

Resetting Drop-In Decoder To Original Factory Settings

Using The T9000 Throttle

Follow these steps to reset your AirWire Decoder to its original factory settings. Remember that any Drop-In decoder sharing the frequency will also be reset. Turn off all other nearby decoders to avoid this problem.

Turn on the throttle.

Push the SPR key then the SEL key to enter the Service mode.

One at a time, push the following keys: *, 8, *.

One at a time, push the following keys: #, 1, 3, 5, #.

Listen for the decoder to beep signifying the command has been sent.

Push the SPR key to return to normal operation or cycle the throttle's power switch..

At this time, the decoder has been reset to factory defaults. It will be on address 3. Set the throttle to address 3 to confirm that decoder has been reset.

Using The RF1300 Throttle

Follow these steps to reset your AirWire Decoder to its original factory settings. Remember that any Drop-In decoder sharing the frequency will also be reset. Turn off all other nearby decoders to avoid this problem.

First, turn *off* throttle's power switch.

Next, push **and hold** the 9 key. While holding down the 9 key, turn on the power switch.

Release the 9 key. Notice the direction indicators are alternately flashing signifying the throttle is in the programming mode.

One at a time, push the following keys: *, 8, *.

One at a time, push the following keys: #, 1, 3, 5, #.

Listen for the decoder to beep signifying the command has been sent.

Turn off the throttle to exit programming mode.

At this time, the decoder has been reset to factory defaults. It will be on address 3. Reset your throttle to address 3 to confirm that decoder has been reset.

See the Drop-In Decoder Users Guide for much more information regarding all the ways to setup your new decoder and locomotive for optimum performance.

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AirWire900®

F3 Drop-In™ Decoder

Installation Guide

USA-Trains F3A-B Disassembly

Battery And Smart Charger Preparation

F3 Drop-In™ Decoder Installation

Quick Start Guide

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The F3A locomotive and the F3B locomotive use the same F3 Drop-In decoder board and this installation manual is for both. Disassembly will be similar although the B unit is easier to work with since it has only the smoke units and a single backup light. The B-unit also doesn't have the challenge of a hard to reach screw in the front. Otherwise, the installation procedure for the A or B unit is basically the same.

AIR WIRE®
900

Contents
F3 Drop-In Decoder
Battery Pigtail
Charger Pigtail
Rear Lamp Jumper
This Manual

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How To Use This Booklet

The F3A unit and the F3B unit use the same F3 Drop-In decoder board. Disassembly will be similar although the B unit is easier to work with since it has only the smoke units and a single backup light. The B-unit also doesn't have the challenge of a hard to reach screw in the front. Otherwise, the installation procedure for the F3 Drop-In decoder is basically the same.

Locomotive Disassembly and AirWire Drop-in Decoder Installation

This section starts with the simple task of attaching the appropriate sockets and plugs to the battery and the battery charger. Step-by-step instructions then show how to disassemble the USA-Trains F3A diesel locomotive. The F3B is similar but easier. Once the locomotive is opened up, installation continues with enlarging a switch hole for the charging jack, mounting the battery, installing the Phoenix P8 sound module and finally the F3 Drop-In decoder. With the installation done, a quick checkout is run and then the locomotive is reassembled.

Quick Start Instructions

This short section describes how to control the features of the F3A-B locomotive using the AirWire throttle. In this section you will find the "cheat sheet" listing the throttle function key assignments for both the locomotive and P8 sound effects.

Miscellaneous Items

Some useful items related to changing the Drop-In decoder address and how to reset the Drop-In decoder to its original factory settings finish out this book.

See The Drop-In Users Guide For Applications Tips

Since this manual is used during installation only, and it is specific to the F3A-B locomotive, there is a second users guide. This second users guide will have all of the items related to fine tuning and performance optimization as well as some interesting application tips.

Recommended Optional Items - Phoenix P8 Sound Module & Interface Adapter

The Drop-In Decoder is designed to work with the Phoenix P8 sound module. The P8 module requires their interface adapter to setup the P8 functions. If your installation will not have sound, then you may ignore all references to the P8 sound module

Throughout this manual, all references to the battery charger and battery are referring to the CVP Products' 14.8V Lithium battery pack and the Tenergy brand smart battery charger.

**A smart person reads instructions.
A genius follows instructions.**

Changing Drop-In Decoder Address

Using The T9000 Throttle

The original factory setting for the decoder address is 3. You can change the address to any number from 1 to 9999. We recommend using the locomotive cab number. If you don't have a lot of locomotives, perhaps the last digit of the cab number is sufficient. What ever is used, make sure it is unique. Keystroke examples are done using CVP's AirWire T9000 throttle first, followed by the RF1300 throttle. See the appropriate throttle instruction manual if you are using a different type of throttle.

Changing the Locomotive Address.....CV1

Range is 1 to 9999 when using an AirWire throttle.

For this example, the address will be changed from 3 to 4227. First turn on the decoder power switch. Using the T9000 throttle, enter the following keystrokes to set the new address:

SPR	selects service mode
SEL	confirms that service mode is wanted
,1,	tells which CV is to be changed
#4,2,2,7,#	loads the number of 4227 into the selected CV
SPR	exits service mode

When the final # is pressed, the locomotive decoder is sent the information. The decoder acknowledges this with both a momentary pulse of the motor along with the several beeps.

Press SPR to exit the service mode, or simply turn the throttle power switch off then back on. Either way exits the service mode.

Enter the new number, 4227, into the throttle and verify the locomotive operates. There is no change to the P8 sound module if it is installed; it must be set to DCC address 3.

Using The RF1300 Throttle

The original factory setting for the decoder address is 3. You can change the address to any number from 1 to 9999. We recommend using the locomotive cab number. If you don't have a lot of locomotives, perhaps the last digit of the cab number's is sufficient. What ever is used, make sure it is unique.

First, turn *off* throttle's power switch. Then push **and hold** the 9 key. Then, while holding the 9 key down, turn on the power switch. Now release the 9 key. Notice the direction indicators are alternately flashing signifying the throttle is in the programming mode.

One at a time, push the following keys: *, 1, *.

Then, one at a time, push the following keys: #4,2,2,7,#.

Listen for the decoder to beep signifying the command has been sent.

Turn off the throttle to exit programming mode, then turn it back on.

Enter the new number into the throttle, #4,2,2,7,# and verify the locomotive operates along with the P8 sound system if it is installed.

The Drop-In decoder sends all sound effect commands to the Phoenix P8 decoder on DCC address 3 regardless of the Drop-In decoder's locomotive address. The P8 sound decoder must always be set to receive commands on DCC address 3.

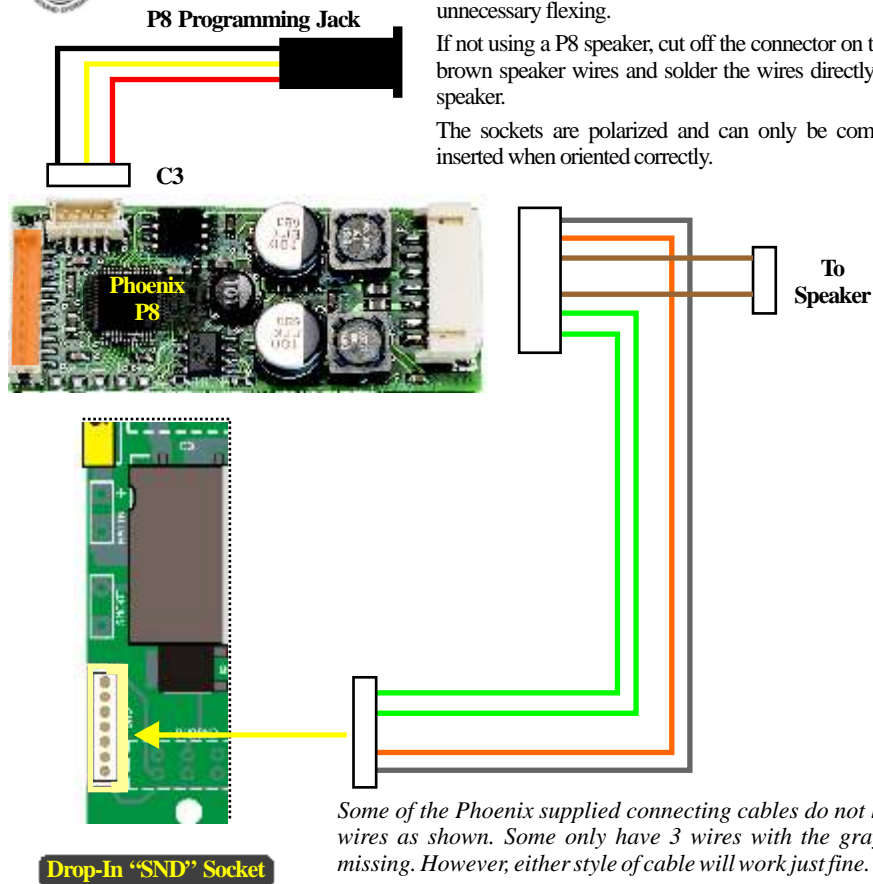
Phoenix P8 Hookup Diagram



This is the Phoenix P8 hookup diagram. The wires are somewhat stiff and fragile. Don't subject them to a lot of unnecessary flexing.

If not using a P8 speaker, cut off the connector on the two brown speaker wires and solder the wires directly to the speaker.

The sockets are polarized and can only be completely inserted when oriented correctly.



The Drop-In decoder has a dedicated power switch for the P8. The P8 power switch is independent of the Drop-In decoder power switch. When turned on, the P8 is connected directly to the battery. The P8 can be powered while the Drop-In decoder is not.

Don't forget this fact when you turn the sound volume down low or off. Even if off, the P8 draws power from the battery and it will not automatically turn off.

Always use the power switch to shut off the P8.

P8 Address Setup

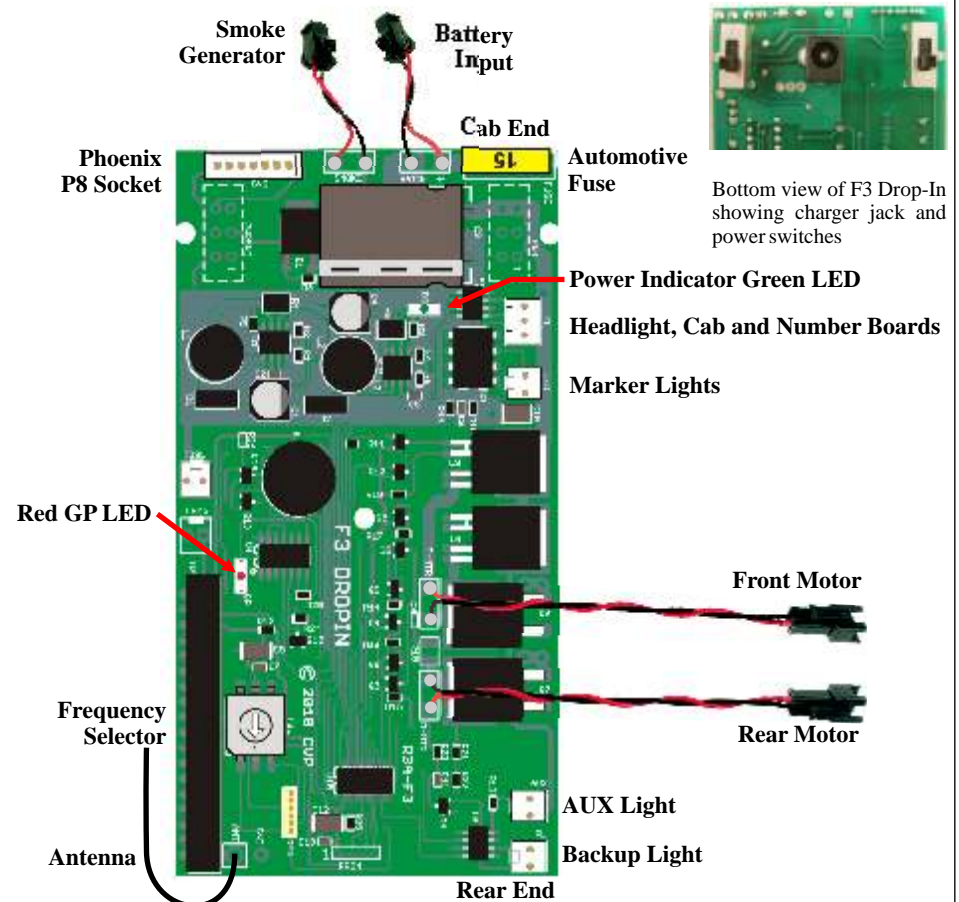
The Drop-In decoder sends DCC commands to the P8 on address 3. There is no need to change the P8 address from the factory setting of 3.

Phoenix P8 Sound Decoder Setup - See The Drop-In Decoder Users Guide

The P8 is a versatile sound decoder with many options and selections. However, there are selections that must be made to achieve the best results with the AirWire Drop-In decoder.

Detailed P8 manual instructions are contained in the Drop-In Decoder Users Guide. Also, be sure and see the P8 setup and read the help screens that are part of the Phoenix programming software.

F3A-B Drop-In Decoder Familiarization



Actual pigtail lengths are different than shown and are sized to fit the F3 locomotive.

There is an additional jumper included with the F3 Drop-In Decoder. This jumper is used to replace the spring contacts that connect the Drop-In to backup light.

The battery and charger pigtails are not shown here but are also included with the Drop-In decoder.

Save This Header and Its Wire

Similar to the SD70 locomotive show to the left, the USA-Trains F3 locomotive includes an unused header taped to the bottom of the chassis and hidden by the fuel tank. You will find it as you start the installation process.

Save this header and its wire for use as a replacement for the unreliable spring contacts connecting the roof-top smoke units to the controller.

If you do not have this cable, one may be purchased directly from CVP Products for \$3 plus shipping. The part number is JMP100.



Attaching Battery Pack Pigtail



WARNING: The CVP battery pack wire ends are insulated with heatshrink tubing. Remove only one piece of tubing at a time and then, only when ready to make the connection to the power plug, NEVER allow the two bare battery wires to touch.

The Lithium battery pack comes with wires that must be connected to the power plug pigtail. The pigtail is included with each Drop-In decoder. This is not difficult and no special tools are needed.

If you are using a different battery, you must properly identify the PLUS wire. If you get the polarity wrong, you will damage the Drop-In decoder and the warranty does not cover this. If you are not sure, seek help - don't guess.

Battery polarity is very important. Incorrect polarity will damage the decoder. This is not covered by the decoder warranty. For the Lithium battery, the plus wire is red. The black wire is minus. For the power plug, the plus wire is also red and the minus wire is black.

Twist the Power Plug Wires Together so they look like the picture. This helps minimize radiated noise. Once twisted together, trim both power plug wires to about 4 inches long. Next, trim the red power plug wire so it is about 1 inch shorter than the black wire.

Remove about 1/2 inch of the insulation from the black wire. Twist the strands together and touch a tiny bit of solder to the twisted wire. This is called tinning and keeps the twisted wires from unraveling.

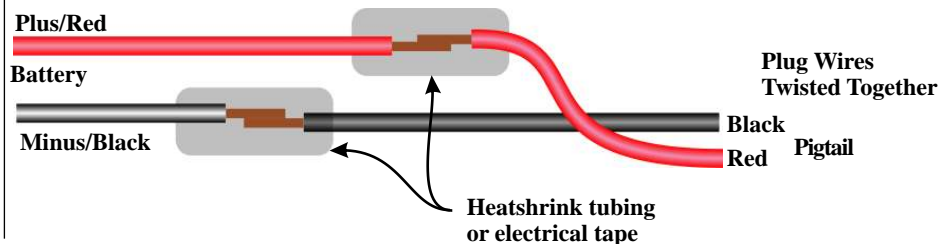
Remove about 1/2 inch of the insulation from the red wire. Twist the strands together and touch a tiny bit of solder to the twisted wire. This is called tinning and keeps the twisted wires from unraveling.

On the battery, start by trimming the black wire so it is one inch shorter than the red wire. Do not remove the heatshrink tubing on the red wire.

Remove about 1/2 inch of the insulation from the battery's black wire. Twist and tin the wire.

If you are using heatshrink tubing to insulate the solder joints, now is the time to slide a piece over the black wire - either side will work. Otherwise, use electrical tape to insulate each connection. Overlap or twist together the two black wires and solder them together. Once the solder joint has cooled, slide the heatshrink over the connection and heat it up so it shrinks around the connection. Make sure no bare wires are visible.

Remove the heatshrink tubing from the red wire. Don't forget to slide on a fresh piece of heatshrink for use later. Now overlap or twist together the two plus wires and solder them together. Once the solder joint has cooled, slide the heatshrink over the connection and heat it up to shrink it around the connection. Make sure no bare wires are visible. This completes the wiring.



F3A-B Quick-Start - continued

Coupler clang is triggered by F3. Trigger means the sound effect is transitory and sounds each time the key is pressed.

Grade crossing horn is triggered by F4. This is a 15 second recording of a complete grade crossing horn sequence.

“AllAboard” station announcement is triggered by F5.

Compressor start up is triggered by F6. The sound effects runs for a few seconds and then shuts off.

Volume Up is triggered with F7. To use this feature, push F7 to begin increasing the overall Phonenix sound volume. When the volume reaches the desired level, push F7 to stop and hold the volume setting.

Volume Down is triggered with F8. This works the same as F7 except the volume will begin to decrease when F8 is pushed. Push F8 again to stop and hold the volume setting.

Caution: if the volume is allowed to decrease to 0 or off, the volume will remain at 0 when the power is turned off. When turned back on, you may think there is a problem with the sound when in fact you simply have to push F7 to raise the volume.

Dynamic Brake is toggled with F9.

Brake release sound is triggered with F10.

Air Pop Valve sound effect is triggered with F11.

Diesel Engine Shutdown is triggered with F12. This will initiate the shut down sequence for the diesel engine. You can manually restart the engine by simply pushing F12 again. Note that if the throttle speed setting is not idle, the diesel automatically restart. This applies when the locomotive is standing still too. Any change of the speed control will automatically restart the diesel engine.

This table shows the combined list of recommended function key assignments for the Drop-In decoder and the P8 sound module. Black is the effect for the Drop-In decoder and red is the effect for the P8.

Throttle Key	Locomotive Effect (black) and/or – Sound Effect (red)
0	Toggle headlights, number boards, markers
1	Toggle bell
2	Manual horn activation
3	Trigger coupler clank sound
4	Trigger grade crossing horn sequence
5	Enable cruise control - change speed or direction to cancel
	Trigger station or hotbox announcement
6	Trigger compressor sound effect
7	Volume up - push to ramp up, push to stop
8	Volume down - push to ramp down, push to stop
9	Toggle dynamic brake sound effect
*0	Toggle smoke generator [two minute timeout]
	Trigger brake release sound
*1	Toggle cab interior light
	Trigger air pop valve
*2	Toggle engine shutdown or startup sound sequence

F3A-B Drop-In Decoder Quick-Start Guide

The quick-start page assumes the locomotive decoder is on the original factory setting of address 3 and frequency 0. If you have changed either of these, then be sure and use your new settings. The locomotive address and frequency must match. This page also assumes you have used the recommended settings for the P8 sound module. See the Drop-In Users Guide for details.

Now that the locomotive is reassembled, lets try a few out a few of its features. These two pages describe features that are part of the original factory settings. As you become familiar with your locomotive performance, you will undoubtedly want to make changes as well as fine tune its operation. Detailed instructions for fine tuning are covered in the Drop-In Users Guide which is a separate booklet.

Locomotive Motion Control

Speed and direction are controlled from the throttle. Use the throttle's knob to change speed. To change direction, push the direction key. "Forward" direction is defined as if you were sitting in the locomotive cab.

Cruise control activation is easy. Once the locomotive is running at the desired speed, push F5 to activate cruise control. A beep will be heard when cruise control is activated. To deactivate cruise control simply change the speed or direction. A beep will be heard when cruise control is deactivated. At very slow speeds, you may hear a double beep. This means that the locomotive is going too slow for reliable cruise control so you need to increase the speed slightly and push F5 again.

Locomotive Lighting and Smoke Generator Control

Headlights, number boards and marker lights are toggled on and off with the throttle's 0 key. This is function 0 which we shorten to F0 The headlight automatically turns off and the backup light turns on when the direction key is pushed. The marker lights are green going forward, and red in reverse.

Cab interior and number boards are toggled on and off with F11. As a reminder F11 is the * key followed by the 1 key on the T9000 throttle. For the RF1300 throttle, F11 requires you to push the # key, then the * key followed by the 1 key.

Smoke units are toggled on and off with F10. Once turned on, the smoke generator has an automatic 2 minute timeout. However, if the smoke fluid has run out, the locomotive's own smoke generator controller will turn off even if the 2 minute timer has not run out. As a reminder F10 is the * key followed by the 0 key on the T9000 throttle. For the RF1300 throttle, F10 requires you to push the # key, then the * key followed by the 0 key. Do not depend on the factory installed smoke controller circuit to shut off the Smoke unit.

Phoenix P8 Sound Effects Control

The table on the next page assumes you have used the recommended configuration file or have set up the P8 to match our recommended settings. These settings are described in the Drop-In decoder Users Guide. If you have not yet configured the P8, the sound effects and throttle activation keys will not match and the sound may shut off after only a few minutes of operation. This is normal if the configuration has not been changed - it is not a Drop-In or sound module problem.

Bell is toggled on and off by F1. Toggle means push and release the F1 key to turn on the bell. To turn off the bell, push F1 again.

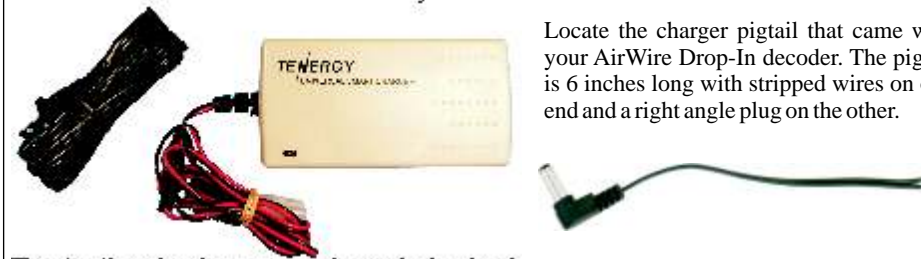
Horn is activated by F2. This is a momentary activation which means push to turn on and release to turn off. There is an automatic timer tied to the horn activation. Sometimes, when the horn is activated, it does not receive the turn off command. This can be caused by motor noise, distance from the throttle or momentary jamming. To prevent the horn from being stuck on, the Drop-In decoder will automatically shut off the horn.

Replace The Roof-Top Details

Don't forget to reinstall the horns and other roof top detail you may have removed during installation.

Attaching Charger Plug Pigtail To Charger

First, open up the charger box. The only items kept are the charger, the power cord, and the spare fuses. All other items are not needed and may be discarded.



Locate the charger pigtail that came with your AirWire Drop-In decoder. The pigtail is 6 inches long with stripped wires on one end and a right angle plug on the other.

The pigtail needs to be permanently attached to the charger output wires. This is not difficult and no special tools are needed.

Wire polarity is very important and reversing the polarity could damage the charger or the battery or both. On the pigtail, the plus wire is the wire with the white stripe. The minus wire is the solid black wire. The charger uses the conventional red wire for plus and black for 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 the insulation from the minus wire. Twist the strands together and touch a tiny bit of solder to the twisted wire. This is called tinning and keeps the twisted wires from unraveling.

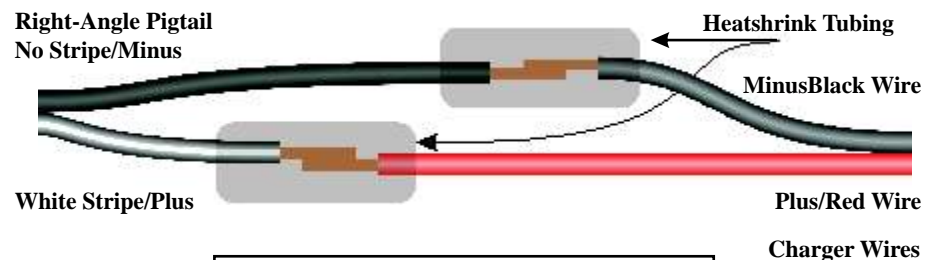
Take the charger wires and split the red and black wires apart for about 3 inches. Cut the minus wire so it is shorter than the plus wire. Remove about 1/2 inch of the insulation from both the black and red ends of the wires. Twist and tin the wires.

If you are using heatshrink tubing to insulate the solder joints, now is the time to slide a piece over the minus wire - either side will work. Otherwise, use electrical tape to insulate each connection. Overlap or twist together the two minus wires and solder them together. Once the solder joint has cooled, slide the heatshrink over the connection and heat it up to shrink the tubing around the connection. Make sure no wire is visible.

Slide a piece of heatshrink over the plus wire. Overlap or twist together the two plus wires and solder them together. Once the solder joint has cooled, slide the heatshrink over the connection and heat it up to shrink the tubing around the connection. Make sure no wire is visible.

Inspect for proper polarity matching and that no bare wire is visible outside the heatshrink tubing. This completes the wiring.

Right-Angle Pigtail
No Stripe/Minus



Heatshrink tubing may be ordered from Mouser Electronics. Use 0.25 inch diameter tubing with part number 5174-1141. It sells for about \$2 and comes in a 4 foot length. www.mouser.com

USA-Trains F3A-B Disassembly

Warning: Many parts of the shell and chassis are fragile and easily break. Especially vulnerable are the steps, doors, side-frame assemblies, window detail. Gently pull up and remove both of the horn assemblies and the little steam vent near the rear.



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. The thin shaft is necessary to fit between the wheel and side frame. 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.



A Soft Work Surface Pays Big Dividends

Spread a couple layers of thick towels on your work surface to serve as a cushion for the locomotive. The top of the locomotive is uneven and is unstable when upside down. The towel will help prevent damage should it fall over.

Use a Foam Block To Hold Screws

Take a rectangular sheet of foam and label it B and F to represent the loco's front and back end. As each screw is removed, position it in the foam at about the same location as found on the locomotive.



Total Mounting Screw Count is 11

When all the screws are removed, there will be a total of 11 screws. When you are done, if your count doesn't match, go back and check to see which ones you missed. The next series of illustrations shows the location of the screws and have been numbered for easy reference.

Remove Fuel Tank - 2 Screws

The 2 screws are numbered below and the black circles show where you will find the screws. Remove the 2 screws, place them in the foam block, then lift off the tank and set it aside for now.



F3A-B Closing Up The Locomotive

Common Errors and Fixes

Green Power LED doesn't turn on: Make sure the Drop-In decoder power switch is on. The power LED does not turn on even though the sound module is operating OK.

Red GP LED only has a very slow flash rate: This is your indication that either the radio frequency or the locomotive address is set incorrectly. The small frequency selector could also be off by one click. While the power is on, use a small screwdriver to rotate the selector left or right. If the GP light turns on steady, then you have found the correct frequency.

Make sure everything checks - you don't want to have to take the locomotive apart more than once.

Closing Up The Locomotive

This will take a few minutes and can be the toughest part of the job. Don't rush - take your time. The first task is to push the P8 programming plug up through the round hole in the chassis and plug it into the P8.

Next, bundle the backup light wiring and smoke unit wiring together. Use some tape to fasten the backup light wiring to the roof of the shell. Keep it away from the all the mounting posts. Lift the shell over the chassis and observe the wiring. To insure that the wires don't obstruct the mounting posts, make sure that they naturally fall inside, and between the mounting posts. Use additional tape, twist ties or cable ties if necessary to keep them in place. Continue to bring the top half down onto the chassis. Watch and make sure all wires are **INSIDE** the mounting posts. Don't allow a wire to fall on the outside of the post or you risk pinching it when the top half is mated to the bottom half. Look on both sides of the locomotive.

The bundle of wires going to the cab area lights are the ones that generally cause trouble with the mounting screw #3 which is near the coupler pocket. Make sure they all go through the notch in the wall. You can lift up the shell a bit to verify that the wires are clear of the mounting hole.

The two halves should seat themselves correctly although the nose may droop a bit until the #3 screw is installed. It is easy to be off by a small amount which will prevent the two halves from mating. Once the two halves are together, turn the locomotive on its side or on its back. If upside down, do not strain the speaker and programming wires. Install the #3 screw first. To start the screw, first turn it slightly counter-clockwise to get it seated in the threads, then turn it clockwise to tighten. Do not over tighten. Then install the rear end screws.

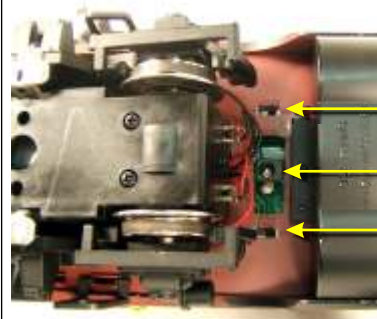
Before mounting the fuel tank, push the extra speaker and programming wires up through the hole in the floor. No wires should be allowed to touch the black speaker cone or the sound will distort. Now attach the fuel tank. Finish the reassembly by installing the remaining screws.

If A Screw Just Spins

If a screw spins in the hole without tightening, the hole is not stripped. Rather the top and bottom halves are too far apart or slightly misaligned. This can be caused by a wire that is pinched between the two halves. Take the locomotive apart and try again. If you find a broken wire, splice it. If just kinked or creased, move it out of the way and fasten it down before continuing. Always insulate splices. No bare wires are allowed inside the locomotive.

Power Switches And Charger Jack

Move the switches towards the cab to turn on the Drop-In decoder and the P8 sound module. The switches must be off to charge the battery.



Drop-In Power Switch [shown OFF]

Battery Charger Jack

Phoenix P8 Module Power Switch [shown OFF]

Set Drop-In Decoder Frequency Selector Switch

Before closing up the locomotive, now is the time to change the decoder's frequency selector. You can always change the frequency at any time but since the locomotive is already open, now is a good time to set it.

The Drop-In Decoder offers the original 8 frequencies plus an additional 8 frequencies making a total of 16 available frequencies. Either the RF1300 or the T9000 throttle can use the original 8 frequencies, numbered from 0 thru 7. **Only** the T9000 throttle can use the 8 new frequencies available on the Drop-In Decoder.

Setting RF1300 To One Of The Original 8 Frequencies - 0 to 7

Use the illustrations to ensure that the throttle/decoder pair have matching frequencies. Notice that the small arrow on the decoder's selector switch points at the frequency number. In the picture to the right, it is pointing at 0. The frequency can be changed at any time and the new setting takes affect immediately. In the drawings below, the white square is the slider portion of the switch. Changes can be done with the power on.



Note, if using the optional remote frequency selector, set the selector switch to 0.

Setting T9000 To One Of The Original 8 Frequencies - 0 to 7

Push SEL1 and enter the number that matches the number dialed in at the Drop-In decoder. This will be in the range of 0 through 7. Push # after the number has been entered.

Change Frequencies Carefully - Watch And Count

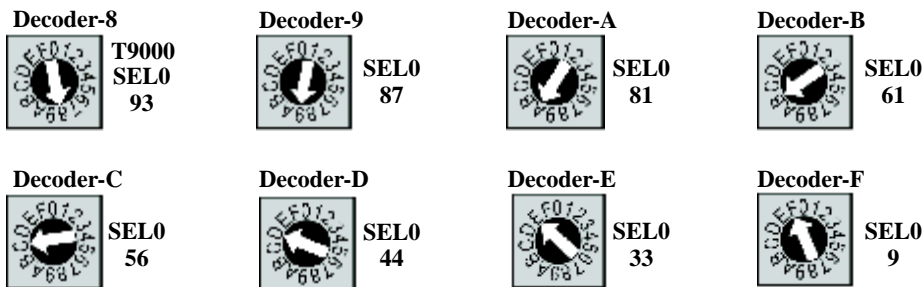
When changing the decoder's frequency, each click of the switch is followed by a chirp. This tells you that the decoder's frequency has been changed. The little switch's arrow is small so use a bright light, good reading glasses, a jewelers screwdriver and count the chirps as the arrow is moved. Use the GP light as your final check that the frequency and address match before closing up the shell.

Decoder RF1300



Setting T9000 To One Of The New Drop-In Decoder Frequencies - 8 to F

You will be delighted to know that your T9000 is already capable of accessing the 8 new frequencies. The T9000 has an undocumented command that is used to set it to the new frequencies. Note that there is no direct match between the T9000's new frequencies and the Drop-In decoder's switch setting. Be sure to set the decoder first and then enter the frequency on the T9000 throttle. Push SEL 0, enter the number shown below and then push #. Verify that the decoder's GP light turns on.



USA-Trains F3A-B Disassembly

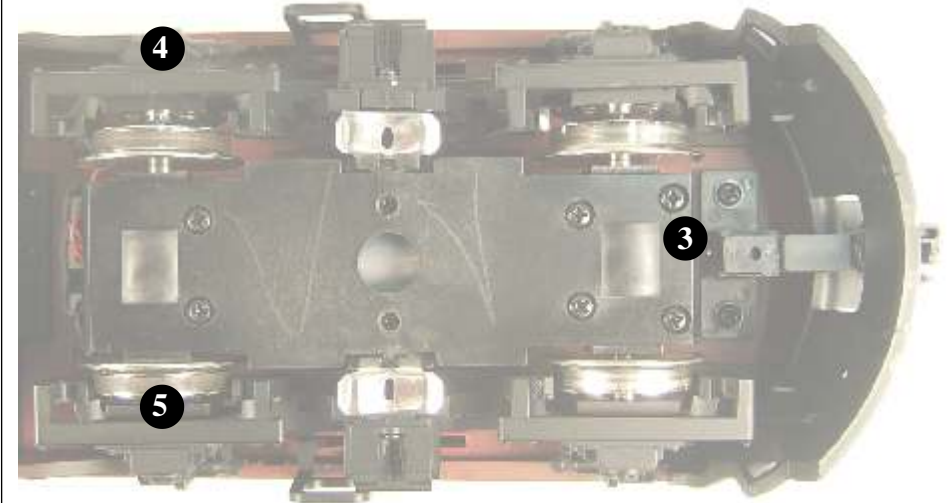
Cab End Mounting Screws - 3 Screws

You will need to rotate the truck to see the holes in which the screws will be found. The screws are located in deep hollow tubes and you will need to use the long, thin-shafted screw driver. As each screw is removed, place it into the foam block.

Take care not to damage the truck wiring. Be careful not to damage the side frame's delicate detail.

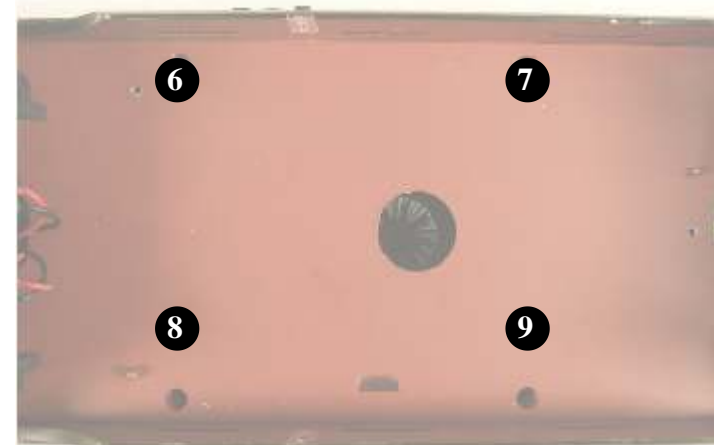
The number 3 screw may be difficult to see. Its hole is directly behind the coupler pocket. Rotate the truck to see it better. Wedge the screwdriver into the hole while gently pushing the truck away. You can also remove the side frame to provide better visibility.

If a screw does not come out with the screwdriver's magnetic tip, give the screw several more turns to insure it has released from the upper shell. The screw is usually hung in the burrs at the end of the tube. Just make sure it has released from the top shell. You can retrieve it once the top and bottom sections are separated.



Under Fuel Tank Mounting Screws - 4 Screws

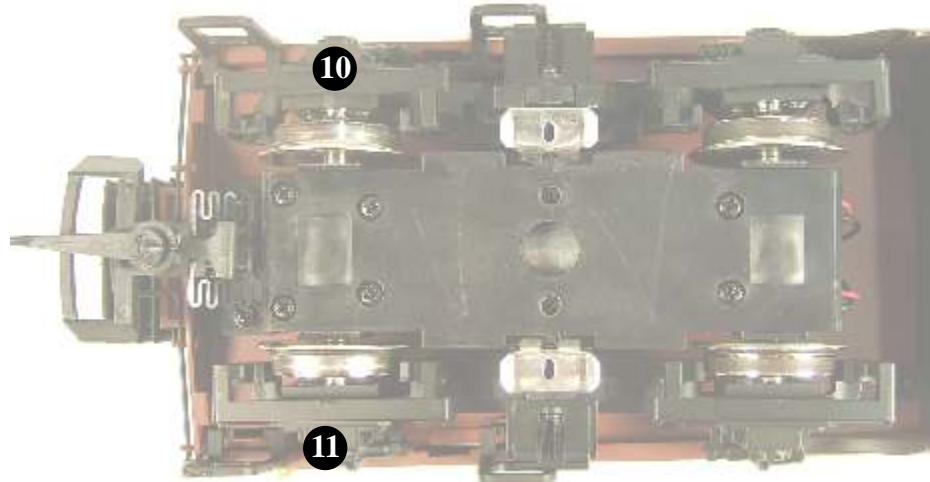
Remove the 4 screws that are visible once the fuel tank is removed. Place the screws into the foam block.



USA-Trains F3A-B Disassembly

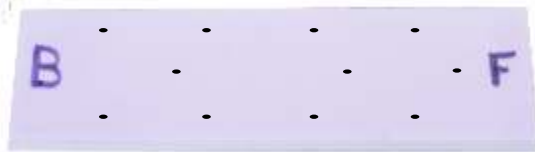
Rear Mounting Screws - 2 Screws

The last 2 screws are located in hollow tubes that the truck partially obscures. Rotate the truck to expose the holes and remove the last two screws.



Check Your Screw Count

With all screws now removed, take a moment and compare your count and foam board holder to the one below. The total count is 11. If your count is different, you've missed one. Go back and find the missing screw and remove it. If it is hung in the tube, that is OK, just make sure the screw has been released from the top half. If all screws are not removed, the top shell and bottom chassis can not be separated.



Separate The Top Shell From The Chassis

Turn the locomotive over and gently remove the shell. It will separate easily if all the screws have been removed. If it doesn't come apart, you have missed a screw. Find it and remove it.



F3A-B Preliminary Checkout

Preliminary Checkout

As delivered from the factory, the Drop-In decoder is set to locomotive address 3. Also, the frequency selector will be set for frequency 0. For this initial test, verify that frequency selector rotary switch's little pointer is pointing at the number 0. If not, use a small straight slot screwdriver to move the arrow head of the indicator to point at 0.

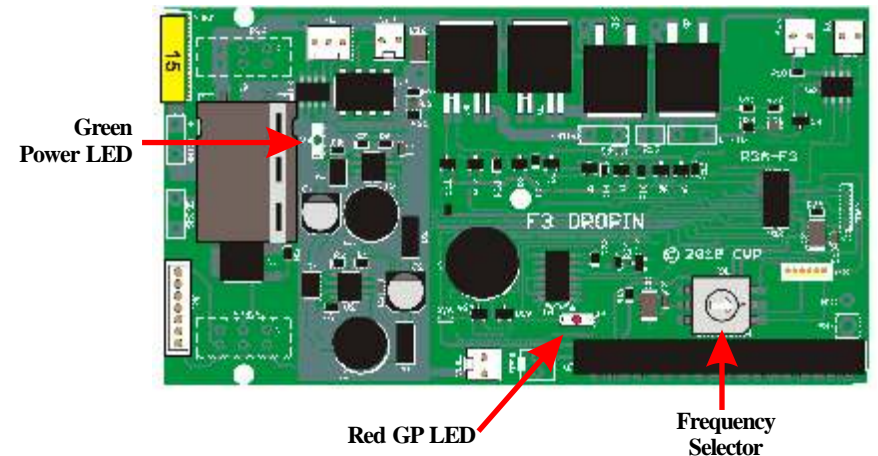
1. Turn on both power switches on the Drop-In. The ON position is when the slide switches towards the cab. The green LED will turn on indicating that battery power is present.
2. You will hear the Phoenix P8 module turn on (if installed). Don't be alarmed if the sound turns off in a minute or so - that is normal and changing this feature is discussed in the Users Guide.
3. Turn on the throttle and set it for address 3. Also set the throttle to frequency 0. See your throttle manual for how to do this. Now look at the red GP LED - it will be on. It may appear to flicker a bit which is normal. This tells you that the address and frequency are set to match the throttle.
4. Slowly turn up the throttle until you see the motor attempt to move. Verify that both motors turn in the same direction.
5. Turn on the front headlight, number boards and front marker lights by pushing the 0 key on the throttle. Set the throttle for reverse and confirm the backup light turns on, the front markers are red and the headlight is off. Push 0 to turn off the headlights.
6. Push the * key followed by the 1 key. This will turn on the cab interior light.
7. To test the smoke unit, you must add a few drops of smoke fluid to both smoke units. Make sure the cab is right side up before testing the smoke unit. The smoke unit is turned on by pushing the * key followed by the 0 key. Since this is the older style of smoke unit, there is no fan. After a few minutes, smoke will appear. Push * and 0 again to turn off the smoke unit. Do not rely on the factory smoke controller to automatically turn off - it is unreliable. Use the throttle to turn it off.
8. If you have installed the Phoenix sound decoder, push the 2 key and the P8 horn will sound.

This concludes the preliminary checkout.

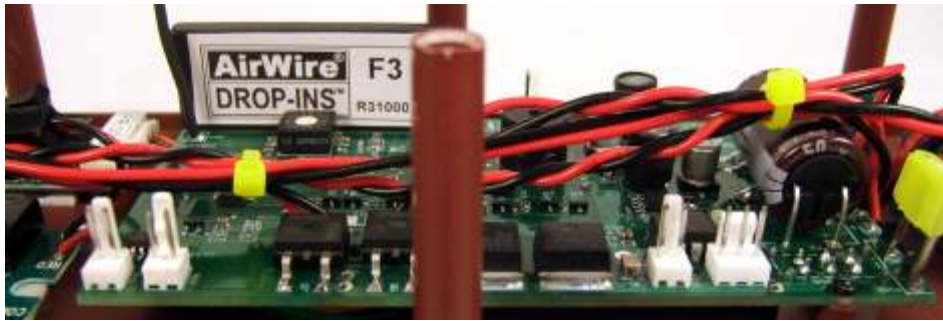
What About Fine Tuning?

With the exception of the frequency selector switch setting, all other motion control settings, options and selections can be made from the throttle. The Phoenix P8 settings are changed via the programming interface jack you mounted in the fuel tank. Complete information is in the Drop-In Users Guide.

If you intend to change the frequency, do so now before the chassis is reassembled. See the next page for how to do this. And if the frequency is changed, set the throttle to the new frequency and verify the red GP LED turns on before closing up the shell.



Connect Shell Lights and Smoke Unit



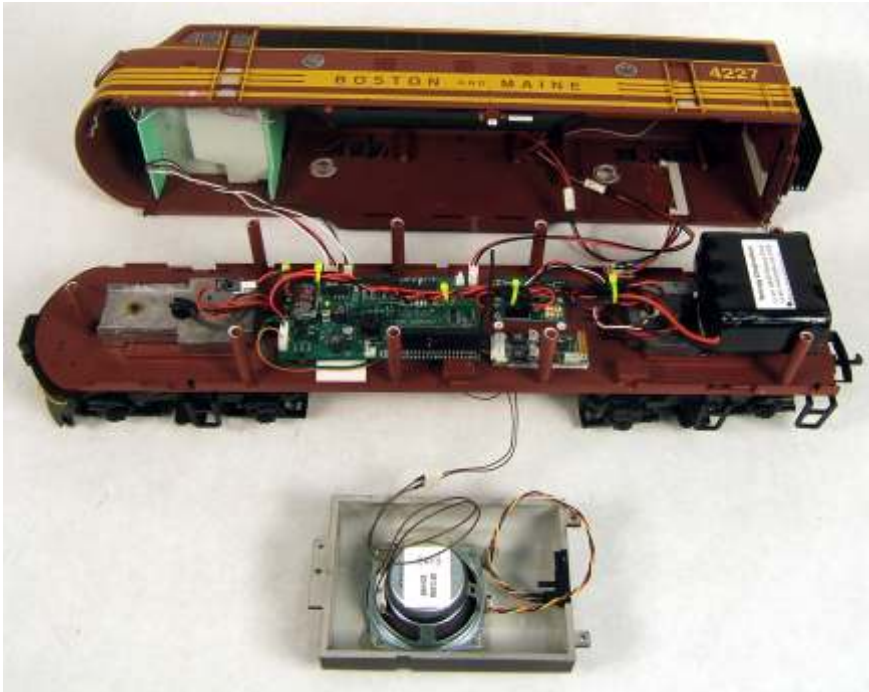
↑ Backup Light ↑ AUX Light
 ↑ Marker Lights ↑ Headlight, Cab and Number Boards

Plugging In The Top Shell Connectors and Preparing For Preliminary Checkout

Before closing everything up, it is best to perform a preliminary checkout. This checkout verifies that everything is working and ready to go. For this checkout, you will need to connect the top shell connectors to their appropriate locations on the Drop-In decoder. Once everything checks OK, the locomotive will be ready for final reassembly.

Bring the shell near to the chassis and plug in the connectors to the appropriate headers on the Drop-In board.

For the backup light, temporarily connect the jumper and plug it into the Drop-In. Also plug in the smoke unit to the new pigtail. Finally, plug in the speaker. The photo below shows the setup ready for preliminary testing. The P8 programming cable is not connected at this time.



USA-Trains F3A-B Disassembly

Unplug All Connectors From Old Circuit Board and Remove The Board

This is relatively easy. Unplug all the connectors from the circuit board. Remove and save the little twist ties. These will be used later.

The lighting connectors are relatively robust and are held in place by friction. Grasp the white plug and pull straight up. Do not pull on the wires.

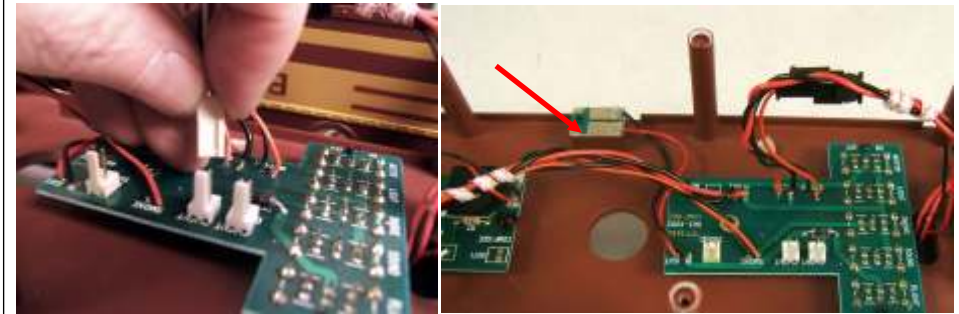
Disconnect the motor and pickup wires as well as the smoke generator controller connector from the main board. These connectors have a locking tab. To release the lock tab, push the down on the tab while gently pulling the connectors apart.

Remove the screw holding the small circuit board used to make contact with the spring connector on the shell. Make sure the proper one is selected as shown by the arrow. Do not remove the other spring contact board; it is used to connect to the smoke units..

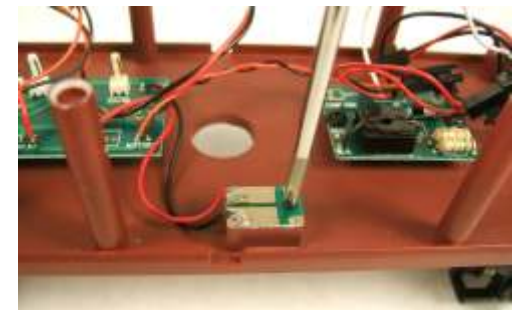
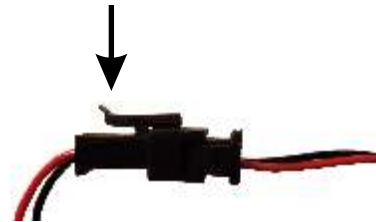
Finally, remove the 3 screws holding the main circuit board and remove it. Save the screws. The board is no longer needed but the screws are used to mount the Drop-In decoder.

Save the "Speaker Header" and Its Wires

The speaker header taped to the bottom of the chassis is unused. It is perfect for use as a replacement for the unreliable spring contacts used on the smoke generator wiring. Cut the "speaker header" wires at the old board and save the header for later use.



Push Here To Release Lock Tab



If You Break A Wire...

We have noticed that some of the wires and their solder joints may be frayed or outright broken. If you notice this, stop and resolder the wire to the appropriate location. The most common wire breaks are on the smoke controller board, and the spring contact circuit board for the smoke units.

To resolder a broken wire, first remove the circuit board from the chassis. Next, strip the wire back about a quarter to half of an inch. Twist the copper strands tightly and then tin with a little solder. Then reinsert back into the circuit board. You may have to heat the back side to allow the wire to enter the hole.

USA-Trains F3A-B Disassembly

Removing The Front Truck - Optional But Recommended

The front truck and the connecting wires are in the way of the work that needs to be done to enlarge the switch holes to accept the F3 Drop-In decoder. Although the truck doesn't have to be removed, it is real easy to nick or break the truck wires so we recommend removing it. It isn't hard.

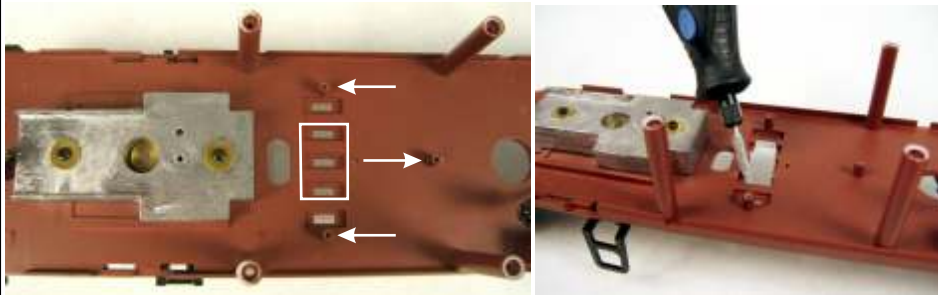
The truck is held with a single screw in the middle of the weight (red arrow). Remove the screw to free the truck. Retrieve the washer so as to avoid losing it. Gently pull the truck wire through the chassis hole and set the truck aside.



Enlarge Switch Openings In Chassis Floor

Look at the bottom of the Drop-In board. Note the two switches and jack. The switches fit the outside switch holes in the locomotive floor. However, the area for the charging jack needs to be enlarged.

The area to be enlarged is outlined by a white box. Use a hobby knife or motor tool with an abrasive or routing bit to enlarge this area so the jack simply drops through. The jack must not bind. Temporarily mount the Drop-In board when the hole is complete. It must fit flush to the mounting posts (white arrows) and the jack must not bind in the opening. When you get a good fit, remove the Drop-In, clean away the debris and proceed on to the next step.



Reattach Front Truck

With the switch holes enlarged, you can now reattach the front truck. Feed the wires through the hole in the chassis floor. Do not forget the washer when attaching the truck.

Mounting The F3 Drop-In Decoder

Mount F3 Drop-In

Before mounting the Drop-In decoder, verify that both power switches are off. The actuators will be towards the rear of the locomotive when off. Place the decoder onto the mounting posts. Make sure the jack and switches fit through the holes and the board is flush to the mounting posts. Verify the P8 plug and wires are not caught under the switches or charger jack. Use the 3 screws from the original circuit board to mount the Drop-In.

Plug In P8 Connector

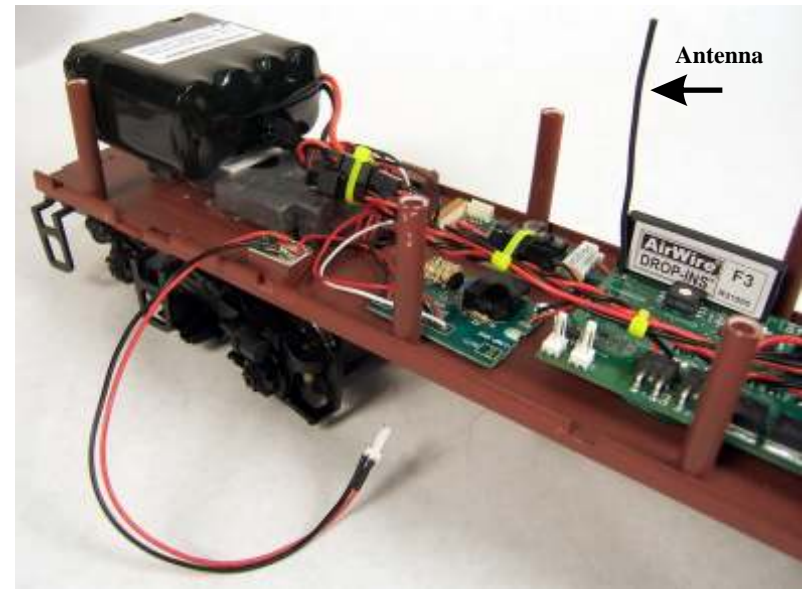
Plug in the P8 cable to the white connector on the Drop-In. It only goes one way, so don't force it.

Plug In Front Motor, Rear Motor, Smoke Controller and Battery Pack

Plug in the front and rear motor connectors. Plug in the battery pack. Be sure and connect the battery pack only to the proper socket on the Drop-In. Accidentally plugging it into the smoke generator plug will damage the decoder. Finally, connect the smoke controller to the Drop-In's smoke output.

Neatness Counts - Keep Wires Clear of Antenna

There will be a wad of wires and connectors near the battery including the unused pickup connector. Tidy up the area using a bit of tape, plastic tie-wraps or with twist ties. Make sure all wires lie between the tall mounting posts. Keep the wire bundles away from the antenna as much as possible. Arrange the wires to favor the side of the locomotive opposite of the antenna. Use twist ties or cable ties to hold everything in place. The photos show the use of 4 inch wire ties that are florescent yellow making them easy to see in the photos.



Moving Smoke Controller And Mounting P8

Moving The Smoke Controller

The smoke controller needs to be moved to make room for the Phoenix P8 sound module. The smoke controller is mounted on two small plastic standoffs in the middle of the chassis floor. By moving it off the standoffs, there is plenty of room for the P8 to sit side by side with the smoke controller.

First, remove and discard the two screws holding the smoke controller. Carefully move the controller out of the way to expose the bosses. The wires and solder joints tend to be fragile so don't flex them too much. Now use your flush cutters to trim the plastic standoffs flush to the floor.

Apply a piece of foam tape to the bottom of the controller and butt it up against the chassis mounting post before pressing it down to the floor.

Mounting the P8

With the standoffs out of the way, the P8 fits on the chassis floor next to the smoke controller. Turn over the P8 and place a small piece of double-sided foam tape in the area shown. Then add one more strip across the entire unit. Orient the module as shown with the main connection header facing towards the front of the locomotive.



Plug In The P8 Connection Cable To The P8 Header

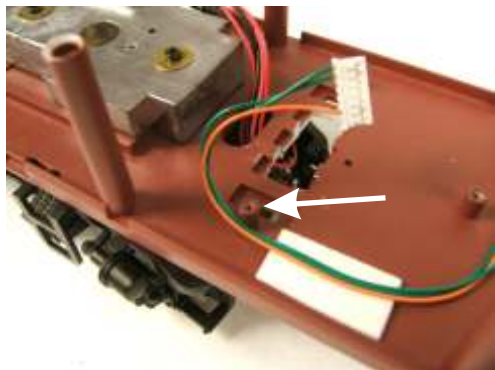
This Phoenix supplied cable connects to the right angle connector on the P8 and the other end connects to the speaker and Drop-Indecoder. Plug in the cable to the P8. The socket is polarized and the plug only fits in one orientation. See page 22 for the complete P8 wiring diagram.

Push the brown speaker connector through the round hole. Route the 4-wire (some only have 3) connector towards the front of the locomotive.

The P8 connecting cable is stiff and has a bad habit of getting in the way of mounting holes. Use foam tape to tame the wires and keep them away from mounting holes.

Near the switch openings, arrange the wires and the tape to allow the wires to go around the outside of the Drop-In decoder mounting hole (indicated with the white arrow).

Once the Drop-In is mounted, the dangling connector will have a home.



Speaker And P8 Interface Jack Mounting

In the next step, the fuel tank is fitted with a speaker and the Phoenix P8 sound module programming interface jack. If you are not using a sound decoder, skip the next two pages.

P8 Interface Jack Installation

The Phoenix P8 sound module uses a programming jack to connect it to a PC for editing and downloading of sound files. The programming jack is installed into the fuel tank for easy access. For fast mounting, use quick-set epoxy or hot-melt glue.

The end of the fuel tank facing the rear truck is where to drill the hole. Put the hole about half way up the tank and favoring one side. This makes it easier to plug in the P8 programming cable. Drill a 5/16 inch hole for the jack. Remove any burrs from around the hole.

The fuel tank walls are too thick for the jack's threads so remove the nut from the jack and discard. Push the small plug and wire through the fuel tank hole. Use either epoxy or hot-melt glue to permanently mount the jack.



P8 Speaker Mounting

Newer speakers from Phoenix include a two wire plug pre-attached to the speaker. If your speaker doesn't have a plug, then solder the brown wires to the speaker before mounting it. Hot melt glue is the quickest method to mount the speaker although some people prefer silicone adhesive which takes longer to dry. We like hot-melt glue simply because it is fast.

Center the speaker in the grill opening before gluing.

Place the hot melt glue nozzle into the speaker's corner mounting hole and squirt out a blob of glue. Slowly pull the nozzle from the hole while continuing to dispense glue. This builds up a small glue "post" that holds the speaker securely to the fuel tank. Finally, place a small amount of glue around gaps between the speaker and the mounting area for best sound reproduction.



Replacing Spring Contacts

Improving The Smoke Unit And Rear Light Connections

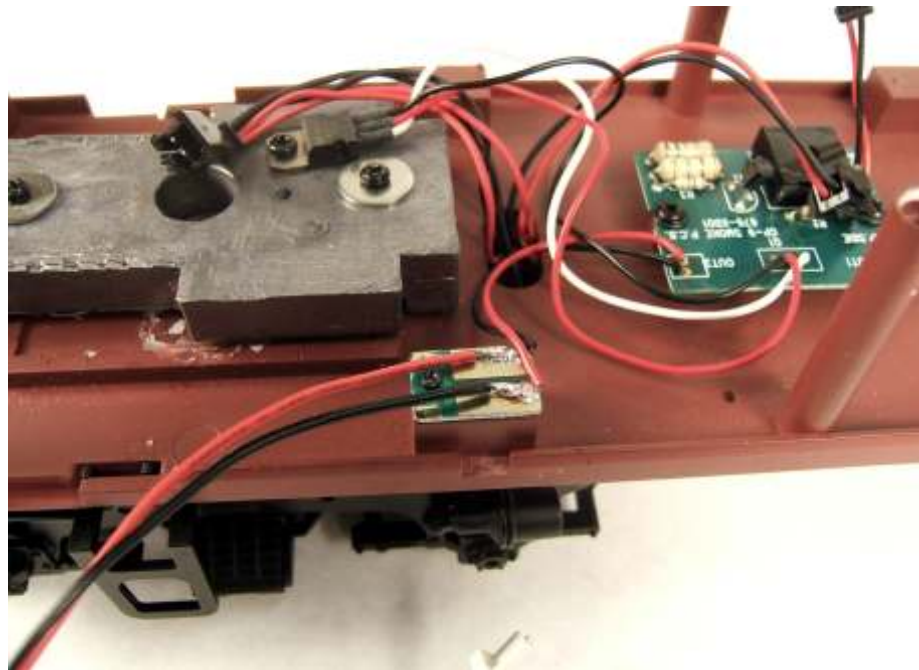
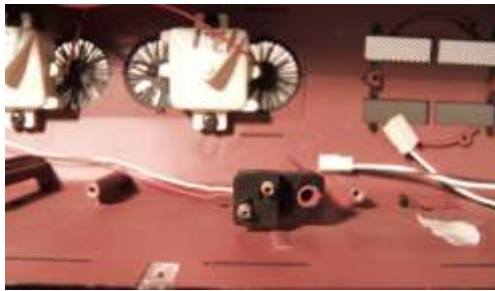
Both of these connections are made with spring contacts touching small circuit boards. The little springs are notorious for developing intermittent contact after only a short time outdoors. Fortunately, the Drop-In decoders solves both of these issues with just a small amount of effort.

First, remove both of the plastic holders containing the springs. The holder is friction fit onto the mounting posts inside the shell. Pull up on the holder while gently wiggling it back and forth.

Disconnect the white plugs from both holders. Don't worry that the little spring contacts fall out - they are not needed. You may also discard both holders.

The rear light will plug into a jumper provided with the F3 Drop-In decoder so nothing else needs to be done. Temporarily place a small piece of tape to keep the wires out of the way.

For the smoke unit, the "speaker header" provided by USA-Trains that you removed from the fuel tank area is perfect for replacing the springs. Solder the red and black wires directly on to the small circuit board. Don't overheat the board; the plastic underneath the board may soften and warp. Match red for red and black for black. The header will be connect the smoke units on the roof to the Drop-In decoder later.



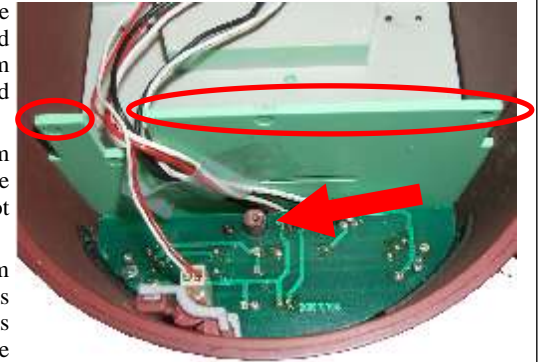
Cleanup Cab Wiring and Battery Mounting

Fasten Down Cab Light Wiring

The wires connecting the cab lights to the Drop-In decoder need to be gathered together and taped down. This prevents them from obscuring the mounting hole (indicated by the red arrow) next to the cab front wall.

Use tape to hold down the wires; keep them inside the wall's notch. They can not lie in the areas circled or the shell and chassis will not mate properly.

Notice the white plug and wires going from the circuit board up into the cab. This serves the cab interior lamp. In our unit these wires were flopping around. A bit of tape took care of the slack and kept them away from the mounting hole.



Battery Mounting

This installation makes use of the standard CVP Lithium battery pack. The small size yet high power capacity makes for a simple installation. Since there is lots of room, the battery mounts on top of the rear weight.

To provide a smooth surface on which to mount the battery, first remove the rear screw from the weight. Next, use your wire cutters to trim the raised ridge on the edge of the weight. The lead weight is very soft and is easy to cut.

Apply a square of foam tape as shown. The battery must clear the power transistor and will slightly hang over the end of the weight. Avoid pushing the battery too far towards the back or it might interfere with the shell. Orient the battery with the connector towards the locomotive's cab end and press it firmly down onto the tape. A few spots of hot melt glue will insure the battery doesn't work loose. Do not allow glue into the truck mounting screw area.

