GP30 Drop-In Configuration Variables List

This is the list of all CVs used in the updated GP30Drop-In. The "Orig Value" column shows the original factory value when the decoder was new or after the decoder is reset.

CV #	Orig Value	Value Range	Description
CV1	3	0-99	1-99 Primary Address
CV2	9	0-255	Motor Starting Voltage MSV
CV3	2	0-255	Motor Acceleration Rate
CV4	2	0-255	Motor Deceleration Rate
CV5	255	0-255	Maximum Motor Voltage Vmax
CV6	128	0-255	Mid-point Motor Voltage Vmid
CV8	135	135	CVP Manufacturer ID
CV11	0	0-255	Loss of Signal Timer (seconds)
CV17	0	0-255	Loco Address Hi-Byte
CV18	0	0-255	Loco Address Lo Byte
CV29	2	0-255	Decoder configuration
CV35	0	0-99	F1 Function Key Action
CV36	0	0-99	F2 Function Key Action
CV37	9	0-99	F3 Function Key [RCOUPLR]
CV38	15	0-99	F4 Function Key Action [DL On]
CV39	1	0-99	F5 Function Key Action [CRUISE]
CV40	3	0-99	F6 Function Key Action [CAB] [E1]
CV41	0	0-99	F7 Function Key Action
CV42	0	0-99	F8 Function Key Action
CV43	4	0-99	F9 Function Key Action [AUX1] [E2]
CV44	2	0-99	F10 Function Key Action [SMOKE]
CV45	5	0-99	F11 Function Key [AUX2] [E3]
CV46	0	0-99	F12 Function Key Action
CV56	0	0-255	Bump Amount
CV57	0	0 - 127	Bump duration in us
CV59	3	1-15	Headlites Effect Period (x512ms)
CV60	0	0-15	Headlights Mode 0=normal/autorev
CV61	4	0-15	Headlight Front Effect
CV62	4	0-15	Headlight Rear Effect
CV63	0	0-1	Cruise Mode - 0 Norm, 1=Track
CV64	4	1-16	Cuise Track Rate (ms)
CV65	2	1-3	Cruise Track Step Size
CV200	0	0-16	RF Frequency number
CV201	3	1-15	Light Effect Period (x512ms)
CV202	4	0-15	CAB Special Effect [E1]
CV203	4	0-15	AUX1 Special Effect [E2]
CV204	4	0-15	AUX2 Special Effect [E3]
CV205	4	0-15	AUX3 Special Effect [E4]
CV206	0	0-255	AUX3 Auto-off Timer [E4]
CV207	3	0-255	DLites Flash period (x256ms)
CV208	0	0-255	DLites Mode (0=On, 1=Off)
CV209	15	0-255	DLites Flash TImeout (seconds)
CV212	3	0-255	Smoke Timout (3 minutes)
CV213	8	0-99	Function Key 13 [FCOUPLR]
CV214	6	0-99	Function Key 14 Action [E4]
CV215	99	0-99	Function Key 15 [Cruise Off]

CV Value	Function Key Action
0	No Function
1	Activate Cruise Control
2	Smoke Enable
3	Toggle CAB Lite [E1] on/off
4	Toggle AUX1 Lite [E2] on/off
5	Toggle AUX2 Lite [E3] on/off
6	Toggle AUX3 Lite [E4] on/off
7	Dim Headlighs on/off [Rule 17]
8	Activate Front Coupler
9	Activate Rear Coupler
10-14	reserved
15	Activate Ditch Lights
99	Deactivate Cruise Control

CV Value	Special Lighting Effects
0	Off 0%
1	Dim 6%
2	Dim 25%
3	Dim 50%
4	On 100%
5	Strato Light
6	Oscillating Light
7	FRED
8	Rotary Dome light 1
9	Gyra Light
10	Mars Light
11	Rotary Dome Light 2
12	Strobe Single Pulse
13	Strobe Double Pulse
14	Reserved
15	Random flicker

CV Value	Cruise Control Mode
0	Normal (cruise off w/speed change)
1	Tracking mode (Cruise stays on)

CV Value	Head/Rear Lites Action
0	Normal, autoreverse
1	Normal with rule17
2	Front headlite on always
3	Front headlite on always w/ rule 17
4	Rear headlite on always
5	Rear headlite on always w/ rule 17
6	Front & Rear both on
7	Front & Rear both on w/ rule 17
8	Swap F to R Auto Reverse
9	Swap F to R Auto Reverse w/ rule 17
10-15	reserved

AirWire900®

NEW!

USA Trains GP30 Drop-In™ Decoder Installation Guide

AIRWIRE® 900

Contents

- **New** GP30 Drop-In Decoder (2022)
- Charger Pigtail
- Light Connector Jumper
- **New** GP30 Installation Manual
- Drop-In Users Guide

How To Use This Booklet

Locomotive Disassembly and AirWire Drop-in Decoder Installation. This section starts with the simple task of attaching the charging-plug pigtail to a battery charger. Step-by-step instructions then show how to disassemble the chassis from the body shell. Removal of the original circuit boards is next. Then, the optional installation of the XDRIVE and DCC sound module is described followed by the rather simple task of installing the 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 AirWire Drop-In using the AirWire throttle. In this section you will find the "cheat sheet" listing the throttle function key assignments for the locomotive. Some useful items related to changing the Drop-In decoder loco number, changing the decoder frequency and how to reset the Drop-In decoder to its original factory settings finish out the installation manual.

See The Drop-In Users Guide For Applications Tips

This manual is used during Drop-In decoder installation only, and it is specific to the USA-Trains GP30 locomotive. There is a separate manual, the Drop-In Users Guide. This guide will have all of the items related to fine tuning of locomotive performance, useful application tips as well as instructions for using the ALT lighting features.

Recommended Battery And Charger

The CVP BAT2 is a 14.8V, 6800mAh, Lithium-Ion rechargeable battery. It is an ideal battery for this locomotive. The matching smart charger insures maximum lifetime for your battery. The Drop-In decoder comes with a plug to splice onto the charger. The plug matches the socket on the Drop-In. The BAT2 and the matching smart charger can be ordered from authorized AirWire dealers or direct from CVP Products. **www.cvpusa.com**

Battery 14.8V, 6800mAh	BAT2
Smart Charger	CHARGER1

Optional Accessories, Sound Modules, and Couplers

Whip Extension Cable (WEC) is a low cost way to improve the Drop-In reception range. It is used to relocate the Drop-In's whip antenna away from noisy motors and wiring. It's about 14 inches long and comes with matching connectors that snap onto the radio module and the whip antenna.

AirWire XDRIVE: With the addition of the AirWire XDRIVE board, an NMRA-DCC sound module or decoder can be used with the Drop-In. The XDRIVE comes with the appropriate Drop-In harness and connectors.

Sound Decoders and Modules: For best results, use either a Soundtraxx or a TCS decoder with an XDRIVE.

Speaker: There is no speaker included with the locomotive. A round or square 2.5 inch speaker will fit in the locomotive speaker grill. Soundtraxx, TCS and Phoenix sell speakers. They can also be purchased on Amazon.

Phoenix P8 Sound Module and Couplers: The Drop-In Decoder is designed to work directly with the Phoenix P8 sound module. It does not need the XDRIVE. The Drop-In decoder has 2 sockets suitable for driving a pair of Phoenix solenoid couplers. Order these items directly from Phoenix or one of their authorized dealers. The Drop-In coupler drivers cannot be used with other coupler brands.

Soundtraxx	https://www.soundtraxx.com
Train Control Systems (TCS)	https://tcsdcc.com
Phoenix Sound Systems	https://www.phoenixsound.com

Resetting Drop-In Decoder To Original Factory Settings

This reset procedure applies only to the AirWire Drop-In decoder. It does not affect an attached sound module in any way. The sound module address will still be its original address.

Using the Hidden Menu of the T6000 Pro-Ops Wireless Controller
All programming commands are hidden on the T6000. Use this procedure to get to the hidden commands.

Press and release the green MENU key once. Second, push and hold the ENT key. The first page of the hidden menu will be shown. Push the menu key once more to bring up page 2 of the hidden menu. At any time press ESC to return to the home page. See the T6000 User Guide for additional details.

Step-by-Step Key Sequence To Reset Decoder Using The T6000 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 locomotive decoder to be programmed.

- Turn on the T6000. Verify it is set to the same frequency as the decoder.
- Go to MENU page 2 and then push 4 to select Service Programming.
- Enter the CV number of 8 by pushing, one at a time, the following keys: 8, ENT;
- Enter the CV8 value of 135 by pushing, one at a time, the following keys: 1, 3, 5, ENT;
- Listen for the decoder to beep signifying the command has been received.
- 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.

Drop-In Frequency Listing

The Drop-In decoder supports all 17 AirWire frequencies numbered 0 to 16. It can be set to any of the available frequencies.

Number	Frequency (MHZ)	Number	Frequency (MHZ)
0	921.37	9	924.62
1	919.87	10	923.12
2	915.37	11	918.12
3	912.37	12	916.87
4	909.37	13	913.62
5	907.87	14	910.87
6	906.37	15	904.87
7	903.37	16	916.37
8	926.12		

DCC Sound Decoder Programming

There are two important programming changes required to insure the sound decoder is matched to the locomotive speed. Use the T6000 throttle to program the required changes.

1. Be sure the sound module power switch and the Drop-In decoder are turned on before programming.
2. The sound module must have the same loco number as the Drop-In decoder. If you have not done this, program CV1 with the desired loco number. When the command is issued, both the Drop-In and the sound module will be programmed with the same loco number.
3. Program the sound module so speed information is derived from the throttle speed value and not from the missing locomotive motor's BEMF signal. For the TSU-4400, this is CV 217. Program CV 217 to a value of 0.

Finally, if you don't like the sound modules pre-assigned function key actions, you will have to reprogram them to what you want. Please consult the sound module's user guide for specific details.

There are many programming options for the sound module. Learning how to set them up and use them for your particular application can take a lot of trial and error. If you have questions or need help regarding the setup of the sound decoder, please contact the sound decoder manufacturer. CVP is unable to provide assistance for the sound decoder operation.

Overlapping CVs - Drop-In and TSU-4400

There are several CVs used in the Drop-In that are also used in the TSU-4400 but they have different meanings and functions.

Changing a CV with both units powered on will reprogram **both** the Drop-In decoder as well as the TSU-4400.

Assuming you want to change a TSU-4400 CV, first verify it is not used on the Drop-In decoder. Check the Drop-In CV list on the back page of this booklet. If the TSU-4400 CV is not listed, then you may program it knowing it will have no effect on the Drop-In. However, if the same CV is used on the Drop-In, then a special sequence must be followed.

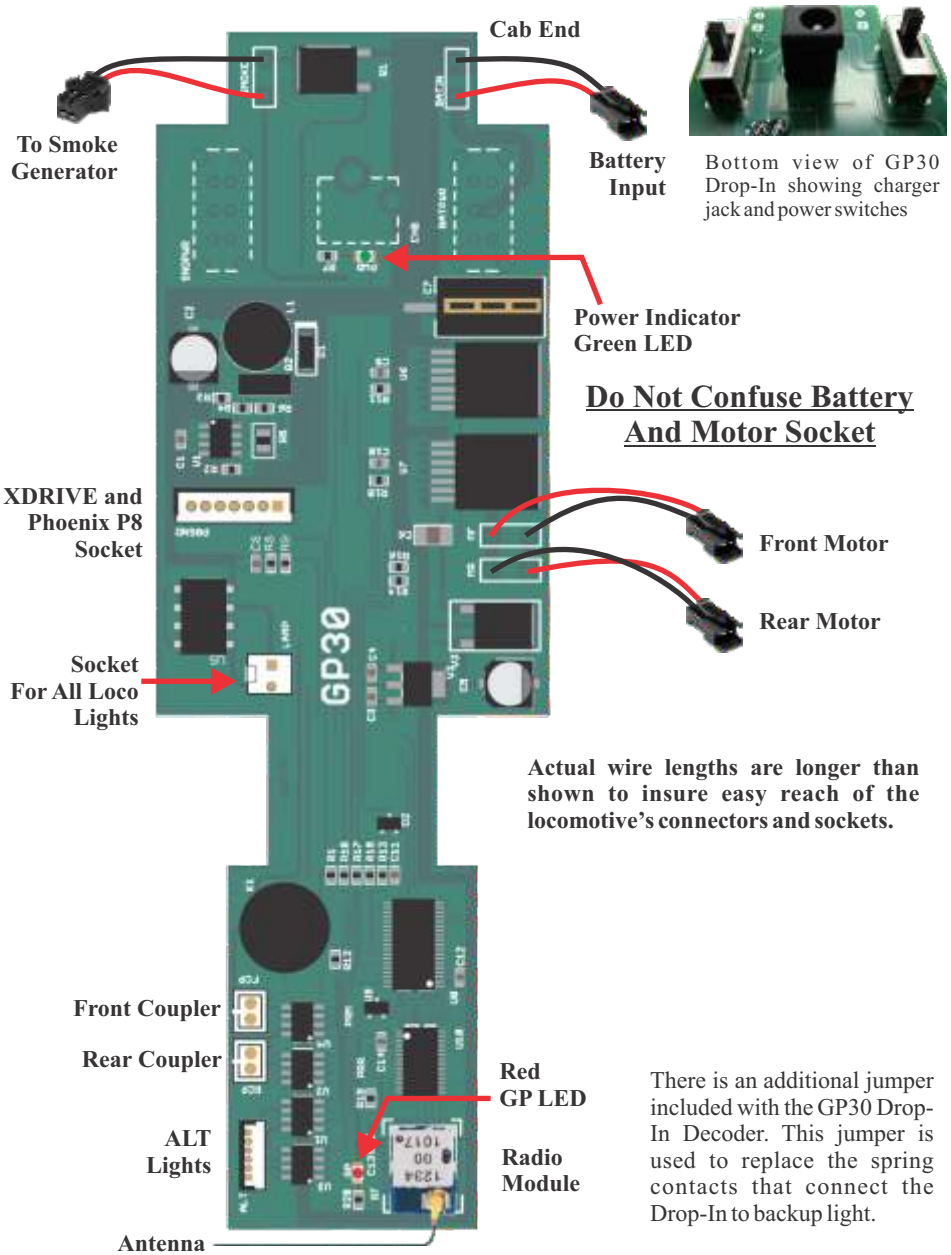
First step is to know the current value for the Drop-In CV. The original factory value is shown in the ORIG VALUE column. If you have never changed the CV, just make a note of the value.

1. Program the desired value into the TSU-4400 CV. (It also programs the Drop-In CV).
2. Turn off the Drop-In's SNDPWR switch. This turns off the TSU-4400.
3. Program the Drop-In CV back to the desired value. Since the TSU-4400 is turned off, it will not get the programming command
4. Turn the Drop-In's SNDPWR switch back on.

Overlapping CV Programming Procedure

1. Program the Sound Decoder CV First.
2. Turn Off SND Power Switch.
3. Program Drop-In CV Back To Its Original Value.

GP30 Drop-In Decoder Familiarization



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

Do Not Confuse Battery And Motor Socket

Actual wire lengths are longer than shown to insure easy reach of the locomotive's connectors and sockets.

Be sure to bend the antenna wire so it is oriented vertical with respect to the Drop-In board.

For best reception, attach the Whip Antenna Extension (WEC) to the radio module and mount the whip antenna near the top of the chassis away from motors and wires.

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.

Light Connector Jumper

Attaching Charger Plug Pigtail To Charger

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

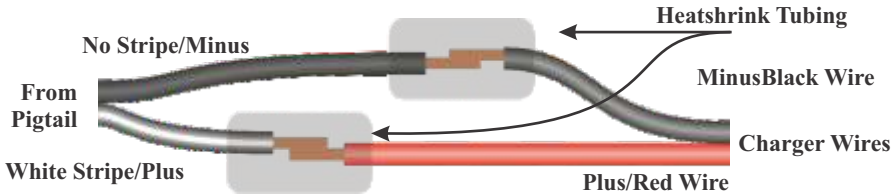
Locate the charger pigtail that came with your AirWire Drop-In decoder. The 2-conductor pigtail comes with stripped wires on one end and a right angle plug on the other.

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

Take the pigtail and separate the 2 wires for about 2 inches. Cut the plus wire so it is 1 inch shorter than the minus wire. Remove about ½ inch of insulation from the plus wire. Twist and apply solder to the twist end of the plus wire. This is called tinning and keeps the twisted wires from unraveling. Next, 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.

Take the charger wires and split the red and black wires apart for about 3 inches. Cut off the alligator clips and cut the minus (black) wire so it is 1 inch shorter than the plus (red) wire. Remove about ½ inch of the insulation from both the black and red ends of the wires. Twist and tin the wires.

Insulate the solder joints with heatshrink tubing. Heatshrink tubing may be ordered from Mouser Electronics. Use 0.25 inch diameter tubing with part number 5174-1141. www.mouser.com



Verify Battery Pack Connector Polarity

Locate The Drop-In Battery Input Socket. The motor connector and the battery connectors look the same. Be careful. DO NOT accidentally plug the battery into the motor connector. This will damage the Drop-In board.

Check The Battery Pack For Proper Polarization. The CVP BAT2 battery pack has a mating plug that is properly polarized for the Drop-In battery input socket. The drawing shows the red and black wire orientation for both the plug and the socket. Orient the battery plug and the Drop-In battery socket as if they were to be inserted. Confirm the wire colors and connector orientation match the picture below. Notice that the socket's release lever is pointing away from you.

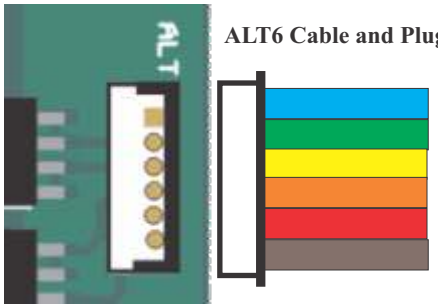
CVP'S BATT2 Battery Pack

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

If you are using a brand of battery, you must verify the polarity is correct before plugging it into the Drop-In decoder. Get help if you are not sure.

ALT Lighting Socket Optional Cable and Pinouts

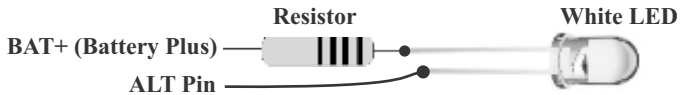
The Drop-In decoder has 4 extra light drivers available at the small white socket labeled ALT. If you want to use these extra lighting outputs, you will need to purchase the matching cable and plug to fit the socket. Order part number ALT6. The plug comes with 24 inches of color coded wire. Much more detail about using the extra light drivers is in the Drop-In User Guide. The original factory settings for function key activation are also shown. The Effect-CV determines the appearance of the lighting effects. All of these can be changed if desired.



ALT6 Cable and Plug

Pin	Output	Activate	Effect CV
1	BAT+	*na*	*na*
2	DLL	F0	207, 208, 209
3	DLR	F0	207, 208, 209
4	ELITE1	F6	202
5	ELITE2	F9	203
6	*not used*	-	-

Typical LED Hookup To ALT Light



It is important to know that the ALT pin does not source voltage. Instead it makes a connection to BAT-minus or ground. When activated, voltage will not be present on the pin.

For LEDs, a limit resistor must be used. For the standard 14.8V Li-Ion battery pack, this resistor should be a value of 620 ohms. A lower resistance value increases the brightness.

The ALT outputs are not protected against overloads or short circuits. Either fault will destroy the output.

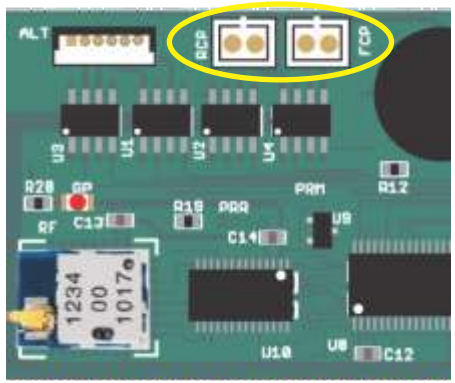
Definitions, examples and additional information is contained in the companion booklet, The Drop-In User Guide, that came with your GP30 Drop-In decoder.

Phoenix Front/Rear Coupler Sockets

The Drop-In decoder includes drivers for two Phoenix solenoid couplers. No extra decoder board is needed. Install the Phoenix coupler on the loco, and insert the coupler's plug into the appropriate socket. The sockets are inside the yellow circle.

The FCP socket is for the front mounted coupler and the RCP socket is for the rear.

The original factory settings are throttle key 3 (F3) to activate the rear coupler and throttle keys *, 3 (F13) to activate the front coupler. The settings can be changed if desired.



Other brands of couplers are not supported.

Assigning Drop-In Actions To Throttle Function Keys

A function key on the throttle is generic. When pressed, it only sends an activate or deactivate command. For example, pushing the throttle's 5 key sends the command "activate function 5." What the decoder does with the function command is determined by the setup inside the Drop-In decoder (not the throttle).

You can change what your new GP30 decoder does with any of the received function key commands except function 0. Function 0 is fixed and is set to always turn locomotive headlights on or off.

Changing Decoder Function Key Actions

Use this step-by-step sequence to setup what the decoder does when it receives a specific function command. The setup is stored in the decoder's memory. The throttle does not store anything.

The Drop-In has many memory locations where setups are stored. We use the term CV# where # is a specific memory location. So CV40 means Drop-In memory location number 40. The value stored at this location dictates what the decoder does when it receives a throttle's function key command.

Deciding the setup is relatively simple. Start by thinking through what you want your throttle to activate on the decoder. For this example, here's what is wanted:

"On the throttle, when I press the 6 key I want to turn on the smoke generator."

Notice the underline of the important items: which throttle function key is to be used, and what the decoder action will be when that key is pushed. For this example, F6 is the throttle's 6 key. Now you are ready to set the Drop-In so that it turns on the smoke generator when F6 is pressed.

Step 1: Find F6 in the Function Key Assignment" table.

From the table, the GP30 decoder uses CV40 for F6 .

Step 2: Find the desired action in the "Function Action" table below and note the value. This will be what is stored in CV40.

For this example, since the smoke generator is to be toggled, which means turned on and off, the CV value of 2 is to be used.

Step 3: Turn on the decoder's power. Set your throttle to the decoder's frequency and locomotive address if it has not yet been set. This is very important since if either the frequency or the locomotive address is wrong, the Drop-In will not hear the throttle's OPS PROGRAM command.

Step 4: OPS PROGRAM CV40 to a value of 2. The decoder will chirp indicating it heard and accepted the command. Escape out of OPS PROGRAM and verify that the GP30 Drop-In's smoke generator turns on when the throttle's 6 key is pressed.

This same sequence is used to assign or change what any of the available function keys do.

Function Key Assignment	CV#	Reset Value
F1 Function Key Action	CV35	0
F2 Function Key Action	CV36	0
F3 Function Key Action	CV37	9
F4 Function Key Action	CV38	15
F5 Function Key Action	CV39	1
F6 Function Key Action	CV40	3
F7 Function Key Action	CV41	0
F8 Function Key Action	CV42	0
F9 Function Key Action	CV43	4
F10 Function Key Action	CV44	2
F11 Function Key Action	CV45	5
F12 Function Key Action	CV46	0
F13 Function Key Action	CV213	8
F14 Function Key Action	CV214	0
F15 Function Key Action	CV215	99

Function Key Action	CV Value
No Function	0
Activate Cruise Control	1
Smoke Enable	2
Toggle CAB Lite [E1] on/off	3
Toggle AUX1 Lite [E2] on/off	4
Toggle AUX2 Lite [E3] on/off	5
Toggle E4 [not available] on/off	6
Dim Headlighs on/off	7
Activate Front Coupler	8
Activate Rear Coupler	9
reserved	10-14
Activate Ditch Lights	15
Deactivate Cruise Control	99

Sound Considerations - XDRIVE + DCC Decoder

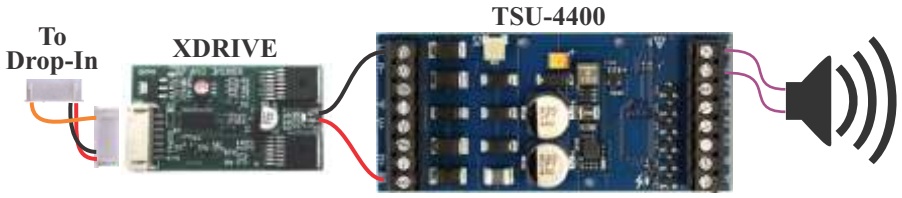
If your installation will not be using a sound module, you can skip this section and proceed to the disassembly section.

Your AirWire GP30 Drop-In can work with two different types of optional 3rd party sound modules.

The New XDRIVE combined with an NMRA-DCC compliant sound decoder is a new option. The XDRIVE comes with the Drop-In harness and a set of connectors to connect to the DCC decoder. We strongly recommend the Soundtraxx or the TCS decoders. The T6000 is used to program the sound decoder. No other equipment is required.

The XDRIVE is for connecting to a DCC sound effects decoder. Do not use the DCC decoder's motor drive output. There is insufficient power from the Drop-In to do so and can damage the Drop-In board.

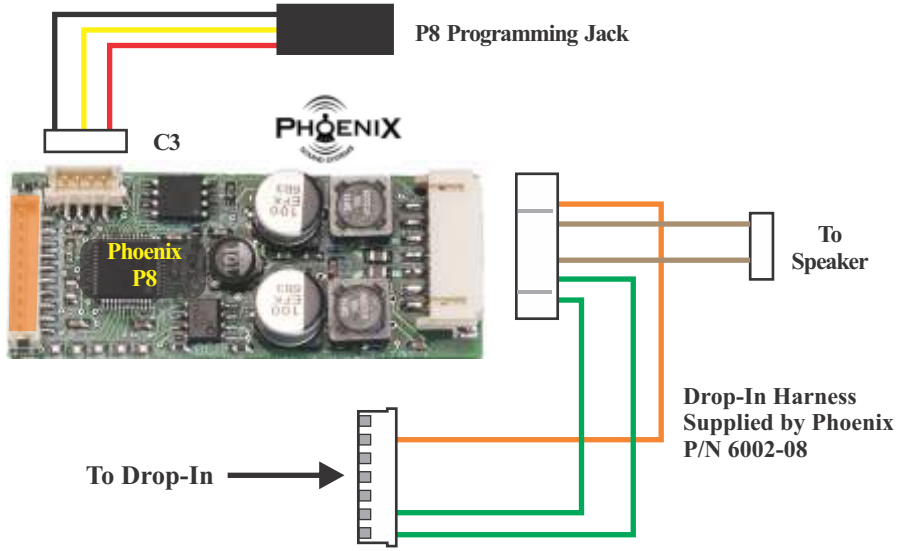
In this installation guide, the TSU-4400 from Soundtraxx will be installed.



Sound Considerations - Phoenix P8

The Original Phoenix P8 Module is your other option. It comes with a harness and plugs in directly to the Drop-In. It will also need the Phoenix computer interface cable. All P8 setup must be done with computer interface cable and the Phoenix supplied software. Except for the loco address, the P8 ***cannot*** be programmed from the T6000 throttle.

For P8 module setup details, download the GP38 Drop-In Installation Guide from the AirWire DOC-Center on the CVP website. **www.cvpusa.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 Philips screwdriver with a shaft 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 Guide

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 when the locomotive is going forward, and red when going in reverse (rear markers work opposite of the front markers).

Smoke unit is toggled on and off with F10. Remember, F10 is the *Fxx key followed by the 0 key. Once turned on, the smoke generator has an automatic 3 minute timeout. The timeout value can be changed. See the Drop-In decoder's user guide for details.

For the USA-Trains, smoke generator, if the smoke fluid has run out, the locomotive's own smoke generator controller will turn off even if the F10 timeout has not run out. However, it is best not to depend on the factory installed locomotive smoke controller circuit to shut off - they are not 100% reliable.

Function Key Assignments table below lists all of the pre-assigned Drop-In function key assignments. These can be changed at any time. The most common reason for a change is to allow a

Function Key	GP30 Drop-In Action
0	Toggle Headlights, Number Boards, Cab, Markers On/Off
1	-
2	-
3	Activate Rear Coupler Pulse
4	Activate Ditch Lights (ALT-2 and ALT-3)
5	Activate Cruise Control
6	Toggle ELITE1 (ALT-4) On/Off
7	-
8	-
9	Toggle ELITE2 (ALT-5) On/Off
*Fxx 0	Toggle Smoke Generator On/Off
*Fxx 1	-
*Fxx 2	-
*Fxx 3	Activate Front Coupler Pulse
*Fxx 4	-
*Fxx 5	Deactivate Cruise Control

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.

First Step - Setting Address and Frequency

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 T6000 throttle. If you have a different throttle, refer to your throttle's user guide.

If you changed the address to get the TSU-4400 to work, you can skip to the frequency change section.

Using the Hidden Menu of the T6000 Pro-Ops Wireless Controller

All programming commands are hidden on the T6000. Use this procedure to get to the hidden commands.

Press and release the green MENU key once. Second, push and hold the ENT key. The first page of the hidden menu will be shown. Push the menu key once more to bring up page 2 of the hidden menu. At any time press ESC to return to the home page. See the T6000 User Guide for additional details.

Step 1: Turn on the throttle.

- If you have not done so, set the throttle to frequency 0.
- Set the throttle to loco number 3.

Step 2: Turn Power on to the Drop-In Decoder

- Slide the switch towards the fuel tank to turn on the Drop-In decoder. The Drop-In's power green LED will glow brightly indicating power is connected.
- Verify the Drop-In's red GP LED is also on. If not, the throttle has not been set to the correct frequency. Do not proceed to step 3 until the red LED and green LED are both on.

Step 3: Change the Drop-In Decoder Address

- Select SERVICE PROGRAM mode on the throttle [menu page 2, number 4).
- Now push 1 followed by ENT which selects CV1 for changing the loco number.
- Enter the desired loco number. The range is 1 to 9999. The loco's cab number is always a good idea. Once you have entered the numbers, push ENT. [Loco number 0 is not allowed]. Press ESC to exit.

Step 4: Set the Throttle To The New Address And Verify That The Loco Runs

Step 5: Changing The Drop-In Decoder 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.
- 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. Set your throttle to the new frequency. Be sure to enter the new frequency on your throttle.

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 on) 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. There will be a series of 5 beeps at the end of the minute.

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

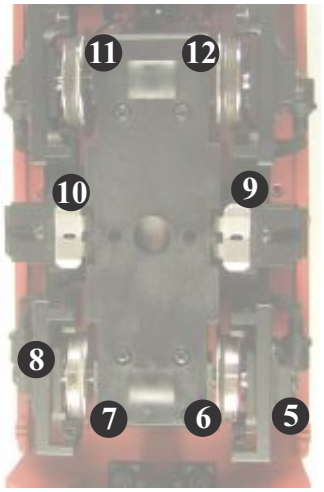
Step 5 - Use SERVICE PROGRAM to set CV200 to the desired frequency. The locomotive address does not matter when using SERVICE PROGRAM mode. Be sure and make a note of the new frequency. Set your throttle to the new frequency and test the locomotive.

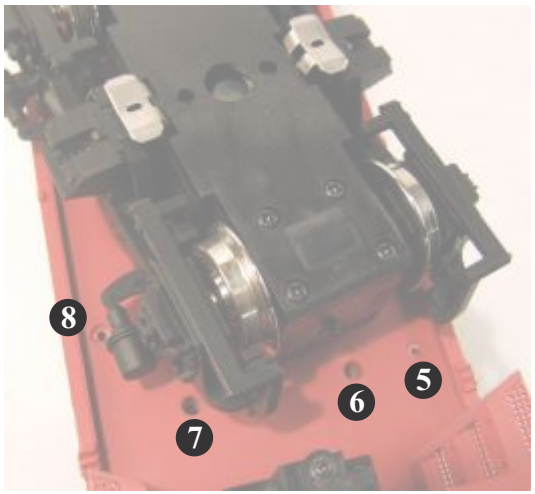
USA-Trains GP30 Disassembly

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. Instead, use the recommended screw driver with the long shank and gently work the screwdriver in between the wheel and the truck body.

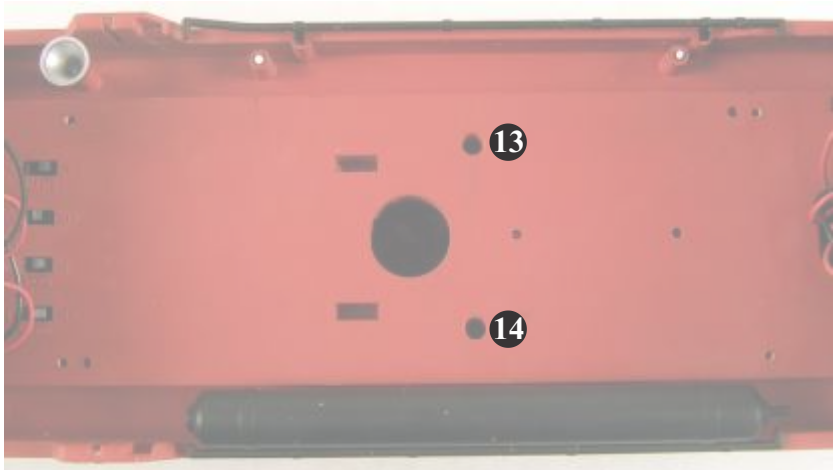
If a screw does not come out with the screwdriver's magnetic tip, give the screw several more turns to insure it has released from the upper shell. The screw is usually hung up in the burrs at the end of the tube. Just make sure it has released from the top shell. You can retrieve it once the top and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





Under Fuel Tank Mounting Screws - 2 Screws

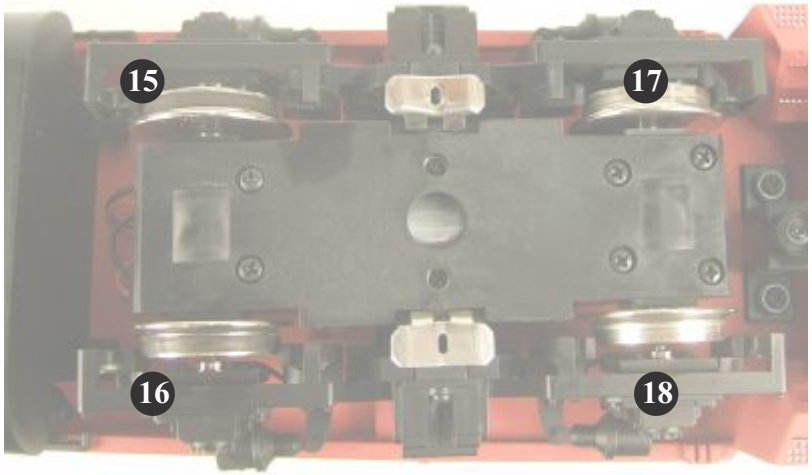
Remove the 2 screws that are visible once the fuel tank is removed. Place the screws into the foam block.



USA-Trains GP30 Disassembly

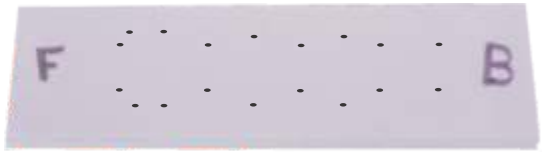
Rear Mounting Screws - 4 Screws

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.

Closing Up The Locomotive

Common Errors and Fixes

Green Power LED doesn't turn on: Always use a freshly charged battery. Make sure the Drop-In decoder power switch is on. Make sure the proper connector has been used. It is easy to confuse the battery connector for a motor connector.

Red GP LED only has a very slow flash rate: This is your indication that the throttle has turned itself off, or the Drop-In and throttle radio frequencies don't match.

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. 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.

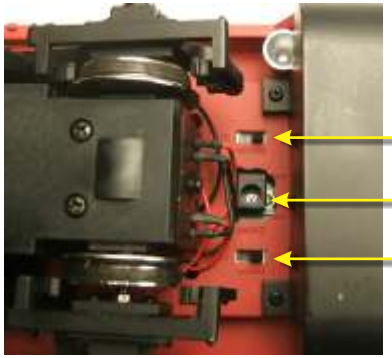
The two halves should seat themselves correctly when in the proper location and when no wires obstruct the mounting holes. Push down firmly to insure the shell is properly mated to the chassis. Once the two halves are together, turn the locomotive on its side or on its back. Insert a couple of screws 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. Then 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 rear of the loco to turn on the Drop-In decoder and the sound module. The switches must be off to charge the battery.

Drop-In Power Switch [shown ON]

Battery Charger Jack

Sound Module Power Switch [shown ON]

GP30 Preliminary Checkout *continued*

Smoke Unit Test

The smoke unit is turned on by pushing the * Fxx key followed by the 0 key. This 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 * Fxx and 0 (F10) again to turn off the smoke unit.

Check XDRIVE and TSU-4400

This is relatively simple. If the LED indicators mentioned before are all OK, then the TSU-4400 should be making engine sounds. If you hear nothing, press and release the throttle's 8 key. This key mutes and un-mutes the sound.

Press the throttle's 2 key to sound the horn. If the horn does not sound, but engine idle noises are present, the TSU-4400 may be not be on the original factory loco number of 3. This is not a problem and easily fixed by programming the loco number.

Changing the Loco Number (decoder address) on the GP30 Drop-In and TSU-4400

Follow this key sequence to change the locomotive number which is also called the decoder address. When the key sequence is completed, both the Drop-In decoder as well as the TSU-4400 will both have the same loco number.

On the T6000, push the following keys in the order presented. Always look at the screen to verify you have pressed the correct keys.

- Push the green MENU key once;
- Push and hold the green ENT key. Release the key when the menu page 1 appears;
- Push the green MENU key once again. Menu page 2 appears;
- Push the 4 key;
- Push the 1 key followed by the ENT key;
- Push the number keys for the desired loco number;
- Push the ENT key. The decoder will chirp indicating it received the command.
- Push the ESC key. The new loco number will be present on the screen.

Push the 2 key and verify the horn activates.

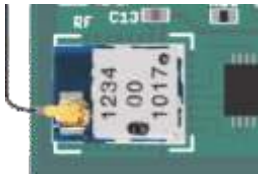
What About Fine Tuning?

All motion control settings, options and selections as well as changes to the frequency are made from the throttle. The attached TSU-4400 is also programmed using the T6000 throttle.

If not using the Whip Antenna Extension, bend the small whip antenna vertical for best reception. Also, orient and locate the wires to be as far away as possible from the antenna. Use small tie-wraps on the wires.

This concludes the preliminary checkout.

Optional Whip Extension Cable (WEC)



The inexpensive antenna extension cable makes it easy to relocate the small whip antenna away from the noisy locomotive motors and wiring. The extension cable is about 14 inches long and has matching pluggable connectors for the Drop-In radio module and the whip antenna.

To use the WEC, first unsnap the antenna's gold connector from the radio module by gently pulling up on the gold connector. Don't pull on the antenna wire. Be sure not to rip the radio module off the Drop-in board.

Next, snap the WEC connector onto the radio module.

Now snap the antenna onto to the other end of the WEC. Route the cable to the area you wish to mount the antenna. Excess cable can be coiled up. Use a small piece of the VHB tape to anchor the antenna to the chassis. For best reception, orient the antenna vertically.

USA-Trains GP30 Disassembly

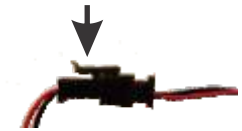
Remove The Two Voltage Regulators From The Lead Weights

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

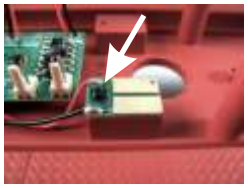
Remove the other screw holding the rear weight. Don't bother with the middle screw since it holds the rear truck and is not attached to the weight. Lift off the rear weight and discard it. This is the area where the battery will be mounted.

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. Save the screws. The board is no longer needed but the screws will be used later to mount the Drop-In decoder.

Improving The Locomotive Lighting 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.

Removing The Font Truck

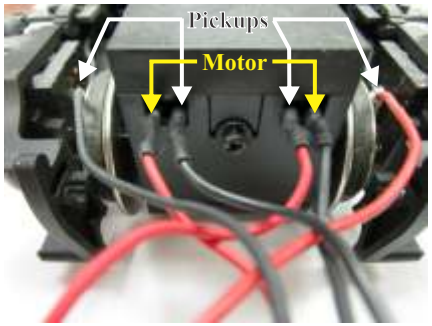
The front truck and the connecting wires are in the way of the work that needs to be done to enlarge the switch holes to accept the GP30 Drop-In decoder. Removing it is simple, plus you can remove the track pickup wires and plug that are no longer needed.

The truck is held with a single screw and washer. Remove the screw and save the washer. Gently pull the truck wire through the chassis hole and set the truck aside.

Remove Pickup Wires From Front and Rear Trucks

Remove the Front Truck Pickup Wires and Socket

The track pickup wires are no longer required and can be removed from the truck. The pickup wires are a set of 4 wires attached to a black socket. The motor wires are 2 wires connected to a black plug. Do not confuse the pickup wires with the motor wires.



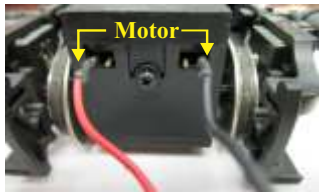
First pull the pickup wires from the pins on the truck case. Cut the other two wires from the side-frame pickups. The pickup wires can be discarded.

When done, there will only be the two motor wires connected to the outside pins of the motor case.

Don't reinstall the front truck yet.

Remove the Rear Truck Pickup Wires

Temporarily remove the rear truck mounting screw and washer. Notice the rear truck has the same set of connectors and wires for the motor and pickup wires.



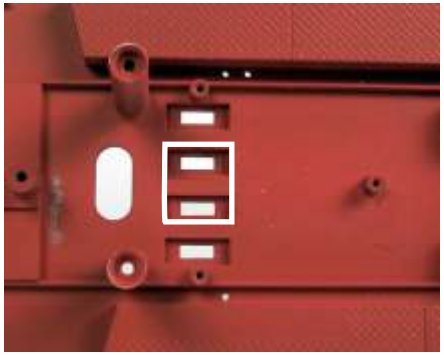
Remove the pickup wires from the rear truck as was done on the front. Reattach the rear truck when finished.

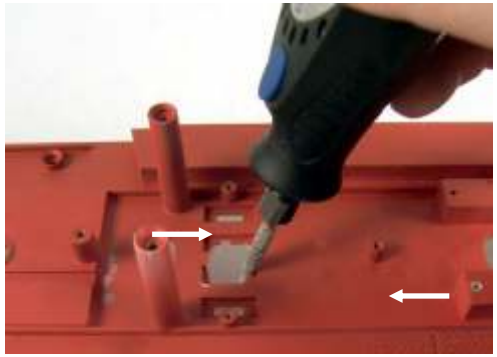
Enlarging Switch Holes

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.

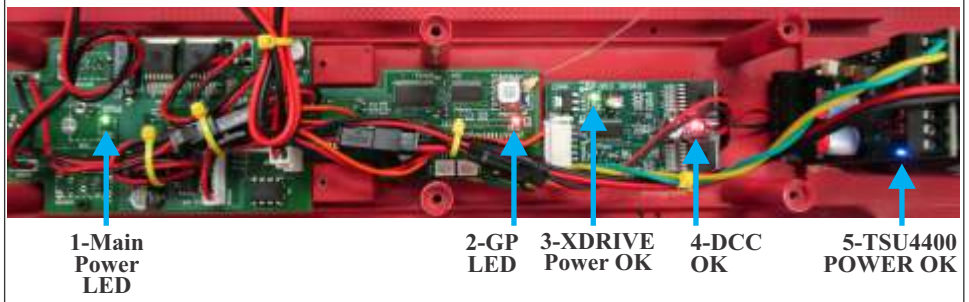
GP30 Preliminary Checkout

Preliminary Checkout

As delivered from the factory, the Drop-In decoder is set to locomotive address 3. The factory setting for the frequency is frequency 0. The factory settings will be assumed for the examples below. The T6000 throttle will be used for the examples.

1. First turn on the throttle. Set the loco number to 3 and set the frequency to 0. Verify these setting on the throttle display.

2. Turn on both power switches on the Drop-In. The ON position is when the slide switches towards the battery. Several indicators will turn on. Each one helps with diagnosing any problems.



LED Indicators and Their Meanings

1. When main power switch is turned on, the main-power green LED will turn. It means that battery power is present. However, it does not indicate if the battery voltage is too low for operation.

2. The red GP LED turns on when the Drop-In frequency matches the throttle frequency. It may appear to flicker a bit which is normal. It ***does not*** indicate if the loco number on the throttle matches the loco number set in the throttle.

3. When the SND power switch is turned on, the XDRIVE (if installed) green PWR LED will turn on. This means power is applied to the XDRIVE and the TSU-4400.

4. When the SND power switch is turned on, the XDRIVE (if installed) red GP LED will be on with the same conditions as the Drop-In GP LED (#2).

5. When the SND power switch is turned on the blue LED of the TSU-4400 will be on (if using the XDRIVE). However, it does not indicate if the battery voltage is too low for operation.

Motor Test

Slowly turn up the throttle until you see the motor attempt to move. Verify that both motors turn in the same direction. The wiring of the Drop-In establishes the motion direction. Assume you are in the cab. When the throttle is set for forward (right facing arrow on display) the locomotive will move forward relative to the locomotive cab. If the throttle is set for reverse (left facing arrow on display) the locomotive will move backwards relative to the locomotive cab. Set the throttle back to forward before the next test.

Lighting Test and Auto-Directional Validation

The GP30 has all of it's chassis lights connected together so they can only be turned on and off together. To turn on the locomotive lights, push the 0 key on the throttle. To turn the lights off, push the 0 key again. The number boards on the front and rear of the locomotive are all on whenever the headlights are on.

When the locomotive is moving in the forward direction, the front headlights are on, the front markers are green, the rear headlights are off, and the rear markers lights are red. When the locomotive is moving in the reverse direction, the rear headlights are on, the rear marker lights are green, the front headlights are off, and the front markers are red. There are no other lighting controls available unless you decide to rewire the locomotive's lighting circuitry or add some ALT lights.

Permanent Mounting *continued*

To help keep the rear motor wires away from the antenna, wrap one time around the battery wire.

Connect the speaker wires to the TSU-4400. First wrap them around the battery wire at least one time. If they are still too long, trim the wires and re-tin the ends. Attach the two wires to the SP- and SP+ terminals on top of the TSU-4400. Use small plastic tie-wraps to keep all the wires bundled neatly together. Small tie-wraps can be found at Home Depot or Lowes.

Connect the front motor to the Drop-In MF pigtail socket.

Connect the XDRIVE harness to the P8SND socket. The socket is polarized so the harness can only be plugged in when oriented correctly.

There is no need to plug in the smoke controller or lighting connections just yet. First thing to do is tidy up the wiring. Use the tie wraps to tidy up the wiring. Excess wires can be looped and placed in the tie wrapped bundle. The photo shows the final installation.

Cab **GP30 Drop-In** **XDRIVE** **TSU-4400**

Connect Lights and Smoke Unit

Plugging In The 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 shell connectors to their appropriate locations on the Drop-In decoder. Once everything checks OK, the locomotive will be ready for final reassembly

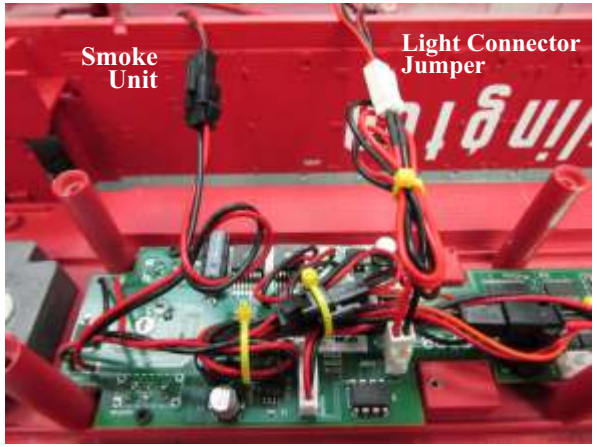
Bring the shell near the chassis and plug in the smoke generator. The smoke unit connector can be coiled up as shown since it is a bit long.

Included with the GP30 Drop-In was a 12 inch light jumper. Depending on the vintage of the GP30, the connector inside the shell may be very short.

If the jumper is too long, coil up and tie wrap the unneeded wire. Use the light jumper to connect the locomotive shell light connector to the Drop-In decoder's LAMP header. The GP30 has only one lighting connection that is shared by all the lamps on the locomotive.

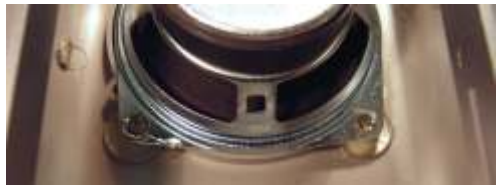
The jumper can also be omitted if it isn't needed.

Always arrange the wire bundles to fit in between the hollow mounting tubes.



Optional Speaker Mounting And Prep

In the next step, the fuel tank is fitted with the optional speaker for use with sound modules. If your locomotive will not be using a sound module, skip this step and proceed to the next section - battery mounting.



Optional Speaker Mounting

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.

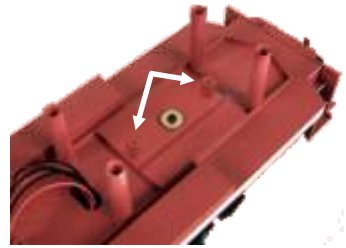
Speaker Wiring

Solder a pair of light duty wires to the speaker terminals. For this installation a pair of yellow and green wires were used.

Cut the wires to about 12 inches long. Strip back each end about 1/2 inch. Twist and tin each end. Solder one end of each wire to the speaker. Twist the two wires together for easier handling. Set aside the fuel tank for now.

Battery Mounting

The GP30 has sufficient space to hold the CVP BAT2 rechargeable battery. 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 tape.

The battery is mounted to the chassis using double-sided tape. Build up several layers to insure the battery clears the truck mounting screw. See the note below about the desired type of tape to use.

Orient the battery with the connector towards the locomotive's cab end, with the front of the battery even with the platform edge 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.

Double-Sided Tape: Do not use white foam tape. The foam deteriorates and separates from the adhesive. Instead, purchase either a roll or squares of 3M's VHB mounting tape. It's available from office supply stores, Home Depot and Amazon.

The tape is sometimes called Scotch-Mount Extreme Double-Sided Mounting Tape at the office supply stores.

The tape is super strong and tacky but relatively thin. Cut some strips the width of the battery and place on either side of the truck mounting screw. Add more layers to clear the screw.

Four layers of VHB tape were needed to clear the truck mounting screw head.

Clearing The Chassis Floor

To provide a flat surface for the XDRIVE board, 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.

Don't worry about the other nearby post since it will be under the Drop-In decoder board and is not used.

Test Fit Drop-In, XDRIVE and TSU-4400

Before permanently mounting the boards, it is best to lay them into their locations, check their fit as well as learn where things are a bit tight. There will be more than sufficient wire length so w recommend that excess wire be bundled up versus cutting the wire. With one exception for the XDRIVE, that is what is done for this installation.

First mount the Drop-In board. There are three small screw holes to which the board is mounted. The board must be flush to the mounting bosses. If not, the switches or the charging jack holes may need to be enlarged. Attach the center screw first and one at the cab end.

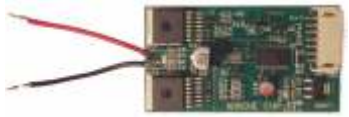
Second, place the XDRIVE on the chassis floor between the Drop-In and the battery. The white harness connector will be very close to the edge of the Drop-In. The other edge of the XDRIVE board will be close to the hole where the motor wires and speaker wires come through the floor. The edge of the XDRIVE board needs to be sanded smooth to avoid chaffing the wires.

Use a piece of fine grit sand paper and smooth the edge of the XDRIVE 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.

The TSU-4400 will be mounted vertically and stuck to the end of the battery with some VHB tape. Go ahead and place it there now so you can see how it fits. The end with the speaker terminals will be on top near the battery wires. The XDRIVE connections will be against the chassis floor.

For this installation, the XDRIVE connector was unsoldered and short pigtails were soldered back on.

Cut off about 2 inches of the red and black wires from the removed connector. Strip, tin and solder them onto the XDRIVE as shown in the picture.



The two wires will be attached to the TSU-4400 terminals.

Remove all the boards at this time.

Temporarily Mount The Fuel Tank

Place the fuel tank under the locomotive and push the speaker wires through the round hole in the chassis floor. Route the speaker wires towards the battery end of the locomotive.

At this time, use 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 reinstalled when the locomotive is closed up.

Permanent Mounting

First be sure the two motor plugs are pushed into the chassis thru their respective holes.

Mount the Drop-In Board First. The board must be flush to the mounting bosses. If not, the switches or the charging jack holes may need to be enlarged. Once the board is seated, use the three screws removed from the old board to mount the Drop-In. If the screw spins, fill the hole with some white glue and let it dry. Once dry, insert and rotate the screw to make some new threads. Don't worry about the connectors yet. Be sure the speaker wires exit towards the battery under the antenna, and opposite the side with the radio module's whip antenna.

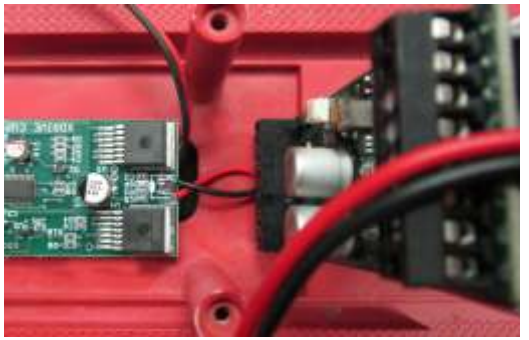
Mount the XDRIVE Board. First plug in the harness to the XDRIVE. Now apply two strips of VHB tape to the bottom of the XDRIVE. Place the XDRIVE board close to the Drop-In to allow the motor wires to move freely. Press down to fasten the board to the chassis floor.

Once the XDRIVE is mounted, move the harness wires towards the cab area. They will be plugged in a bit later.

Route the speaker wires towards the harness connector so they can come out on the bottom near the connector.

The exit hole for the motor wires is just under the right edge of the XDRIVE. This is more than enough room for the wires to move as the truck swivels during locomotive operation.

Mount the TSU-4400



Place two thickness of the VHB tape over the sharp pins of the terminal strip that has the SP+ and SP- terminals. The tape is required to hold the board to the battery as well as insure the sharp pins don't puncture the battery wrapper.

Before mounting the board, first connect the red and black wires from the XDRIVE to the two outside terminals on the bottom of the TSU-4400. The two terminals are labeled LR and RR.

Once the wires are connected, place the board against the battery and press. There is no physical stress on the board; the tape only holds it in place. Route the battery wires over the top of the TSU-4400.

Plug In Battery and the Rear Motor

Plug the Drop-In BATIN connector into the battery. The battery wires are stiff and can be used to hold other wires in place with yellow tie wraps. Yellow was used so they could be seen in the photos. Arrange the wires to favor the side of the locomotive opposite of the antenna. This helps keep them away from the antenna. A preview of the finished install is shown below for reference.