Drop-In Frequency Setting Using Older Throttles

T9000 Throttle

Drop-In decoder uses frequencies numbered from 0 to 16 and these are the numbers used when setting the Drop-In to the desired frequency. However, the T9000 throttle uses different numbers for the frequencies, depending on what command is used to set the T9000 transmit frequency.

To use just the Drop-In's first 8 frequencies, 0 thru 7, you may use the same frequency number for both the Drop-In and the T9000 throttle. However, you must use the SEL-1 command to set the desired frequency into the T9000 and you are limited to just the first 8 frequencies.

To use all 17 available frequencies, 0 thru 16, on the Drop-In decoder, you must set the T9000 throttle transmit frequency to the appropriate number from the table below using the SEL-0 command.

RF1300 Throttle

Owners of, or users of an RF1300 throttle, must select from among the first 8 frequencies, 0 to 7,for use with the Drop-In .

When programming CV200, enter the Drop-In frequency that matches the internal switch settings on the RF1300. The right column shows the 8 different settings and the corresponding Drop-In frequency.

Write The Frequency Down - While you may remember the frequency next week; how about in 6 months? Use a sticky label on which to record the frequency. If you use a locomotive address other than the obvious cab number, write it down too. Place the label somewhere on the locomotive where it can be seen. We put our label on the bottom of the fuel tank.

Setting The Frequency - The desired frequency is stored inside the decoder in configuration variable number 200 which is abbreviated CV200. Use SERVICE PROGRAM mode to set the decoder's frequency into CV200.

Frequency Switch Setting - The table shows the RF1300 switch setting for each of the 8 frequencies. Frequency 0 is with all switches (the white actuators) OFF or down.

Drop-In Frequency	T9000 SEL-1 Mode	T9000 SEL-0 Mode	RF1300 Switch Setting
0	0	74	
1	1	68	
2	2	50	
3	3	39	
4	4	27	
5	5	21	
6	6	15	
7	7	3	
8		93	na
9		87	na
10		81	na
11		61	na
12		56	na
13		44	na
14		33	na
15		9	na
16		54	na

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r3 June 2014

With New Radio Module

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

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.

AIRWIRE® 900

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

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.

This manual applies *only* to F3A Drop-Ins with the new Radio Module. The new Radio Module works differently than an older F3A Drop-In that used a Linx receiver module. This manual has been updated to include new instructions for setting or resetting the radio frequency.

A smart person reads instructions.
A genius follows instructions.

Changing Decoder Address

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.

Do not use OPS mode programming to change the decoder address.

T5000 Step-By-Step Key Sequence To Change Locomotive Address - CV1

For this example, the address will be changed from 3 to 9812. First turn on the decoder power switch. Make sure both the throttle and the decoder are on the same frequency. Using the T5000 throttle, enter the following keystrokes to set the new address:

MENU, MENU 4	Sselects service programming
,1,	Enters the CV number to be programmed
9,8,1,2,#	Enters the value of 9812 to be programmed into CV1
*	Exits programming 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 * to exit programming mode.

Enter the new loco number into the throttle, # 9,8,1,2,# and verify the motor operates along with the P8 sound system if it is installed.

Resetting Drop-In Decoder To Original Factory Settings

CV8 is very special. When this CV is used, ***all*** of your changes to the decoder are erased and the original factory settings are restored.

This reset procedure applies only to the AirWire Drop-In decoder. It does not affect the attached P8 sound module in any way.

Step-by-Step Key Sequence To Reset Decoder Using CV8 Using The T5000 Throttle

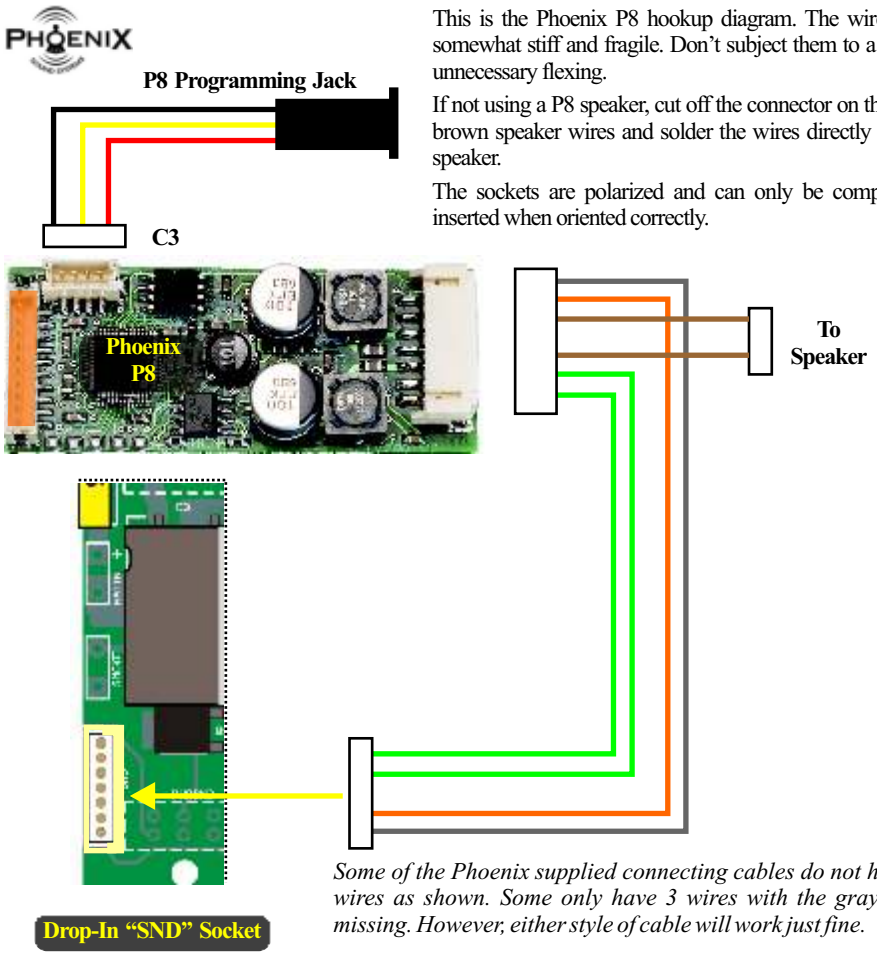
Follow these steps to reset your AirWire Decoder to its original factory settings. Remember that any Drop-In decoder sharing the frequency will also be reset. Turn off all other nearby decoders to avoid this problem. Turn on the decoder to be programmed.

- Turn on the T5000 by pushing MENU. Verify it is set to the same frequency as the decoder.
- Push MENU twice and then push 4 to select Service Programming.
- Enter the CV number by pushing, one at a time, the following keys: *, 8, *
- Enter the value by pushing, one at a time, the following keys: #, 1, 3, 5, #.
- Listen for the decoder to beep or chirp signifying the command has been sent.
- Push ESC to exit programming mode.

At this time, the decoder has been reset to factory defaults. It will be on address 3 and frequency 0. Set your throttle to address 3 and frequency 0 to verify reset of the decoder.

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.

Some of the Phoenix supplied connecting cables do not have 4 wires as shown. Some only have 3 wires with the gray wire missing. However, either style of cable will work just fine.

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

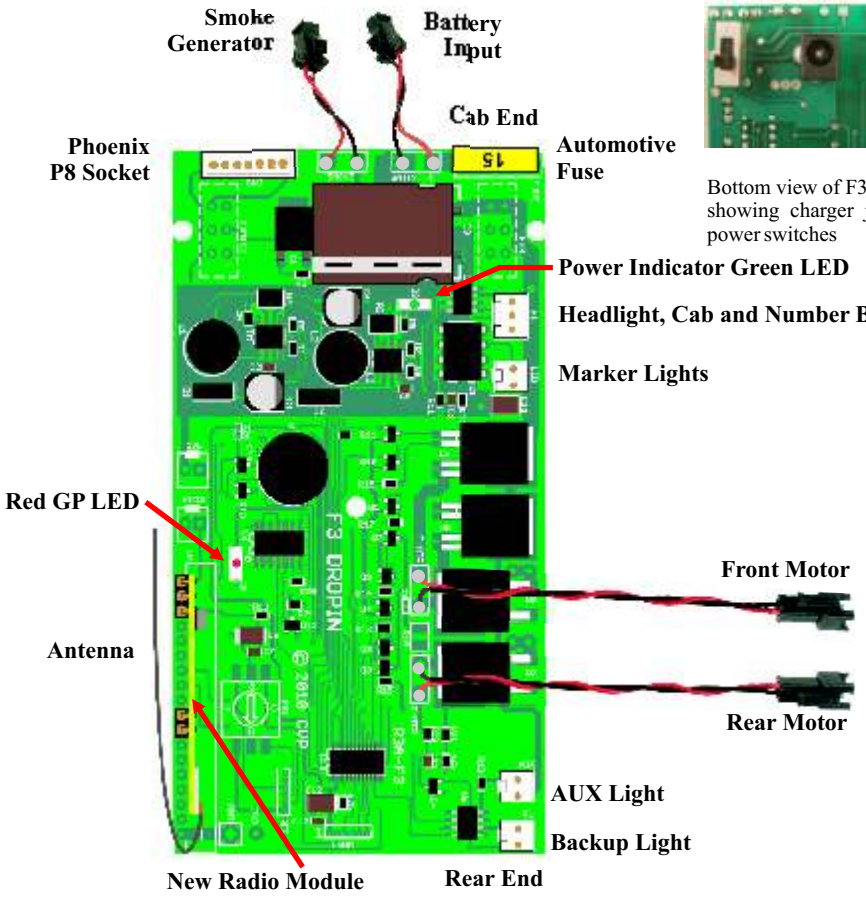
The Drop-In decoder sends DCC commands to the P8 on address 3. There is no need to change the P8 address from the factory setting of 3.

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

F3A-B Drop-In Decoder Familiarization



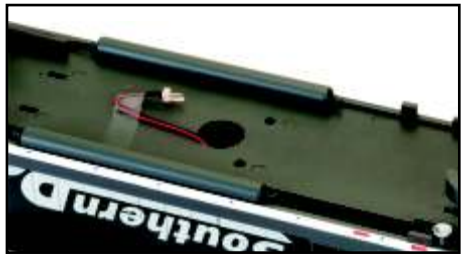
Bottom view of F3 Drop-In showing charger jack and power switches

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

Lithium Battery Pack
Actual color of pack may vary

Power Plug 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 ½ 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.

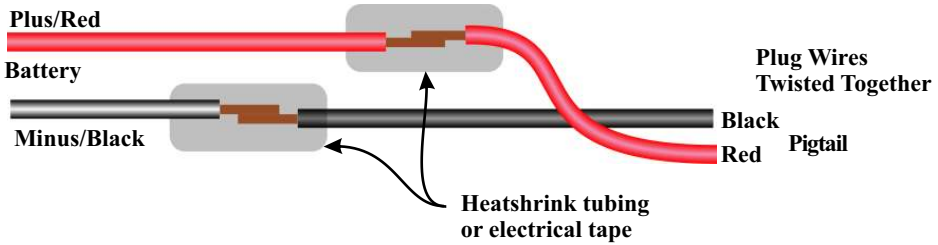
Remove about ½ inch of the insulation from the red wire. Twist the strands together and touch a tiny bit of solder to the twisted wire. This is called tinning and keeps the twisted wires from unraveling.

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 ½ 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 Drop-In Decoder Operation 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.

"All Aboard" 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 Drop-In Decoder Operation Quick-Start

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 all turned on and off with the throttle's 0 key. This is function 0 which we shorten to F0. When going in reverse, The front headlight automatically turns off and the rear headlight turns on. The front marker lights are red when going in the reverse direction.

Cab interior light is turned on and off with F11 [* then 1].

Smoke unit is 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. Remember, F10 is 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 (see page 21). 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.

Coupler clang is triggered by GP30. 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.

"All Aboard" (or hot-box) announcement is triggered by F5.

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

continued on next page

Replace The Roof-Top Details
Don't forget to reinstall the air horn assembly you removed prior to beginning loco disassembly.

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.

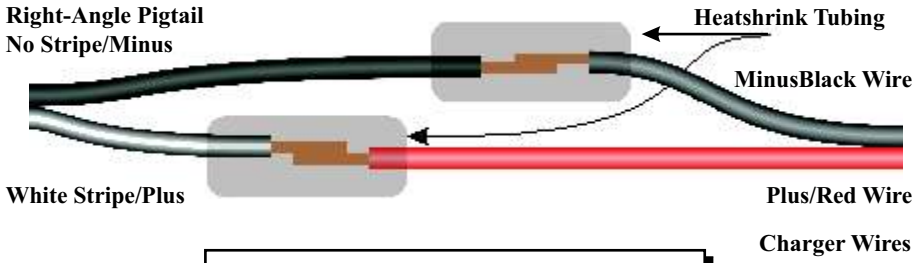
Take the pigtail and separate the 2 wires for about 2 inches. Cut the plus wire so it is 1 inch shorter than the minus wire. Remove about ½ inch of the insulation from the minus wire. Twist the strands together and touch a tiny bit of solder to the twisted wire. This is called tinning and keeps the twisted 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 ½ 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.



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 BOTH Drop-In decoder power switches are on. The sound module switch is independent of the Drop-In decoder switch.

Red GP LED only has a very slow flash rate: This is your indication that nothing is being received from the throttle. The throttle has either turned itself off, is on the wrong frequency, or is on the wrong locomotive address.

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. ***Keep all wires as far away from the antenna as possible.***

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.

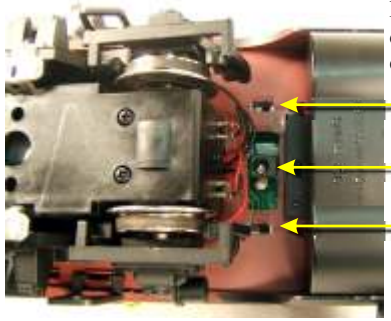
Before mounting the fuel tank, push the extra speaker and programming wires up through the hole in the floor. No wires should be allowed to touch the black speaker cone or the sound will distort. Now attach the fuel tank. Finish the reassembly by installing the remaining screws.

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. **Be very careful with the antenna. If it is cut by a mounting screw, you'll get poor reception and it will have to be replaced.**

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]

Quick Start - Setting Address and Frequency

Your Drop-In decoder features an all new and much improved method for setting its radio frequency. Unlike the older style Drop-In decoder, there isn't a tiny rotary frequency selector switch. In its place is a new RF module that uses your throttle to set the frequency. With this new module, you may change the frequency at any time and without opening up the locomotive.

The "Quick Start" section assumes you have already installed your Drop-In. As delivered from the factory, the Drop-In's frequency is set for 0 and the locomotive address is 3. The steps below are for the T5000 throttle. If you have a different throttle, refer to your throttle's user guide.

Note, the LEDs may not be visible in your locomotive. If so, just ignore the comments but do follow the instructions in sequence.

Step 1: Turn Power on to the Drop-In and Turn on Throttle

- The Drop-In's power green LED and the RF module's green LED will glow brightly indicating power is connected.
- If you have not done so, set the throttle to frequency 0. Assuming your Drop-In still has the factory default address setting, also set the throttle's locomotive address to 3.
- When the throttle is turned on to the proper frequency, the RF module's red GP LED will be on. When the throttle is set to the proper locomotive address, the Drop-Ins red LED will also be on. If the neither red LED is on, then your throttle is not on the proper frequency or is set to the wrong address. Do not proceed to step 2 until both red LEDs and both green LEDs are on.

Step 2: Set the Drop-In Decoder Address

- Select SERVICE PROGRAM mode. Press the green menu key twice and then push the number 4.
- Now push 1 and push ENT which selects CV1 for changing the address.
- Enter the decoder address that you want to use. The address must be unique. The loco's cab number is always a good idea. Once you have entered the numbers, push ENT. [Address 0 is not allowed].

Step 3: Set the Throttle To The New Address And Verify That The Loco Runs

Step 4: Changing The Drop-In Frequency

- Select SERVICE PROGRAM mode on the throttle.
- Enter 200 followed by ENT. CV200 is where the desired frequency (from 0 to 16) is stored in the Drop-In decoder. *Note: CV200 is used to avoid conflicts with other CVs used in the Drop-In.*
- Enter the desired frequency number and push ENT. Your Drop-In is now on the new frequency. If you can see the small radio module's red LED, it will now be off because your throttle is still on the old frequency.
- Push ESC to cancel SERVICE PROGRAM mode.
- Be sure to enter the new frequency on your throttle.

Quick-Start - Resetting The Drop-In Frequency

There may come a time when your locomotive no longer responds to what you believe is the correct frequency, or you can not remember the correct frequency. Here's how to reset the frequency

Step 1 Turn off all AirWire throttles. This is very important since it is the of the absence of a throttle signal, plus a decoder power-cycle (turning the decoder's power off and then back) that allows the decoder to temporarily jump to frequency 0 where you can set a new frequency.

Step 2 Turn off the Drop-In decoder if it was powered on.

Step 3 Turn on the Drop-In decoder and wait at least one minute. Do not turn on any throttles during this time. After one minute, the Drop-In will be temporarily on frequency 0.

Step 4 Turn on your throttle, and set it to frequency 0.

Step 5 - Use SERVICE PROGRAM to set CV200 to the desired frequency. The locomotive address does not matter when using SERVICE PROGRAM mode. Be sure and make a note of the new frequency. When done, power-cycle the decoder to accept the new frequency.

USA-Trains F3A-B Disassembly

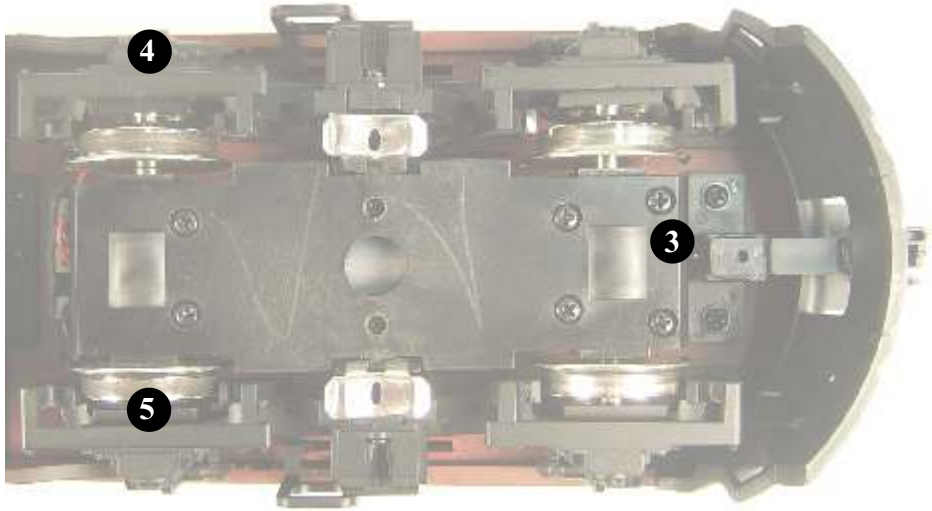
Cab End Mounting Screws - 3 Screws

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.

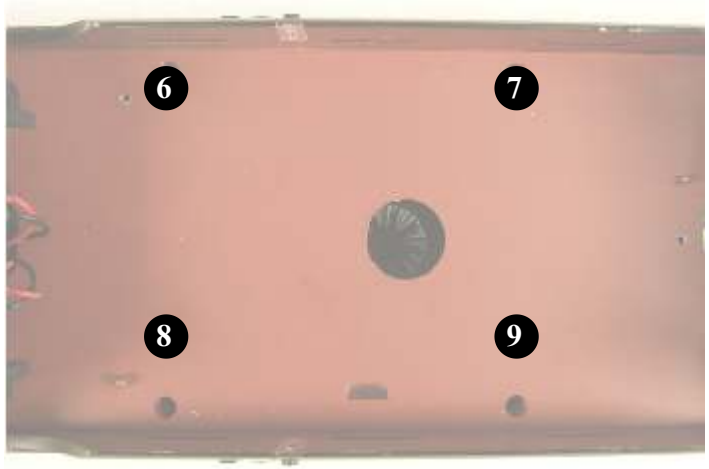
The number 3 screw may be difficult to see. Its hole is directly behind the coupler pocket. Rotate the truck to see it better. Wedge the screwdriver into the hole while gently pushing the truck away. You can also remove the side frame to provide better visibility.

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

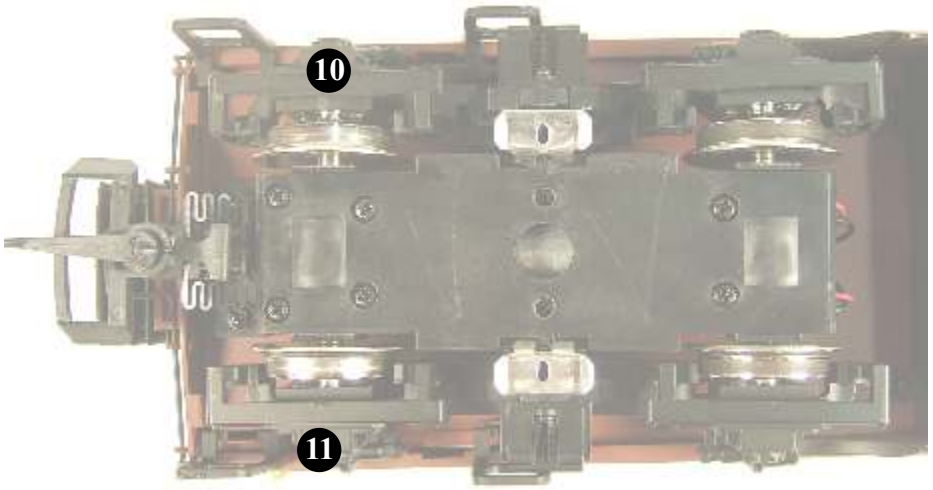
Remove the 4 screws that are visible once the fuel tank is removed. Place the screws into the foam block.



USA-Trains F3A-B Disassembly

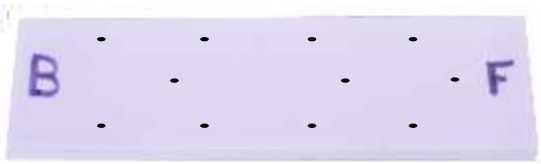
Rear Mounting Screws - 2 Screws

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 this F3A Drop-In uses a new type of radio module. It allows you to change the frequency without opening up the locomotive. The factory setting for the frequency is frequency 0. For the examples below, a T5000 throttle will be used.

1. Turn on both power switches on the Drop-In. The ON position is when the slide switch is 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 which is function 10. This will turn on the cab interior light.

7. To test the smoke unit, you must add a just 5 drops of smoke fluid to both smoke units. Make sure the cab is right side up when adding drops and testing the smoke unit. The smoke unit is turned on by pushing the * key followed by the 0 key. After a few minutes, smoke will appear or you will notice the warm air from the heater. 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.

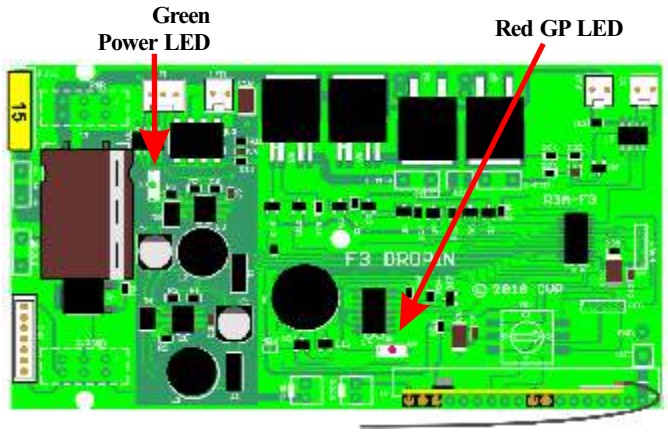
8. If you have installed the Phoenix sound decoder, push the 2 key and the P8 horn will sound.

This concludes the preliminary checkout. **Rotate the antenna connector so the antenna wire is vertical for best reception. Keep it away from all wires.**

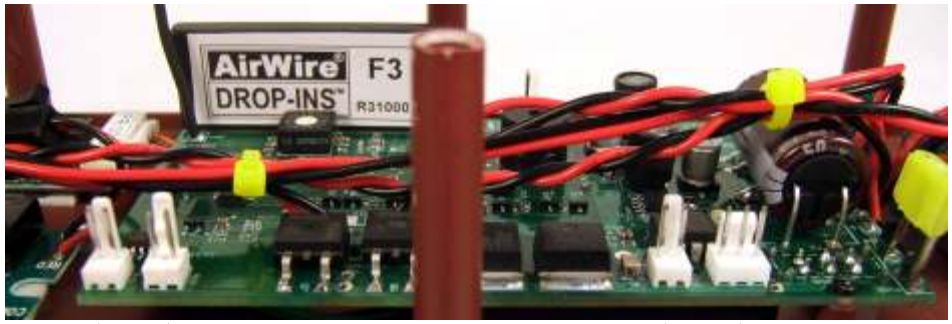
What About Fine Tuning?

All motion control settings, options and selections as well as changes to the frequency are made from the throttle. The Phoenix P8 settings are changed via the programming interface jack you mounted in the fuel tank. A summary of the P8 changes is on page 21. Complete information is in the Drop-In Users Guide.

You can leave the frequency set for 0. Changing the frequency is covered in detail in the user guide. A shortened version is on the next page.



Connect Shell Lights and Smoke Unit



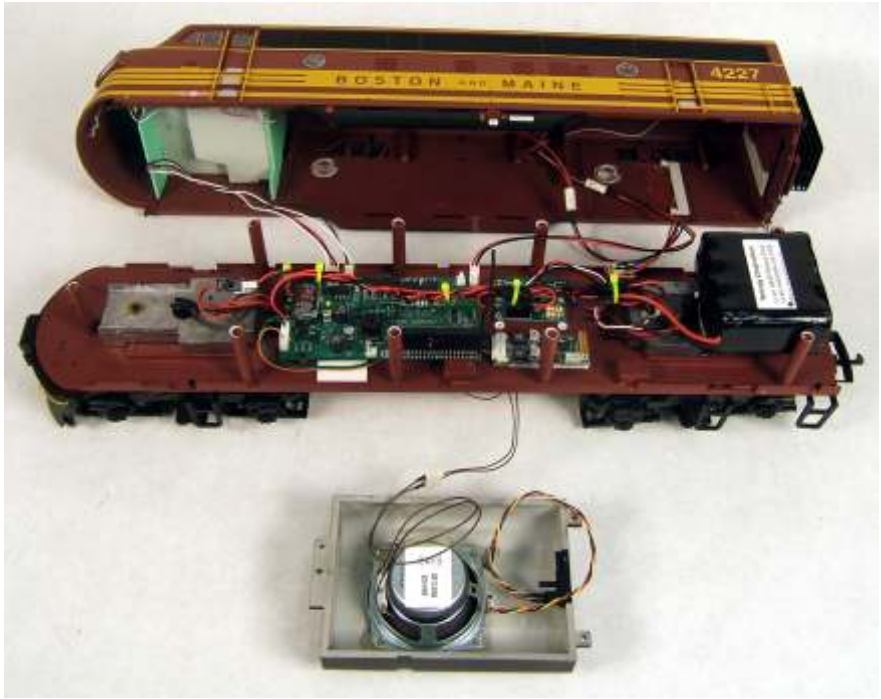
Backup Light **AUX Light** **Marker Lights** **Headlight, Cab and Number Boards**

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.

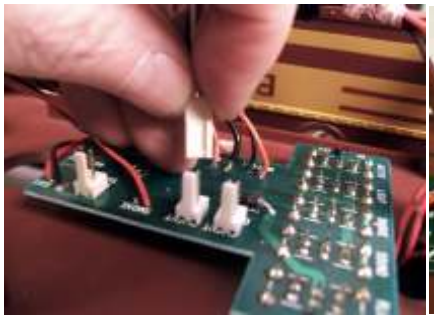
Disconnect the motor and pickup wires as well as the smoke generator controller connector from the main board. These connectors have a locking tab. To release the lock tab, push the down on the tab while gently pulling the connectors apart.

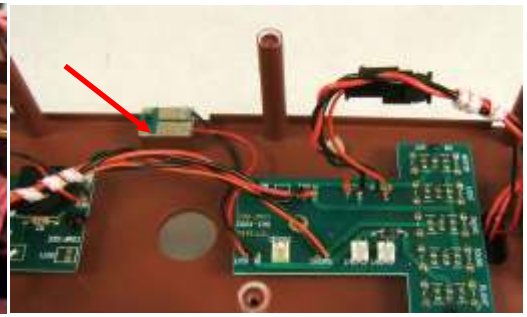
Remove the screw holding the small circuit board used to make contact with the spring connector on the shell. Make sure the proper one is selected as shown by the arrow. Do not remove the other spring contact board; it is used to connect to the smoke units..

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.

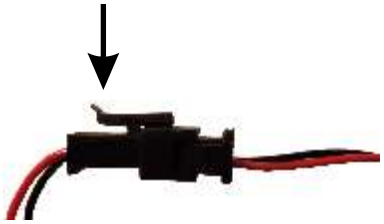
Save the "Speaker Header" and Its Wires

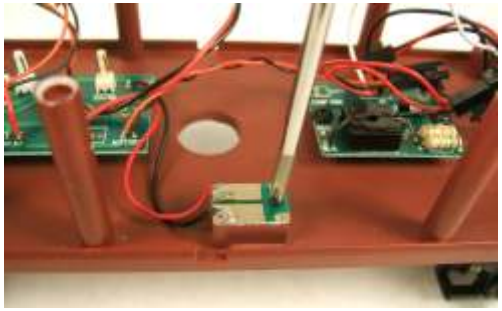
The speaker header taped to the bottom of the chassis is unused. It is perfect for use as a replacement for the unreliable spring contacts used on the smoke generator wiring. Cut the "speaker header" wires at the old board and save the header for later use.





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.

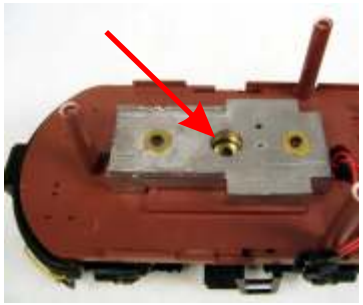
To resolder a broken wire, first remove the circuit board from the chassis. Next, strip the wire back about a quarter to half of an inch. Twist the copper strands tightly and then tin with a little solder. Then reinsert back into the circuit board. You may have to heat the back side to allow the wire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

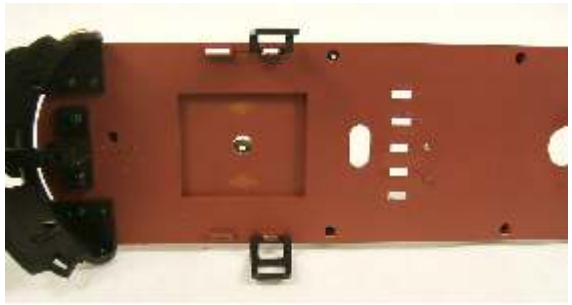
USA-Trains F3A-B Disassembly

Removing The Font 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.

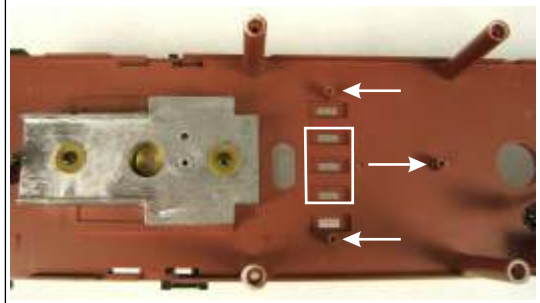




Enlarge Switch Openings In Chassis Floor

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

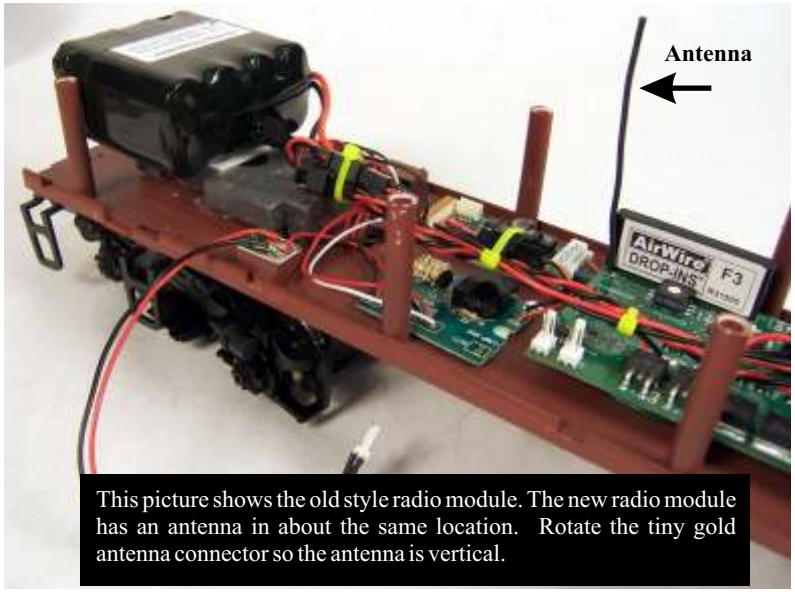
Plug in the P8 cable to the white connector on the Drop-In. It only goes one way, so don't force it.

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

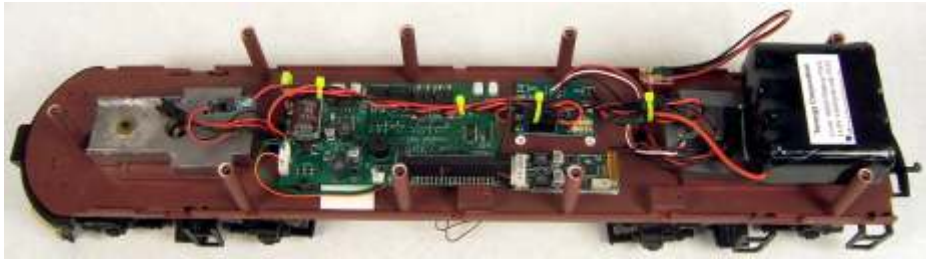
Plug in the front and rear motor connectors. Plug in the battery pack. Be sure and connect the battery pack only to the proper socket on the Drop-In. Accidentally plugging it into the smoke generator plug will damage the decoder. Finally, connect the smoke controller to the Drop-In's smoke output.

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.

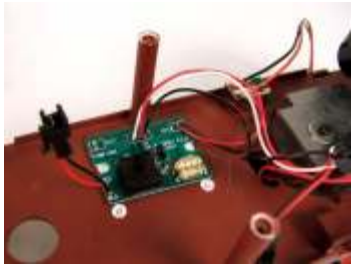


This picture shows the old style radio module. The new radio module has an antenna in about the same location. Rotate the tiny gold antenna connector so the antenna is vertical.



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.

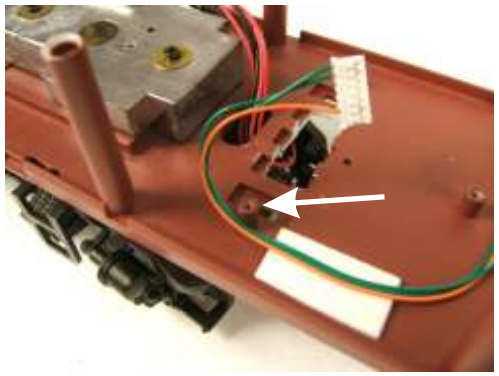
Apply a piece of foam tape to the bottom of the controller and butt it up against the chassis mounting post before pressing it down to the floor.

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 programing 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

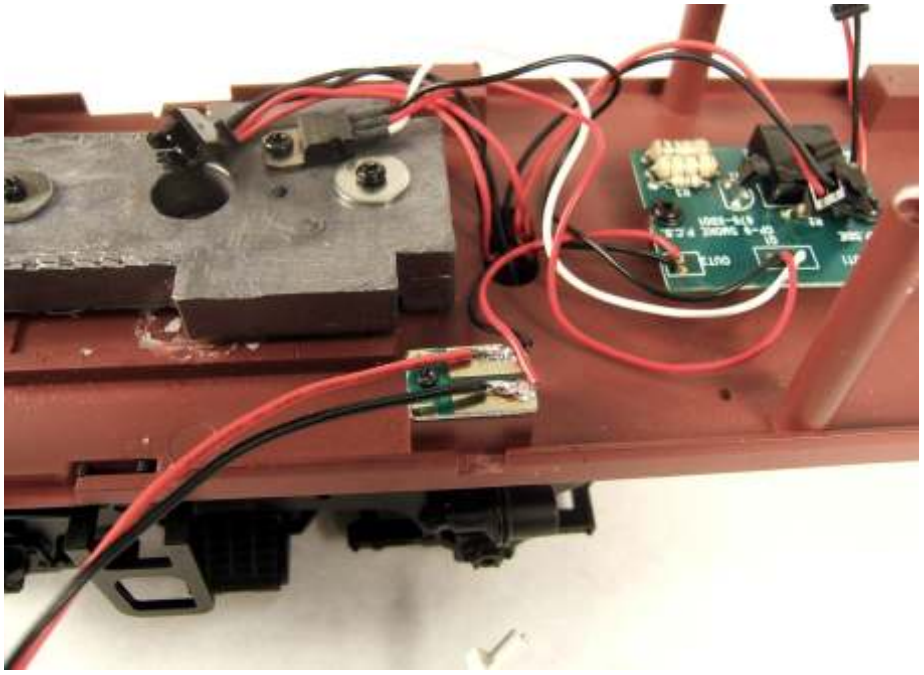
Both of these connections are made with spring contacts touching small circuit boards. The little springs are notorious for developing intermittent contact after only a short time outdoors. Fortunately, the Drop-In decoders solves both of these issues with just a small amount of effort.

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.

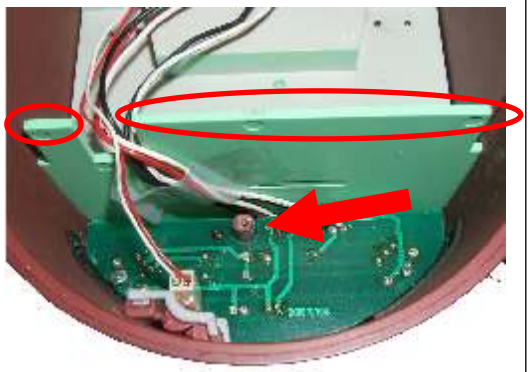
For the smoke unit, the "speaker header" provided by USA-Trains that you removed from the fuel tank area is perfect for replacing the springs. Solder the red and black wires directly on to the small circuit board. Don't overheat the board; the plastic underneath the board may soften and warp. Match red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

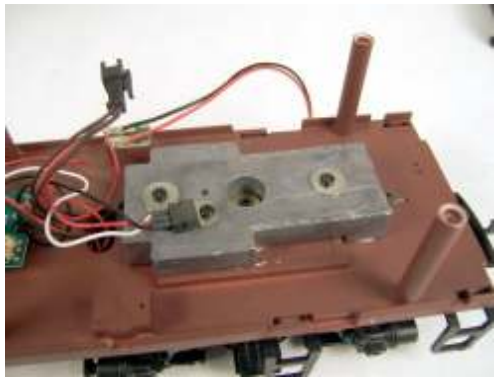


Use tape to hold down the wires; keep them inside the wall's notch. They can not lie in the areas circled or the shell and chassis will not mate properly.

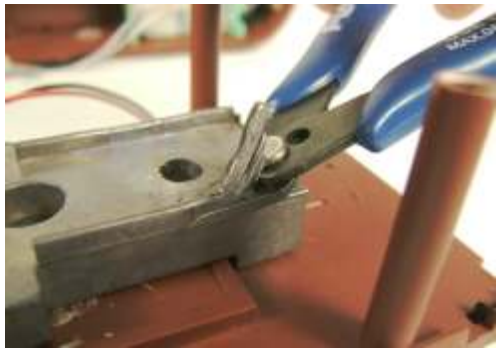
Notice the white plug and wires going from the circuit board up into the cab. This serves the cab interior lamp. In our unit these wires were flopping around. A bit of tape took care of the slack and kept them away from the mounting hole.

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.