

Drop-In Frequency Selection 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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June 2014 r2

**With New
Radio Module**

AirWire900®

GP30 Drop-In™ Decoder

Installation Guide

USA-Trains GP30 Disassembly

Battery And Smart Charger Preparation

GP30 Drop-In™ Decoder Installation

Quick Start Guide

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How To Use This Booklet

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 GP30 diesel locomotive. 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 GP30 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 GP30 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 GP30 locomotive, there is a second “Drop-In Decoder 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 Tenery brand smart battery charger.

This manual applies *only* to GP30 Drop-Ins with the new Radio Module. The new Radio Module works differently than an older GP30 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.

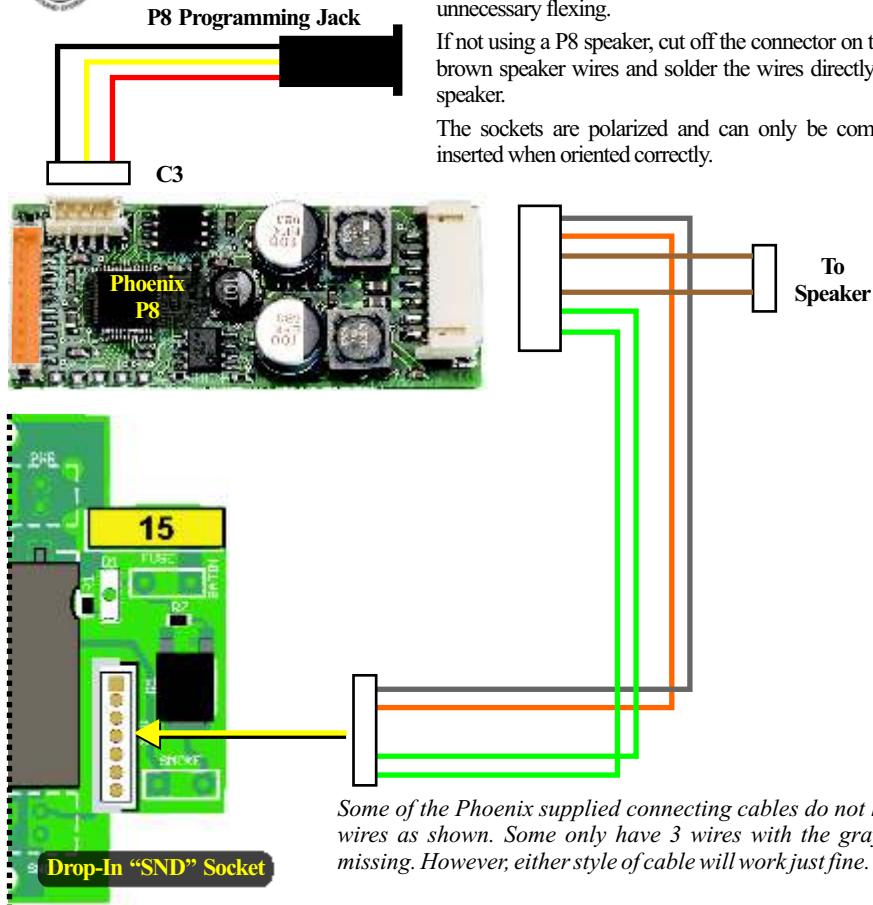
Phoenix P8 Hookup Diagram



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.

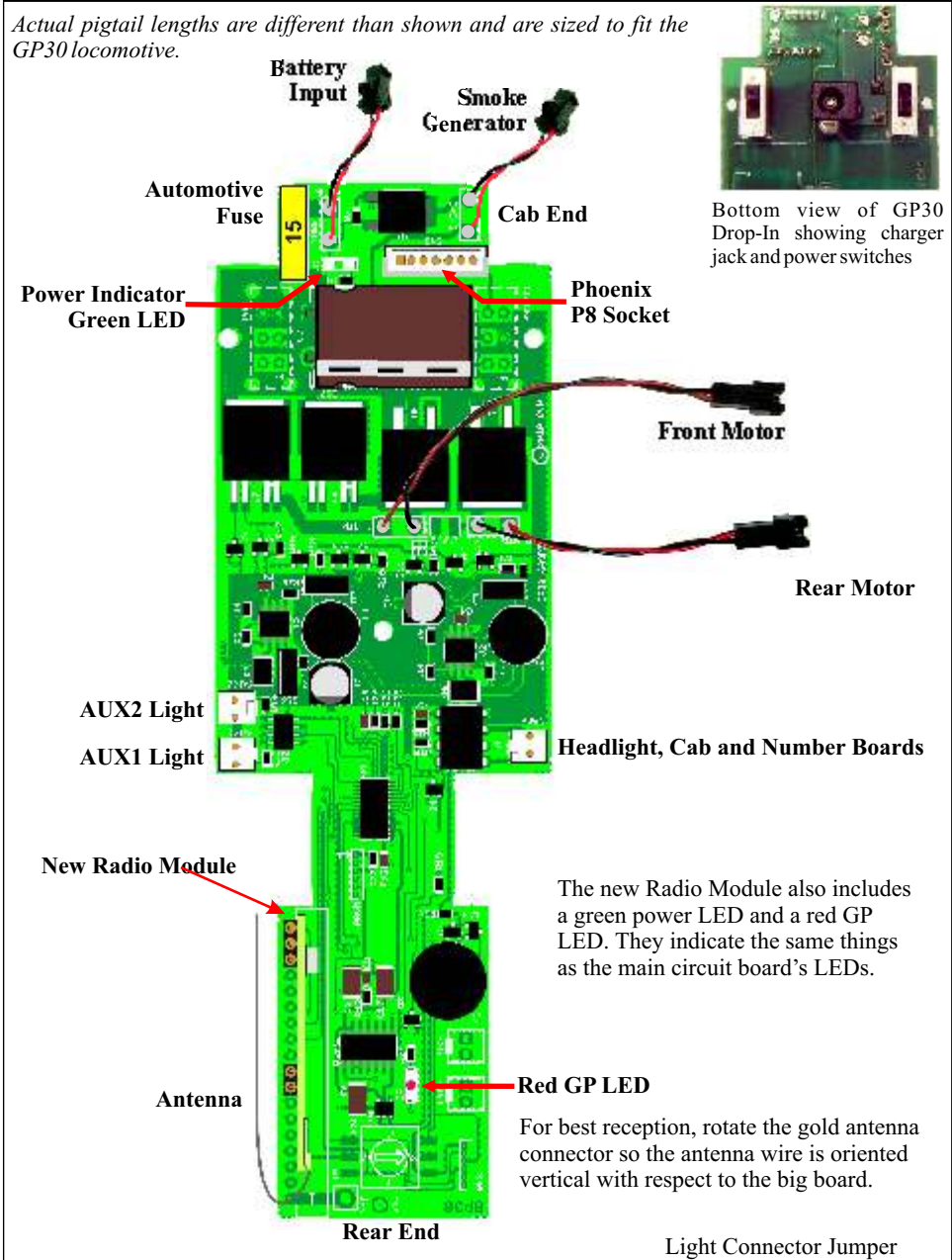
Phoenix P8 Sound Decoder Setup - See The Drop-In Decoder Users Guide

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.

GP30 Drop-In Decoder Familiarization

Actual pigtail lengths are different than shown and are sized to fit the GP30 locomotive.



Bottom view of GP30 Drop-In showing charger jack and power switches

The new Radio Module also includes a green power LED and a red GP LED. They indicate the same things as the main circuit board's LEDs.

For best reception, rotate the gold antenna connector so the antenna wire is oriented vertical with respect to the big board.

There is an additional jumper included with the GP30 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.



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.

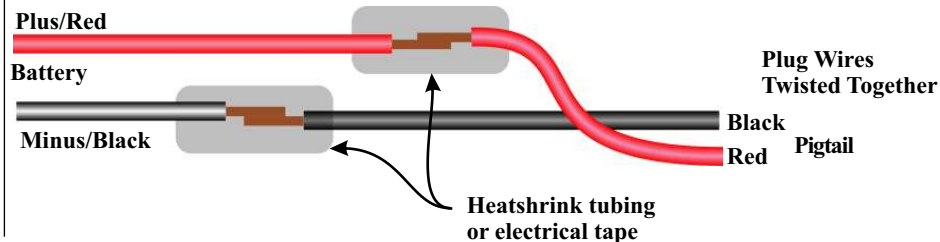
Remove about 1/2 inch of the insulation from the red wire. Twist the strands together and touch a tiny bit of solder to the twisted wire. This is called tinning and keeps the twisted wires from unraveling.

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.



Phoenix P8 Setup - Quick Setup Reference

Phoenix P8 Sound Decoder Setup

There are selections that must be made to achieve the best results with the AirWire Drop-In decoder. This section only lists those options. For more details on the P8 options, see the P8 manual and read the help screens that are part of the Phoenix programming software. You need the optional Phoenix Computer Interface and software to make the required changes. It also enables many other options, all without opening up the locomotive. We strongly recommend getting this accessory if you do not already have it.

Using The P8 Computer Interface

Insert the plug into the P8 programming jack you mounted in the fuel tank and turn on the P8 power switch. The Drop-In power switch can remain off unless you want to operate the P8 from the throttle.

On your PC, start the Phoenix software and verify that it is extracting parameters from the P8 mounted in the locomotive. Once the parameters are loaded, the software brings up the main screen from which all changes are made.

You can download the CVP recommended settings for the P8 from the Phoenix website. Load the file into the P8 decoder and you'll be ready to go. Or use the procedure below to manually change the P8 to our recommended settings.

Setting Up The P8 for 100% DCC Operation - Necessary For Drop-In Operation

There are not many items that need to be changed. However, while you have the computer plugged in you might wish to experiment with some of the other P8 options. Any changes made are stored inside the P8 even with the power turned off.

Option	Setting	Action
MTS Mode	Disabled	Not used with DCC and can cause issues if on
Shutoff Delay	0	Sound never shuts off
DCC Timeout	0	DCC mode never times out
DCC Address	3	Always use address 3 - Do not change it
REVUP DCC	none	Not assigned to any throttle key
REVDWN DCC	none	Not assigned to any throttle key
Stopping bell duration	0	Feature disabled
Startup bell duration	0	Feature disabled
Forward horn volume	0	Feature disabled
Toot hold-off	0	Feature disabled

Recommended P8 Function Key Assignments

F1	Bell	Toggles Bell on/Off	Latched
F2	Horn	Push for horn, release to stop	Momentary
F3	Coupler clang	Push to trigger sound	Latched
F4	Grade Crossing	Push to trigger grade crossing horn	Latched
F5	Station Announce	Push to trigger sound	Latched
F6	Compressor	Push to trigger sound	Latched
F7	Volume Up	Push starts vol ramp up, push to stop ramp	Latched
F8	Volume Down	Push starts vol ramp down, push to stop ramp	Latched
F9	Dynamic Brake	Push to trigger sound	Latched
F10	Brake Release	Push to trigger sound	Latched
F11	Air Pop Valve	Push to trigger sound	Latched
F12	Shut down	Toggle Prime Mover Shutdown or startup	Latched

Before Disconnecting the Computer Interface - Save The P8 Configuration

Since there are so many options and effects from which to choose, we recommend saving the P8 configuration to your PC. That way, should you ever want to load another P8 with the same settings, you can simply retrieve the configuration file from your PC and load everything at once.

GP30 Quick-Start - continued

Volume Up is triggered with F7. To use this feature, push F7 to begin increasing the overall Phoenix 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 restarts. 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, cab interior and marker lights
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	Trigger air pop valve
*2	Toggle engine shutdown or startup sound sequence

See the Drop-In Users Guide for much more information on the setup and operation of your locomotive.

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.

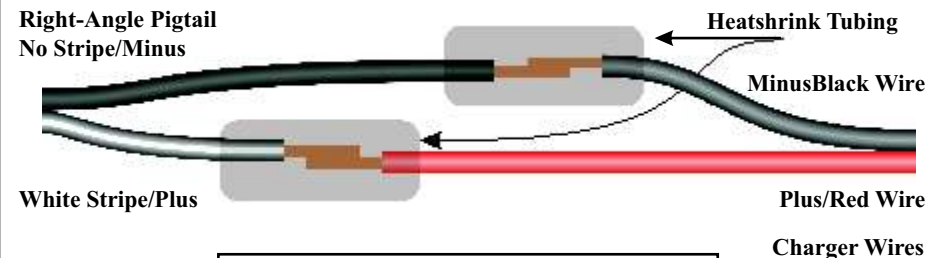
Take the pigtail and separate the 2 wires for about 2 inches. Cut the plus wire so it is 1 inch shorter than the minus wire. Remove about 1/2 inch of the insulation from the minus wire. Twist the strands together and touch a tiny bit of solder to the twisted wire. This is called tinning and keeps the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



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 GP30 Disassembly

Warning: Many parts of the shell and chassis are fragile and easily break. Especially vulnerable are the steps, doors, side-frame assemblies, and both air reservoirs on either side of the fuel tank. Gently pull up and remove the horn assembly before starting.



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 18

When all the screws are removed, there will be a total of 18 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 -4 Screws

The 4 screws are numbered below and the black circles show about where you will find the screws. Remove the 4 screws, place them in the foam block, then lift off the tank and set it aside for now.



GP30 Quick-Start - continued

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, cab interior and marker lights are all toggled on and off with the throttle's 0 key. This is function 0 which we shorten to F0. The front headlight automatically turns off and the rear headlight turns on when the direction key is pushed. The front marker lights are green the locomotive is going forward, and red when going reverse (rear markers work opposite of front).

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 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 (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

Glue On The Broken Items

We managed to break off the bell and both air reservoirs during installation. A few dabs of glue fixed all of them.

Replace The Roof-Top Details

Don't forget to reinstall the air horn assembly you removed prior to beginning loco disassembly.

Quick Start - Setting Address and Frequency

Your Drop-In decoder features an all new and much improved method for setting its frequency. Unlike the older style Drop-In decoder, there is no tiny rotary frequency selector switch. In its place is a new radio receiver section that uses your throttle to set the frequency. With this new receiver, 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

- 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-In's 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 combination 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.

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

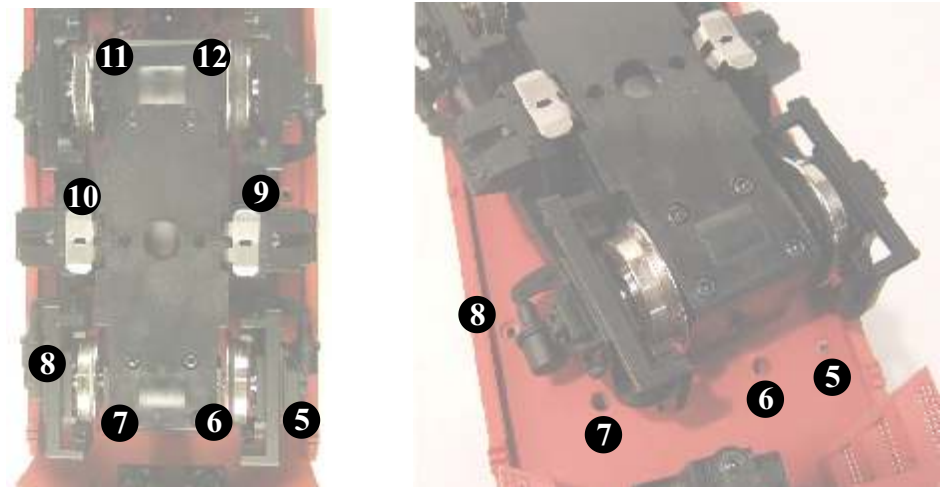
Step 5 - Use SERVICE PROGRAM to set CV200 to the desired frequency. The locomotive address does not matter when using SERVICE PROGRAM mode. Be sure and make a note of the new frequency.

USA-Trains GP30 Disassembly

Cab End Mounting Screws - 8 Screws

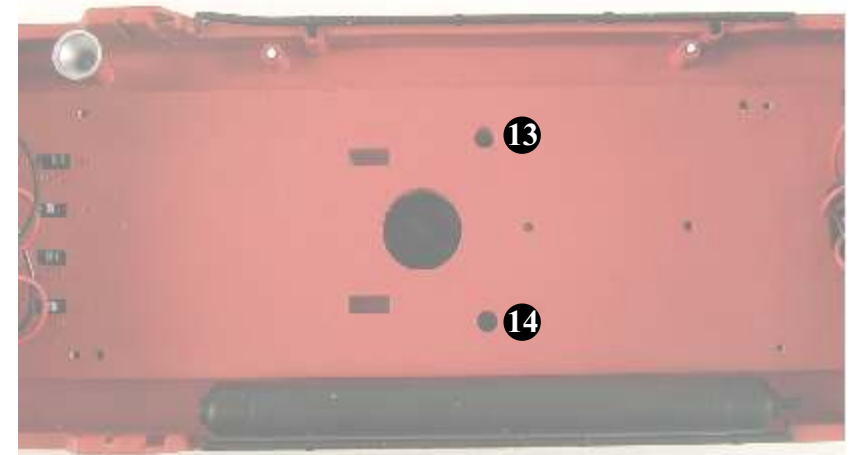
Some screw locations are obvious. For others, you need to rotate the truck to see the hole or the screw head. Some of the screws are located in deep hollow tubes and you will need to use the long, thin-shafted screw driver. As each screw is removed, place it into the foam block. Take care not to damage the truck wiring. Be careful not to damage the side frame's delicate detail. For screws 11 and 12, you can remove the side frames but that is not required if you use the long screw driver and gently work the screwdriver in between the wheel and the truck body.

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 up 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 - 2 Screws

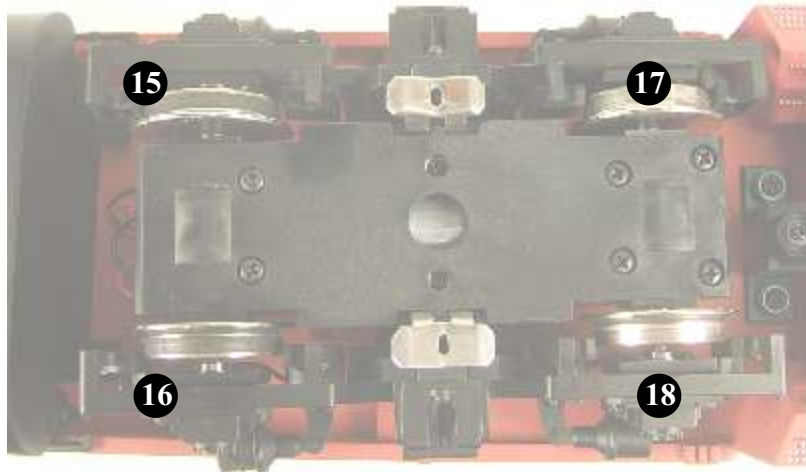
Remove the 2 screws that are visible once the fuel tank is removed. Place the screws into the foam block.



USA-Trains GP30 Disassembly

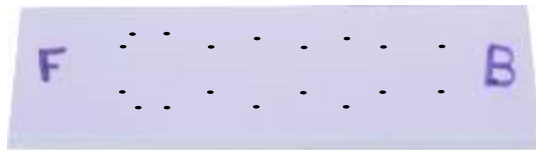
Rear Mounting Screws - 4 Screws

The last 4 screws are located in hollow tubes that the truck partially obscures. Rotate the truck to expose the holes and remove the last 4 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 18. 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.



GP30 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 the throttle has turned itself off, the radio frequency doesn't match, or the locomotive address is set incorrectly.

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 so don't rush - take your time.

Bundle together the smoke generator wire and the lighting jumper. Consider using tie wraps or cable ties to bundle these wires with the front motor wires. The goal is to keep the wires away from the mounting posts in both the top shell and the bottom chassis. You may need some pieces of tape to keep wires away from the holes and posts when mating the two halves. **Keep all wires as far away from the antenna as possible.**

Lift the top shell over the chassis and observe the lay of the wiring. Use tie wraps and tape to make sure that they naturally fall inside, and between the mounting posts. 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 two halves should seat themselves correctly when in the proper location and when no wires obstruct the mounting holes. Push down firmly to insure the shell is properly mated to the chassis. Once the two halves are together, turn the locomotive on its side or on its back. Insert a couple of screws into the cab end. Do not screw them too tight - just snug enough to not rattle. To start the screw, first turn it slightly counter-clockwise to get it seated in the threads, then turn it clockwise to tighten. Then do the same to the last two screws on the back end. If all screws snug up, then the wires are clear of the holes.

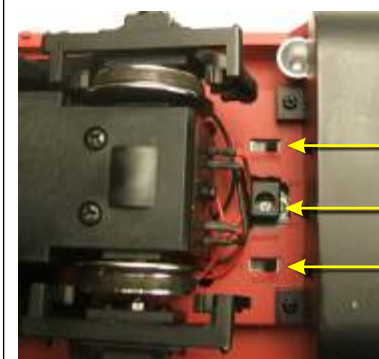
If the fuel tank was temporarily mounted, now is the time to remove it and install the two chassis mounting screws. Now reattach the fuel tank with all 4 screws. Install the rear end screws. Finally, install the remaining screws and you are done.

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]

GP30 Preliminary Checkout

Preliminary Checkout

As delivered from the factory, the Drop-In decoder is set to locomotive address 3. Also this GP30 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, T5000 throttle commands will be used.

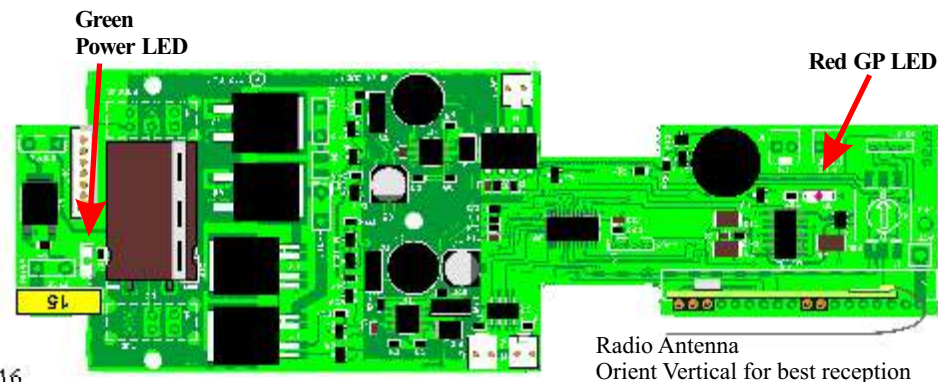
1. Turn on both power switches on the Drop-In. The ON position is when the slide switches towards the cab. The green LED will turn on indicating that battery power is present.
2. You will hear the Phoenix P8 module turn on (if installed). Don't be alarmed if the sound turns off in a minute or so - that 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. The GP30 has all of its lights connected together so there is only one activation key to toggle the lights on and off. Turn on the locomotive lights using the 0 key on the throttle. When going forward, the front headlights are on, the front markers are green, the rear headlights are off, the rear markers lights are red and all the number boards are on. When going in reverse, the rear headlights are on, the rear marker lights are green, the front headlight is off, the front markers are red and all the number boards are on. There are no other lighting controls available unless you decide to rewire the locomotive's lighting circuitry.
6. The smoke unit is turned on by pushing the * key followed by the 0 key which is Function-10. You will hear the little fan motor spin up. Since there is no smoke fluid in the unit, verify the fan motor is running and then push * and 0 again to turn off the smoke unit.
7. If you have installed the Phoenix P8 sound decoder, push the 2 key and the horn will sound. Depending on the setup of the P8 sound the horn may also sound when the motor is started up. The Phoenix P8 factory settings are not optimum for AirWire operation and the Drop-In. Page 21 shows the recommended setup or a much better arrangement of sound effects and their activation keys.

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 page 18.



USA-Trains GP30 Disassembly

Remove The Two Voltage Regulators From The Lead Weights

Unscrew and remove the two voltage regulator devices from the lead weights. Do not lose the screw and washer you remove from the voltage regulator mounted on the front weight. They are needed to fasten the front weight to the chassis and will be used again.

Completely Remove The Rear Weight

Remove the other screw holding the rear weight. Don't bother with the middle screw since it only holds the rear truck and can be left in place. Completely remove the rear weight. It may be discarded since this is the area in which the battery will be mounted.

Unplug All Connectors From Old Circuit Board and Remove The Board

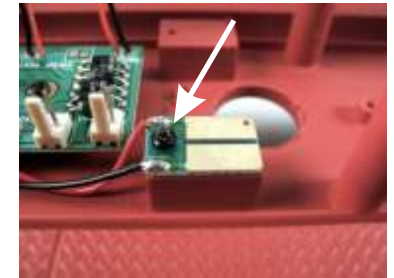
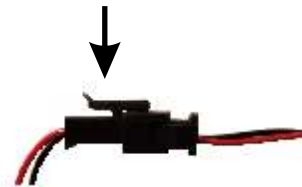
This is relatively easy since there are only a few plugs and connectors. Unplug all the connectors from the circuit board. Remove and save the little twist ties. These will be used later.

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 down on the tab while gently pulling the connectors apart.

Remove the screw (white arrow below) holding the small circuit board used to make contact with the spring connectors on the shell.

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.

Push Here To Release Lock Tab



Improving The Light Connection

All of the locomotive lighting goes through a single set of spring contacts touching a small circuit board. The little springs are notorious for developing intermittent contact after only a short time outdoors. Fortunately, the Drop-In decoder solves this problem and it is as simple as plugging in a wiring connector.

First, remove the plastic holder containing the springs. The holder is friction fit onto the mounting post inside the shell. Pull up on the holder while gently wiggling it back and forth. Disconnect the white plug from the holder. Don't worry that the little spring contacts fall out - they are not needed. You can discard the plastic holders.

Your GP30 Drop-In Decoder includes a special lighting connector jumper. It matches the lighting connector you just freed from the plastic holder. The other end plugs into the lighting socket on the Drop-In decoder. That's all there is to it.



USA-Trains Enlarging Switch Holes

Removing The Front Truck

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 GP30 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.

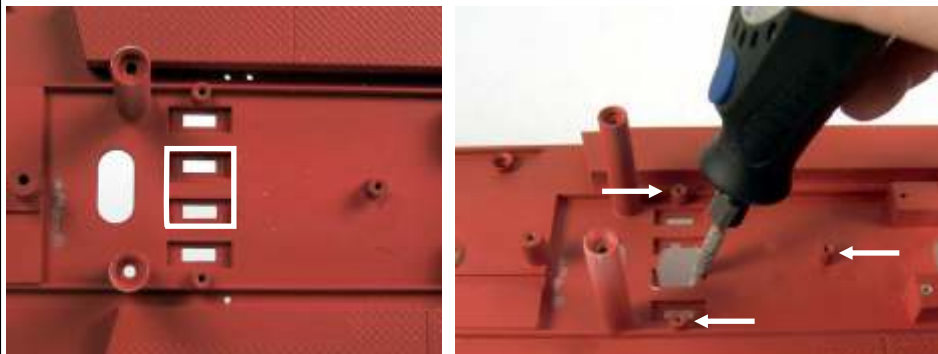
The truck is held with a single screw. Remove the screw to free the truck. Retrieve the washer so as to avoid losing it. Gently pull the truck wire through the chassis hole and set the truck aside.



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 drops through without binding. 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

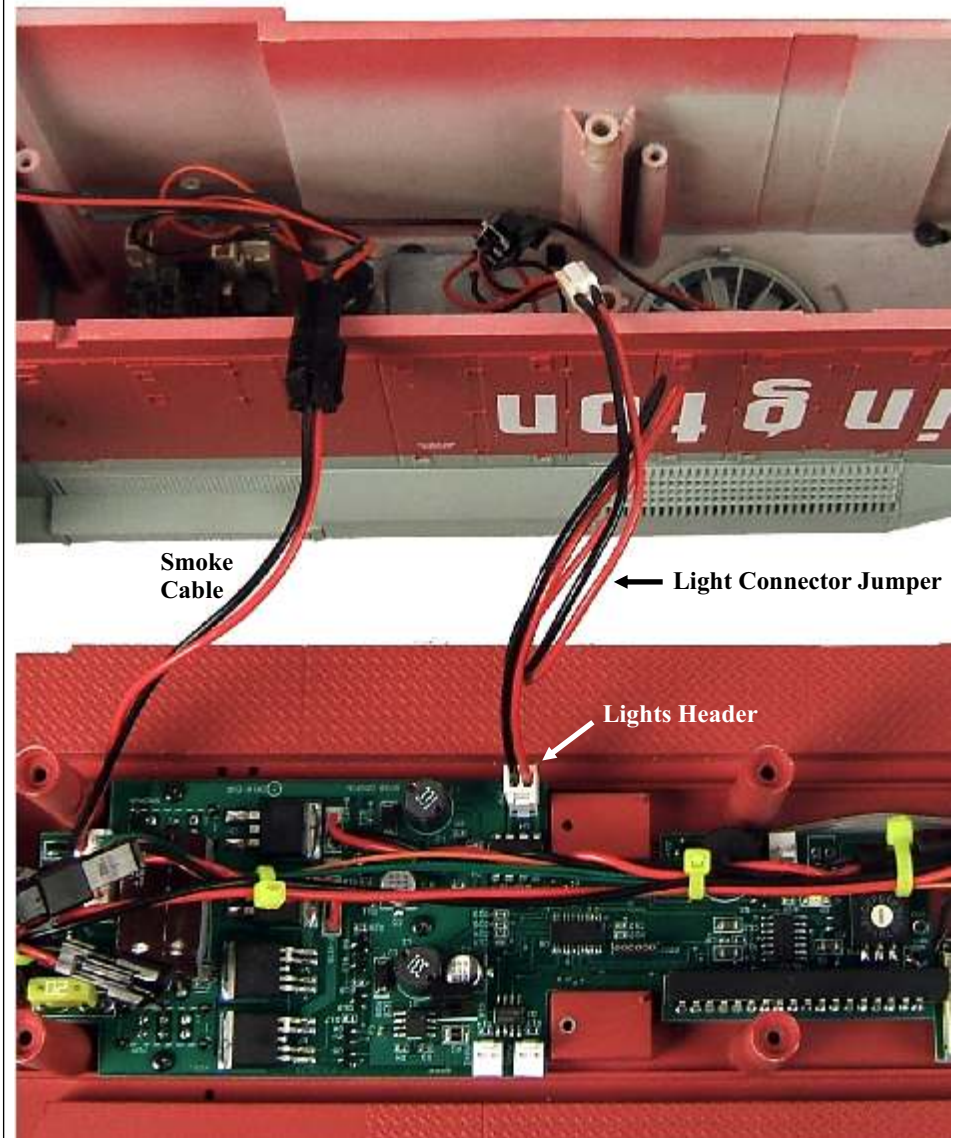
With the switch holes enlarged, you can now reattach the front truck. Do not forget the washer when attaching the truck. Feed the wires through the oval shaped hole in the chassis floor.

Connect Shell Lights and Smoke Unit

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 smoke generator and the lighting connector. Use the light connector jumper to connect the locomotive header to the Drop-In decoder's lamp header. There is only one connection that is shared by all the lamps on the locomotive.



Mounting The GP30 Drop-In Decoder

Before Mounting The Drop-In

Place the speaker under the locomotive and push the P8 programming jack's plug up through the round hole in the chassis floor. Plug it into the P8's matching socket - there is only one that fits. If it doesn't fit, don't force it. All of the P8 sockets and plugs are polarized so all plugs fit in one direction only.

Next, push the speaker plug up through the round hole in the floor and plug it into the matching socket on the P8.

At this time, we recommend using a couple of screws to fasten the fuel tank in place temporarily. It is temporary because there are two chassis mounting screws that will eventually need to be replaced once you are ready to close up the locomotive. You can leave the tank loose or fasten it down - it's your choice. If you leave the tank loose, take care not to strain the speaker wiring or P8 connections.

Mount GP30 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 speaker and programming jack wires go under the board towards the battery. Use the 3 screws from the original circuit board to mount the Drop-In.

Plug In Front Motor, Rear Motor and Battery Pack

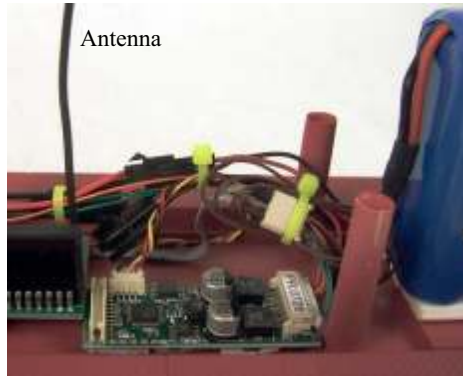
Plug in the front and rear motor connectors. Plug in the battery pack. Be sure and connect the battery pack only to the proper socket on the Drop-In. Accidentally plugging it into the smoke generator plug will damage the decoder.

No need to plug in the smoke controller or lighting connections just yet. First thing to do is tidy up the wiring.

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 cable ties 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 cable ties that are fluorescent yellow making them easy to see in the photos.



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 pages 11 and 13.

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.



Battery Mounting

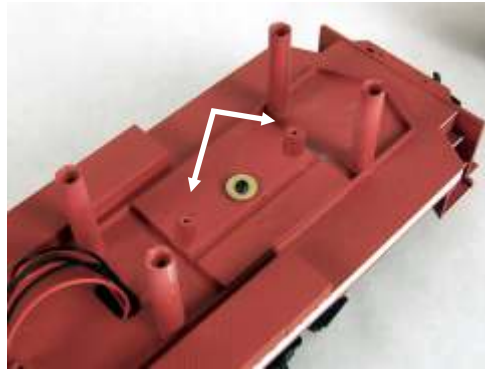
Battery Mounting

This installation makes use of the standard CVP Lithium battery pack. The small size yet high power capacity makes for a simple installation. The battery will mount in the area where the rear lead weight was previously mounted.

First, use your wire cutter to trim both mounting posts (white arrows) flush to the chassis floor. Remove the burrs to provide a smooth surface for the double-sided foam tape.

The battery is mounted to the chassis using double-sided foam tape. Use at least 3 layers so the battery clears the truck mounting screw.

Orient the battery with the connector towards the locomotive's cab end and press it firmly down. 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.



Mounting P8 Sound Module

Make Room For The P8

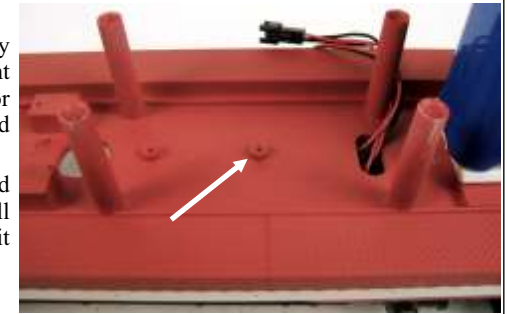
There is limited area to mount the P8. You may be tempted to mount the module above the front weight. Don't do it - it will obstruct the cab floor and prevent reassembly of the top shell and bottom chassis.

The best place is between the battery and the end of the GP30 Drop-In decoder. There is a small post that needs to be removed to provide a bit more room for the module.

Trim the post indicated flush to the floor.

Temporarily mount the GP30 Drop-In decoder. Doing so will help you place the P8 in the proper location.

When mounted, the edge of the P8 decoder will rub on the wires exiting the chassis near the battery. To prevent any damage to the wires, use a piece of fine grit sand paper and smooth the edge of the P8 circuit board shown by the red arrow. It won't take much sanding, just enough to provide a smooth surface that won't cut into the wires as the truck moves. This is also the socket used to make the connection between the P8 and the Drop-In decoder so the wires also provide a bit of a cushion.



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. Now plug in the Drop-In connection cable and route the wires around and towards the front of the locomotive. Orient the module as shown and press down to firmly mount the P8 to the chassis floor. Don't worry about the wires for now.



With the P8 is mounted and fastened down with double-stick foam tape, the next step is to hook up the speaker and programming jack.

