so it is 1 inch shorter than the plus (red) wire. Remove about 1/2 inch of the insulation from both the black and red ends of the wires. Twist and tin the wires. Slide a piece of heatshrink tubing onto the wire. Solder the charger pigtails to the charge pigtails. Position the heatshrink tubing to completely cover the splice and heat it with your soldering iron to shrink it.



Verify Battery Pack Connector Polarity

Check The Battery Pack For Proper Polarization. The CVP BAT3 battery pack has a mating plug that is properly polarized for the JST-SKT pigtail that comes with the B60X.

The drawing shows the red and black wire orientation for both the BAT3 plug and the JST-SKT pigtail. Orient the battery plug and the B60X JST-SKT socket as if they were to be inserted. Confirm the wire colors and connector orientation match the picture below. Notice that the socket's release lever is pointing away from you.



CVP'S BAT3 Battery Pack



Never remove the plug from the battery. Doing so voids the warranty.

If you are using a different brand of battery, you must verify the polarity is correct before using it. Get help if you are not sure.

SoundTraxx TSU4400 Setup

All Soundtraxx decoder setup is done using your AirWire T6000 or T5000 wireless controller. No other equipment is required. Except for the loco address number, all programming is done using OPS mode programming [OPS PROGRAM].

Decoder Address (CV1): ONLY use **Service Mode Programming** [SVC PROGRAM] for setting or changing the decoder address (loco number). We recommend using the cab number for the loco address. Here is the keystroke sequence using the T6000 Wireless Controller.

Press MENU, Press and Hold ENT, Press MENU again, press 4 (SVC PROGRAM), press 1 (the address CV), press ENT, press the keys to enter the desired loco number then press ENT. Press ESC to end programming. Notice that your throttle is now set for the new loco number.

Master Volume (CV128): As delivered from the factory, the master volume default setting is 128 which is about half of the maximum volume available. This is very loud for indoor use so we recommend setting CV128 to a value of 16 for indoor use which is about one sixteenth of full volume. To make the volume louder, program a larger value into CV128 up to the maximum of 255. The change takes effect immediately.

Reset TSU4400 To Original Settings (CV8): Using OPS programming, program CV8 to a value of 8. Invoking this master reset command will change all TSU4400 CV values back to their original factory settings. There are subsets of the master reset that cover specific groups of CVs. See the Soundtraxx technical reference for details.

Function Key Assignments: The table below shows some of the default throttle function key assignments for the TSU4400-Steam sound effects. Note, for F0, the direction setting (fwd or rev) determines which headlight is on. See the Soundtraxx technical reference manual for how to change function key definitions as well as other effects that are available.

Tsunami2 Steam Technical Reference: There are literally hundreds of different TSU4400 settings and configurations. Download the technical reference from the Soundtraxx website.

Function Key	Effect	Function Key	Effect
F0(fwd)	Front Headlight and Dynamo	F9	Grade-Crossing Whistle
F0(rev)	Backup Light and Dynamo	F10	Blowdown
F1	Bell	F16	Water Stop, filling tender
F2	Whistle	F22	Random Cab Chatter
F3	Short Whistle	F23	All Aboard/Coach Doors
F7	Headlight Dimmer	F24	Fire Box Flame
F8	Mute Sound	F27	Smoke Generator

Note About Using Non-SoundTraxx Decoders

If you are using a different manufacturer's sound decoder, make sure you have made the 2 changes below to prevent unwanted operation. These steps are not required for Soundtraxx decoders.

1. Turn Off Decoder Analog Conversion Use the SVC PROGRAM mode to set CV29 to one of the following values based on the decoder's locomotive address. Failure to make the change to CV29 will result in unexpected high speed runaway if the decoder is powered on without a throttle powered on and set to the B60X frequency. For address between 1 and 99: Set CV29 to a value of 2. For address between 100 and 9999: Set CV29 to a value of 34.

2. Set The Decoder Packet Timeout Value To 0 Use the SVC PROGRAM mode to set CV11 to a value of 0. This will permanently disable the feature. Without setting CV11's value to 0, the locomotive will stop if it goes out of range of the throttle. The preferred setting of 0 allows the locomotive to continue running at its current speed until it comes back into the throttle's range.

Reassembly

Connect Rear Headlight *Caution: the rear headlight, its plug and its wiring are fragile and easily broken.* Orient the chassis so the power switches are to the left. Place the shell on its side oriented to face the same direction as the chassis. Insert the small plug from the rear headlight into its socket on the main board.

Join the Chassis and the Shell Lift up the shell and place it on top of the chassis. Slide it into place. You might here a snap or pop when it drops into place and it will not move once in its proper position. Check for any pinched wires. Rotate the antenna connector so the antenna is nearest the shell's edge. Tuck it under the shell for now to keep it out of the way.

Install The Chassis Screws Position the styrofoam block to protect the rear headlight. Grasp the chassis and shell tightly together. Flip the combination upside down with the wheels up and lay it onto the styrofoam block. Verify the rear headlight assembly is not touching the block. Install the 4 screws back into their holes and tighten securely. If the screws spin in their holes, the shell and chassis are not properly aligned. Remove the shell and start over.

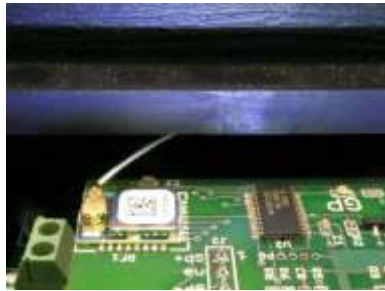
Reattach Brake Wheel and Coal Load Insert the brake wheel back into its brackets and press into its hole in the chassis floor. Before dropping the coal load back into place, position the antenna where you want it to be.

The antenna can remain under the plastic lip that holds the coal load. Although the range won't be as good, most users find this location works well for their railroad.

For best range the whip antenna should be vertically oriented and outside the plastic shell.

Drill a small hole in the coal over the gold antenna connector. Gently bend the antenna vertical at the point where it exits the black tubing portion of the gold connector. Straighten out any kinks so that it favors a vertical orientation. Insert the coal load after fishing the antenna out through the hole.

Take care not to unsnap the antenna connector. If it does come off, center it over the connector and push straight down to snap it back on.



Smoke Unit Use and Control

The Bachmann 4-6-0 is equipped with a smoke generator. There is an on/off switch located behind the smoke box door at the front end of your boiler.

To open the smoke box door, rotate the small metal tab (arrow) upwards out of the way. Pull on the number plate to open the door. It will rotate to the right on its hinges.

When the door is open, the SMOKE switch is visible. It ships from the factory set for OFF. To use the smoke unit, turn on the switch, close the door and move the tab to hold the door closed.

Before operating the smoke generator, you must put 3 or 4 drops of smoke fluid down the smoke stack. New locomotives come with a plastic vial of smoke fluid.

Do not operate the smoke generator without fluid. Doing so can cause the smoke unit to burnout.



Bachmann 4-6-0 Unboxing

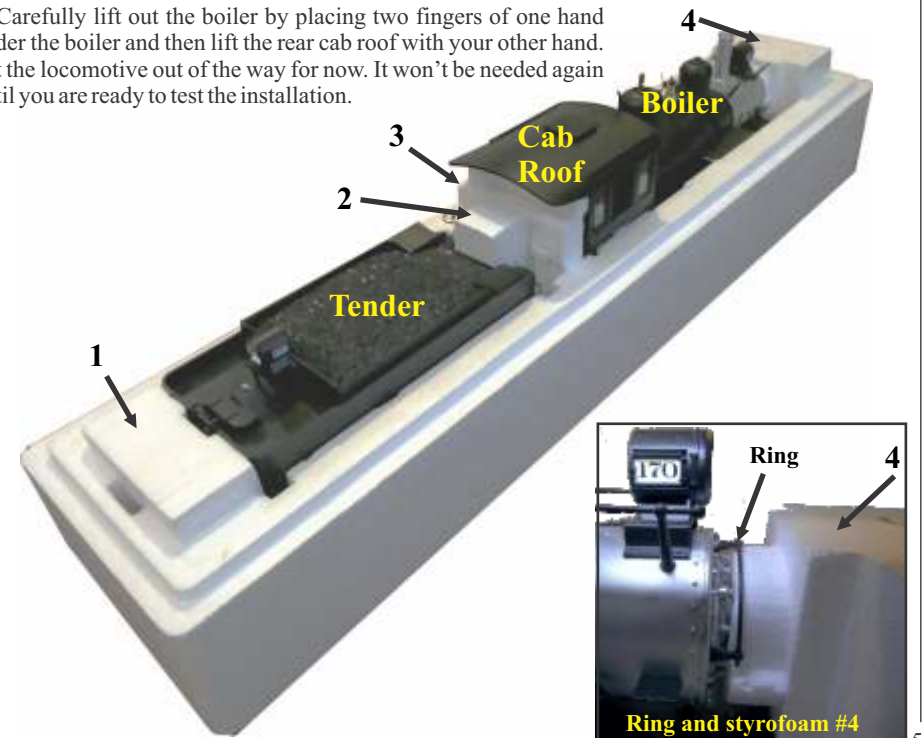
Warning: Many parts of the boiler and tender are fragile and easily break. Some small pieces are simply pressed into mounting holes. Especially vulnerable are the piping, side-frame assemblies, window and roof detail.

Skip this section if you have already unboxed your locomotive. Otherwise, follow along to learn how to remove and save the packaging material so it can be reused. Have a magic marker handy for creating labels, and orientation marks on the styrofoam pieces.

Take your time. Remove the styrofoam shipping container from the cardboard box. Orient the box right side up. Remove the styrofoam cover which has some extra couplers and detail pieces taped into the recesses.

With the top off, notice the boiler and tender are secured with 4 pieces of shaped styrofoam. These pieces need to be taken out in the proper order to prevent damage.

1. Lift straight up the styrofoam piece between the rear of the tender and the box. Ours was very tight. Label the top with a 1.
2. Slide the tender backwards a bit to loosen the next piece. There is a small piece wedged between the front of the tender and the cab. Angle it enough to clear the cab roof as it is lifted out. Label the top with a 2.
3. With the tender slid back as far as it can go, lift the tender out of the shipping container. Set it aside for now.
4. Lift up the back of the cab roof to get to the next styrofoam piece. Lift the cab roof high enough to allow the removal of the piece. Label the top with a 3.
4. There is one more styrofoam piece between the front of the boiler and the container. It actually nestles inside a delicate ring attached to the front of the boiler (see inset). Slide the loco back. Insert your fingers from the side under the front of the boiler. Lift up the boiler to free the styrofoam. Remove the styrofoam. Label the piece with a 4. Also put an "F" on the box to remind you which end is the front of the box where the boiler fits.
5. Carefully lift out the boiler by placing two fingers of one hand under the boiler and then lift the rear cab roof with your other hand. Set the locomotive out of the way for now. It won't be needed again until you are ready to test the installation.



Opening Up The Tender

A Soft Work Surface Pays Big Dividends

Spread a couple layers of thick towels on your work surface to serve as a cushion while working on the tender.

You Must Have The Proper Screwdriver

You must have a thin-shafted, #1 phillips-head screwdriver that is at least 4 inches long to reach the screws in the tender. This one is from General and has a 4 inch long, narrow shaft with a #1 Philips tip. It is also magnetized which comes in handy for pulling the screws from deep recesses.



Remove The Coal Load And Brake Wheel

The coal is cast as a single piece of plastic that is held in with friction. Use a thin hobby knife blade to gently lift it out. While it is out, consider adding a small #2 black screw to the top of the load to serve as a handle. You will appreciate having this when time comes to plug in the battery charger.

The brake wheel is extremely fragile. It is not glued in place. Instead it is press fit into a hole in the chassis and held to the shell with a pair of brackets. To remove it, gently twist the top of the brake wheel and pull it straight up to clear the two brackets.

Tip: Turn the coal load upside down and use it to hold the brake wheel and the mounting screws from the next step.

Removing The Mounting Screws

Caution: the rear headlight is fragile and easily broken. Turn the tender upside down (wheels up). Use the #1 styrofoam block to keep the rear headlight off the towel.

There are 4 screws, hidden in deep recesses, holding the shell to the chassis. The bottom image below shows their locations. There is also a closeup image showing the screw location near the front truck.

Unscrew each of the 4 screws. It is important to make sure each screw is completely backed out and is spinning freely in the hole. Gently lift the chassis off the shell to check that the screws are all loose. If the screwdriver is magnetized, remove each of the screws and put them in the upside down coal load.

Now, while holding the shell and chassis together, flip it right side up and set the tender back on its wheels.

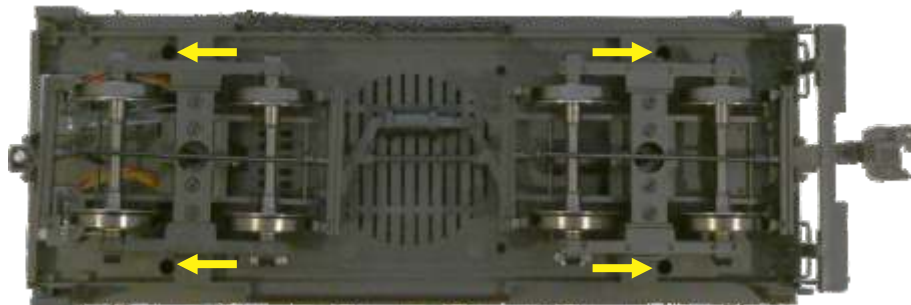
Gently lift the shell to confirm all screws are loose. Most will have already fallen out. If a screw is missing, a gentle shake will help it release. Make sure there are 4 screws. If not, turn the tender upside down and locate the uncooperative screw(s) and remove it.



Protecting Rear Headlight



Screw Location Close Up



Shell Screw Locations (yellow arrows point at the deep hole)

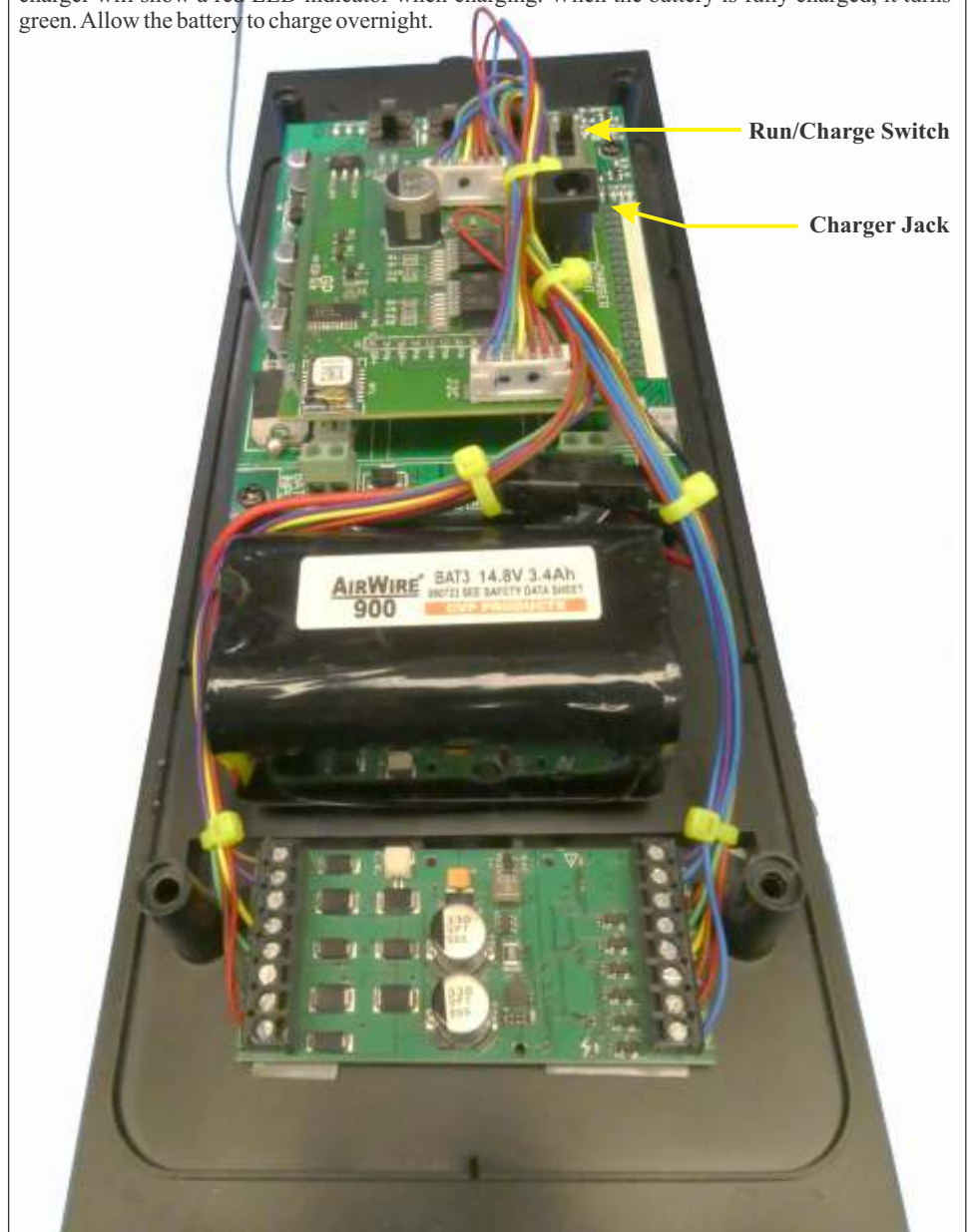
Finished Installation

One last image of the finished installation before reassembly.

The last task is connect the rear headlight to the main board and reattach the shell to the chassis which is described on the next page. Once that is done, the installation is complete.

Resist the temptation to run outside and run the locomotive. A new battery has very little if any charge so it won't last long. The battery needs to be charged first.

Plug the charger into the charging jack. Verify the B60X power switch is set to the CHG setting. The charger will show a red LED indicator when charging. When the battery is fully charged, it turns green. Allow the battery to charge overnight.



Mounting The Decoder *continued*

The remaining task is to finish tie-wrapping the wires into neat bundles. The bundles are positioned away from the antenna as much as practical.

Feel free to unplug the harnesses as this will make working with them easier.

We bundled the harness wires along with the battery wires. Since the battery wires are much heavier they tend to anchor the harness wires in place.

The wires are positioned as close to the battery as possible. This will keep them from interfering when the shell is mated with the chassis at final assembly.

Continue with the tie-wrapping until near the two sockets.



Plug the two harnesses into their sockets. Continue using more tie wraps to keep the excess wire in place. Notice how one tie wrap is used to force the wires to make a u-turn and lie next to the power switch and the charging jack.

Since there is a bit of excess wire, it was allowed to extend beyond the main board. The tie wraps kept all the wires in their place.

Note the position of the wires keeps them away from the radio antenna.

Opening Up The Tender *continued*

Separating Chassis and Shell

Orient the tender in front of you with the rear coupler pointing to the right.

Lift the shell off slowly. Turn the shell on its side and set it very close to the chassis. There needs to be slack in the wires. Take care not to break the small wires which connect to the rear headlight.

The small wires terminate in a very small plug that is inserted into its socket on the main circuit board.

Remove Rear Headlight Plug

Get some good light and perhaps use a magnifying glass. It is imperative not to yank out the socket when removing the plug. There isn't much of the plug showing so make sure you are pulling on the plug and not the socket. In the image to the right, a yellow outline is around the socket and a blue outline is around the plug.

Gently rock the plug to get it to release from the socket. **DO NOT PULL ON THE WIRES.** If necessary, use small needle nose pliers to get a better grip on the plug. Once the plug has been removed, set the shell aside for now. It is not needed until the installation is completed.

Remove The Dummy Circuit Board From Main Board

Pull up on the dummy board while gently rocking it back and forth to release it from its socket. It is no longer needed.

Remove The Tender Track Pickup Wires (2 Sets)

There are two sets of tender pickup wires, one for each truck. Since battery power will now be used, these wires can be removed. The easiest method is to simply unplug the connector from the main board and leave it loose. Or you can totally remove the wires by cutting them where they emerge from the truck.

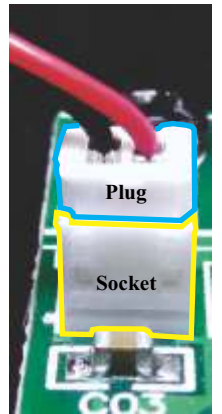
Prepare the JST-SKT Battery Connector

The JST-SKT connector needs to be shortened. Cut the red and black wires to about 2 inches in length. Strip the end back about 1/2 inch. Tightly twist the strands together. Heat the strands with a soldering iron and touch a small amount of solder to the wires. This process is called "tinning" which keeps the wires from fraying when slipped into the terminal strip.

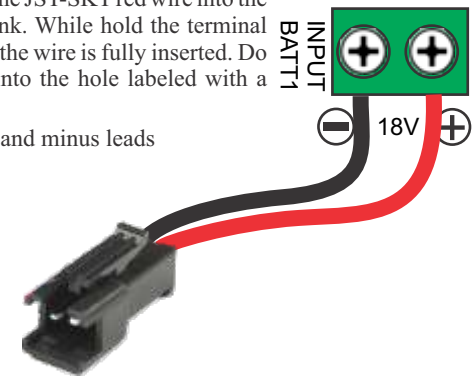
Connect The JST-SKT Battery Connector To The BATIN Terminal Strip

Use a narrow screwdriver to back out both screws of the BATIN connector located on the tender's main circuit board. Slip the JST-SKT red wire into the terminal labeled with a circled plus in white ink. While hold the terminal block with your fingers, tighten the screw once the wire is fully inserted. Do the same with the black wire except it goes into the hole labeled with a circled - sign.

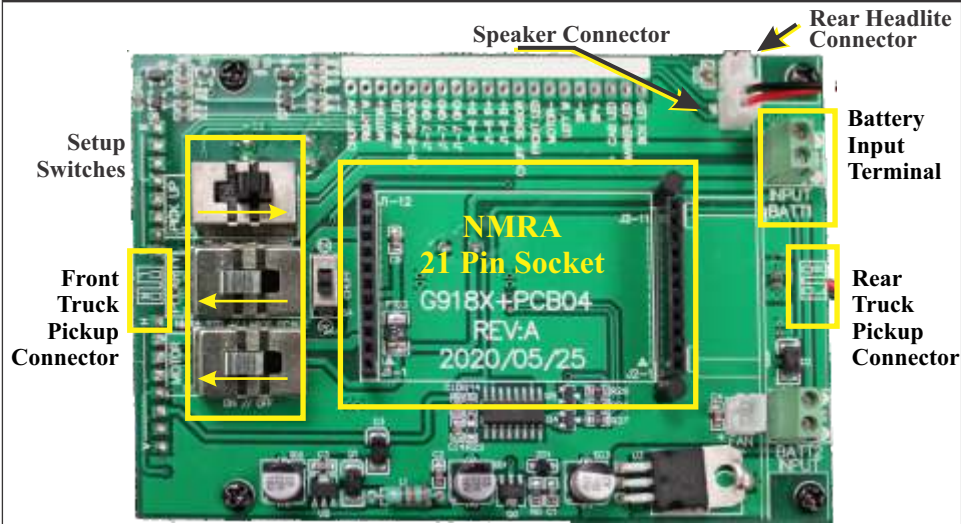
Double check your work. Reversing the plus and minus leads will damage the B60X.



Rear light connector



Tender Main Circuit Board



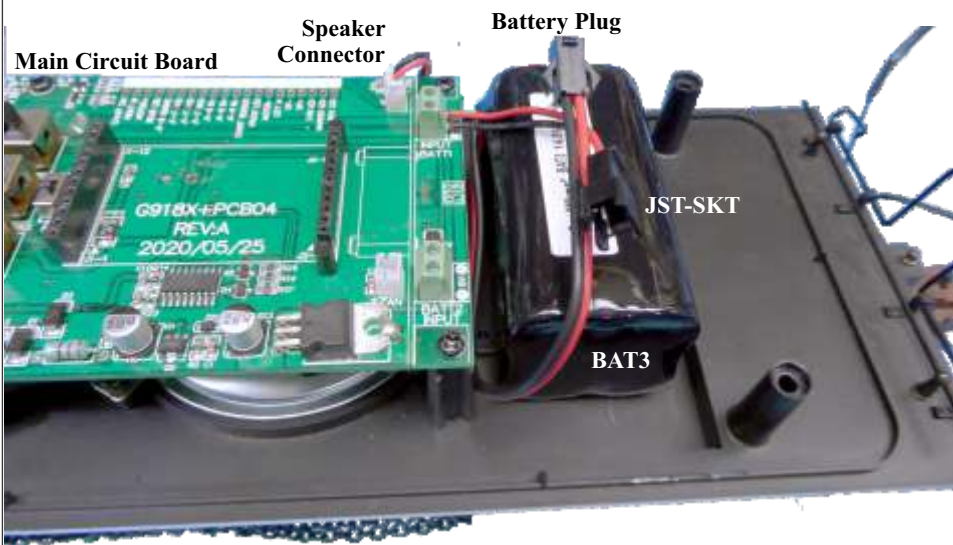
Battery Mounting

The CVP Products BAT3 fits nicely between the main board and the mounting posts for the shell. No modifications to the tender are needed. ***Never cut off the battery plug. This will void all warranties.***

Using the photos below, locate the mounting area and set the battery in place. Orient the battery such that the plug and wires exit out the side closest to the tender's main circuit board.

Use 3M VHB double sided mounting tape only. Apply a piece of tape about the same size as the bottom of the battery. Carefully peel off the protective backing. Press the battery onto the tender floor in the proper orientation and location as shown in the photo below.

Plug the battery into the JST-SKT. Tuck the wires down between the battery and the main board. Make sure the wires do not touch the speaker cone.



Mounting The Decoder

Unplug the shell's backup light from the main board and set it aside. Disconnect the boiler's plugs from the tender.

On the B60X board, rotate the antenna's gold connector so the antenna element is out of the way. You can bend the antenna straight up as shown in the picture.

There is a lot of wire manipulation during this final step. Don't be surprised if one of the wires comes loose from the terminal strip. It will probably be unbroken so it can be simply be reinserted into the terminal strip and tightened securely.

But if a wire breaks, you must strip back the insulation about 1/4 of an inch, tightly twist the strands and then apply a bit of solder. Before inserting the wire, remove the broken piece from the terminal. Reinsert the wire into the terminal strip and continue on.

The decoder is mounted with VHB double sided tape. It lies between the battery and the shell mounting posts. Cut two pieces of mounting tape about the width of the board; one for each end. Stick the tape to the chassis floor. Peel off the protective tape.

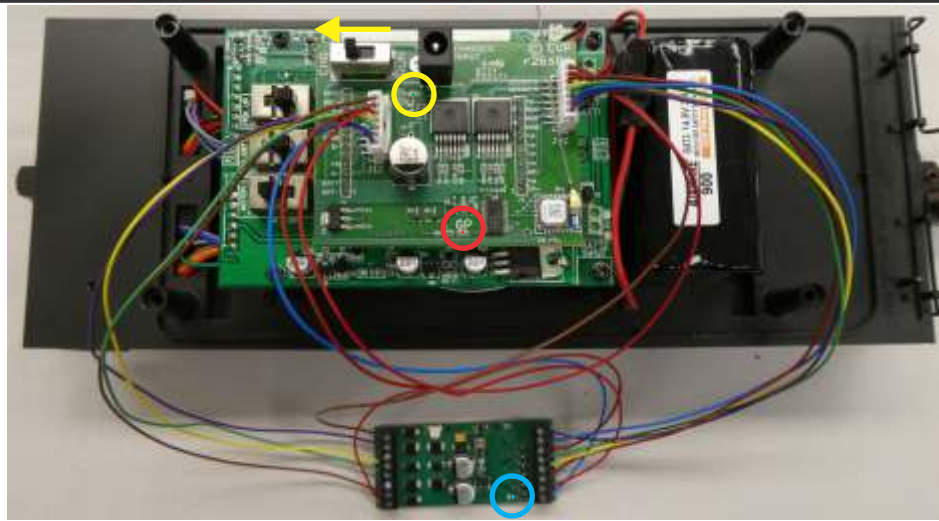
Place the decoder as shown. It will be close to the battery. Press down hard to insure the decoder sticks to the tape. Route the loose wires inside the posts, around the outside of the battery and upwards towards the B60X.

The last task is to bundle the wires using plastic tie wraps. Get a bag of the small 6 inch tie wraps at your local hardware store. We use florescent yellow wraps so they stand out in the photos.

Start with the left most bundle of wires and place a tie-wrap near the mounting post. Do the same for the other side.



Quick Test Of Decoder



Connect the Boiler to The Tender. Plug in both sets of plugs from the locomotive boiler to the tender. Make sure they are inserted all the way.

Plug In The Decoder and Its Harnesses. Place the decoder next to the tender chassis. Make sure the J1-C harness is on the left and the J2-C harness is on the right. Insert each harness plug into their respective socket. There is no need to worry about the rats nest of wires at this time. Make sure nothing metallic is near or under the decoder.

Setup The Wireless Controller. As delivered, new B60X is set for frequency 0. A new DCC decoder is set for loco number 3. Set your controller to loco number 3 and verify it is set for frequency 0. All subsequent checks assume factory settings for B60X and the sound decoder.

Power Up The B60X and Decoder and Check The LED Indicators. Slide the B60X Power switch to the RUN position. On the B60X, the bright green LED labeled PW (with yellow circle around it) shows that battery power is on. On The bright red LED labeled GP (with the red circle around it) show that the B60X is set to the same frequency as the wireless controller. The sound decoder will also power up and its blue LED (cyan circle) will be on. The steam engine idle sound will also be heard.

If the B60X is powered on without the wireless controller being turned on, neither the B60X's red GP LED nor the sound decoder's blue LED will be on. The wireless controller must be on and set to the same frequency for the LEDs to be on.

Run The Locomotive. Set the controller's direction to forward. Advance the speed knob until you see the locomotive begin to move forward, then return the speed to 0. This indicates the motor is wired correctly.

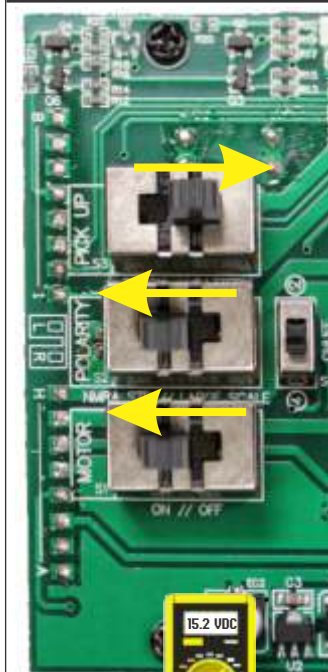
Check Front Headlight. Set the controller's direction to forward. Press function 0 key which is the 0 key. This turns on the headlight. The front headlight will now turn on.

Connect The Tender's Rear Headlight. Temporarily plug in the small plug from the tender's shell into the backup light socket. This is the small socket next to the speaker connection on the main board. On the wireless controller, change the direction to reverse. The rear headlight will now turn on. Disconnect the shell and set aside for now.

Check Firebox Light. Other than headlights, the Bachmann 4-6-0 only has a firebox light and a smoke generator. It does not have cab or marker lights. To turn on the firebox "flame" press function 24 to toggle the firebox flame on or off. You need to open the firebox door to see the flame. The smoke generator will be tested later.

This concludes the testing. If everything check OK, the next step is to mount the decoder.

Set Switches On Tender's Main Board



There are 4 switches that need to be set correctly to use the B60X and the DCC decoder. These are set once and not changed. The switch settings are labeled on the circuit board.

S3-PICKUP switch selects between track and battery. Slide it to the right for battery operation.

S2-POLARITY switch selects the track polarity. Slide it to the the "NMRA-STD" position.

There is inconsistency in the wiring of the POLARITY switch in the Bachmann Steam engines. NEVER set the switch to "LARGE SCALE." If this is done, even momentarily, the battery polarity is reversed at the DCC socket and will cause damage to the B60X. As a precaution, always place the polarity switch in the NMRA-STD position.

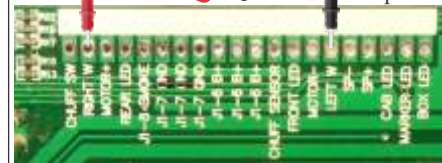
S1-MOTOR switch turns off the driver power to the motor. Set it to the left which is the "ON" position.

S4-CHUFF switch works with the optical chuff sensor. Since the optical sensor is not used with the TSU4400 DCC decoder, the switch setting doesn't matter.

Always Verify Correct Battery Polarity and Hookup

Once all the switches are set, the battery polarity needs to be confirmed as being correct. Use a standard VOM meter to do this check. Make sure the battery is plugged in.

Set your meter for DC Volts. Place the positive probe (red) in the hole labeled RIGHT W. Place the negative probe (black) in the hole labeled LEFT W. The measure voltage will be about 15V, depending on the battery charge (if using the BAT3).



Most meters won't display a PLUS symbol. However if the meter shows a minus/dash in front of the value, the polarity is reversed. Recheck the battery input terminal strip and JST-SKT pigtail (red is plus). Verify the POLARITY switch is set for NMRA-STD.

Plug The B60X Board Into The Main Board Socket

Set B60X Power Switch To CHG

Before plugging in the B60X board, first set its power switch to the CHG position. With no charger connected, this setting is the same as "OFF."

Plug In The B60X in to the Tender's DCC/RC socket

Line up the J1 pins of the B60X with the main board's J1 socket. If the two boards are aligned, the J2 pins will be right over the J2 socket. If not, reorient the board until all pins are over their socket opening. Gently push the board down so the pins are partially in the socket. Inspect both sets of pins and make sure all are ready to go into their sockets. Push down the B60X board evenly and squarely until the board is seated in its socket.

Tall Switch Actuator Interference

If the switch actuator interferes with the B60X insertion, file down or cut off the actuator. Once set, the switches are never changed.

Connecting The Wire Harnesses

These hookup instructions are for the Soundtraxx TSU4400 steam sound decoder. For other brands and models, please follow the manufacturer's hookup instructions.

Orient the Soundtraxx decoder horizontally with the S+, S- terminals at the top right. Unscrew all of the terminal screws at least 3 or 4 turns to allow the wires to enter.

Uniquely mark the two wire harnesses and your TSU4400 decoder. The wires will be connected one a time starting with the J1 harness followed by the J2 harness. The harnesses have the same color wires. They are not interchangeable and must be uniquely marked. Use a narrow point felt-tip pen and put a single dot between the two ridges of the plug. This marks the J1 harness. Put two dots on the other plug to mark it as the J2 harness. Note the wires are already stripped back about a quarter inch and tinned. You can always strip back a bit more if needed.

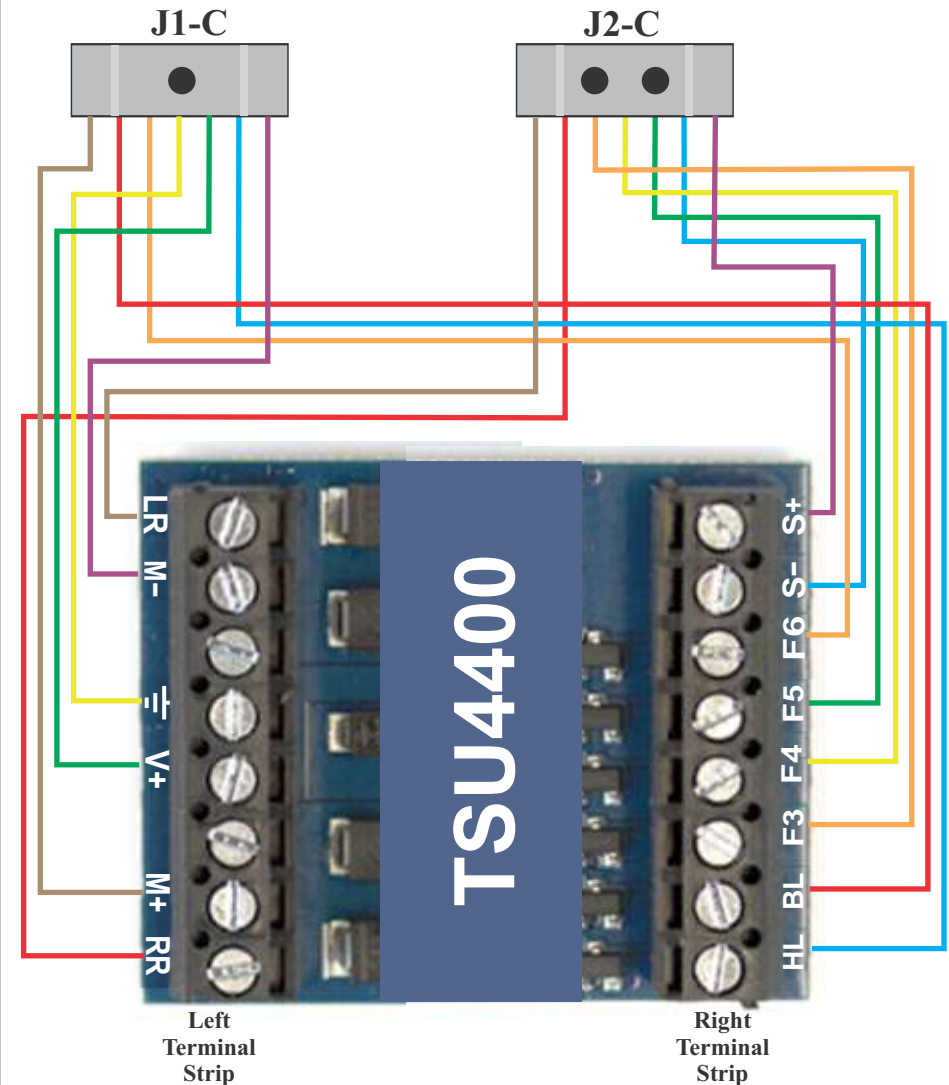
J1-C wire connections to sound decoder. Find the first wire from the J1 harness list which is the brown colored wire. Next locate the terminal on the decoder to which it connects. As shown in the list, it is the left terminal labeled M+. Insert the wire and tighten the screw using a small jewelers screw driver. Gently tug on the wire to insure it is held tightly. Check off the "DONE" box when the connection is made. Continue with the remaining J1 wires.

J1-C Harness Wire Color	Function or Name	DCC Decoder Terminal Label	Location	Done
Brown	Motor +	M+	Left Terminal Strip	
Red	Rear Headlite	BL	Right Terminal Strip	
Orange	Smoke Generator	F6	Right Terminal Strip	
Yellow	Decoder GND	⏏	Left Terminal Strip	
Green	Decoder V+	V+	Left Terminal Strip	
Cyan	Front Headlite	HL	Right Terminal Strip	
Magenta	Motor -	M-	Left Terminal Strip	

J2-C wire connections to sound decoder. Find the first wire from the J2 harness list which is the brown colored wire. Next locate the terminal on the decoder to which it connects. As shown in the list, it is the left terminal labeled LR. Using a small jewelers screw driver, loosen the screw, insert the wire and then tighten the screw. Gently pull on the wire to insure it is held tightly. Check off the "DONE" box when the connection is made. Continue with the remaining J2 wires. *Note: even if the wire is labeled as "not used" on the Bachmann 4-6-0, it's better to connect it to the decoder terminal than to leave it dangling.*

J2-C Harness Wire Color	Function or Name	DCC Decoder Terminal Name	Location	Done
Brown	DCCB Out	LR	Left Terminal Strip	
Red	DCCA Out	RR	Left Terminal Strip	
Orange	Fire Box Flame	F3	Right Terminal Strip	
Yellow	not used on 4-6-0	F4	Right Terminal Strip	
Green	not used on 4-6-0	F5	Right Terminal Strip	
Cyan	Speaker -	S-	Right Terminal Strip	
Magenta	Speaker +	S+	Right Terminal Strip	

Pictorial Hookup Diagram For Wire Harnesses



After all the wires are attached to the decoder, it will look something like the photo to the right

Allow the wires to naturally coil as shown. This will be helpful when the decoder is mounted.

Take some time to verify that each wire is in its proper position.

If the wires are connected to the wrong terminals, damage to the B60X and the decoder will occur.

