



User Guide

Version 1.0 for Android

Railworks Studio
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About this guide

This guide shows you how to set Vector up and run trains with it. It is written for model railroaders, not programmers. You don't need to know anything about how Vector works inside — only what each screen does and what to tap.

Read Part 1 first. It takes you from installing Vector to driving your first locomotive in about ten minutes. After that, dip into the parts you need:

- **Part 2 — Your Locomotives:** building your roster and setting up function keys
- **Part 3 — Driving:** the controls, the four throttle styles, momentum, brakes
- **Part 4 — Consists:** running two or more locomotives together
- **Part 5 — Settings Reference:** every setting, one line each
- **Part 6 — When Something Goes Wrong:** disconnects, and a troubleshooting table

Every screenshot in this guide comes from Vector 1.0 running on a phone. The locomotives you'll see — CRR 101, CRR 460 and the rest — belong to the Cedar River Railroad, a fictional railroad we use for examples. Your screen will show your locomotives, but the buttons and layout are the same.

A word about safety

Vector drives real locomotives. A model train can still damage itself, your rolling stock and your scenery, so a few habits are worth building from day one:

- **STOP** brings the locomotive you're driving to a stop. **E-STOP** is the emergency stop — use it when something is about to go wrong. Both are always on screen. Chapter 13 explains the difference.
- Vector has settings that stop your locomotive automatically if the app is interrupted, closed or the locomotive released. They're on by default. Leave them on until you know why you'd want them off (Chapter 25).
- If your Wi-Fi drops while a train is moving, Vector reconnects on its own, but **do not assume the train has stopped**. Chapter 26 explains exactly what happens and what to do.

Part 1

Getting Started

Chapter 1

What Vector Is

Vector turns your Android phone into a wireless throttle for a DCC model railroad. You pick a locomotive, and you drive it — speed, direction, horn, bell, lights and every other function its decoder supports — from a screen laid out like the controls in a real cab.

Vector isn't one throttle, it's four. You choose the style that suits what you're running:

- **Diesel** — a notched control stand with a dynamic brake, air brake and engine gauges
- **Switcher** — a lever throttle with an air brake, built for yard work
- **Steam** — a regulator and cutoff, with boiler pressure and speed dials
- **Slider** — a plain slider for simple, direct control, left- or right-handed



Figure 1.1 Diesel, Switcher and Steam. The Slider is the fourth style.

Whichever style you choose, the same locomotives, roster and settings are underneath. You can change style whenever you're stopped.

What you need

- An Android phone or tablet with Vector installed.
- A Wi-Fi network that your phone and your command station share.
- A command station that speaks the **WiThrottle** protocol. Vector connects over Wi-Fi to WiThrottle servers including **JMRI**, **DCC-EX** and **Digitrax LNWI**. Other DCC systems, including NCE, can connect through JMRI.

What Vector doesn't do

Vector is a throttle. It doesn't program decoders or change CVs, and it doesn't replace JMRI or your command station's own software — it talks to them. Decoder programming stays where it is today.

A few words you'll see throughout

Word	What it means here
Command station	The box that puts DCC signals on the track (or the computer running JMRI in front of it). Vector connects to it over Wi-Fi.
Address	The DCC number a locomotive answers to. Short addresses are 1–127; long addresses are 128–9999. Most modern locomotives use their road number as a long address.
Acquire	Take control of a locomotive: Vector asks the command station for it, and from then on your throttle is driving it. Release tells the command station you're finished with it.
Function (F-key)	A decoder function — headlight, bell, horn, and so on. Numbered F0 upwards.
Roster	Your list of locomotives, with their addresses and settings, kept on the phone.
Consist	Two or more locomotives driven together as one train.

A fuller glossary is at the back of the guide.

Chapter 2

First Launch

The first time you open Vector it shows a short **Welcome Tour** — six screens that introduce what Vector does. Tap **Continue** to step through, or **Skip** at the top right to go straight to the app.

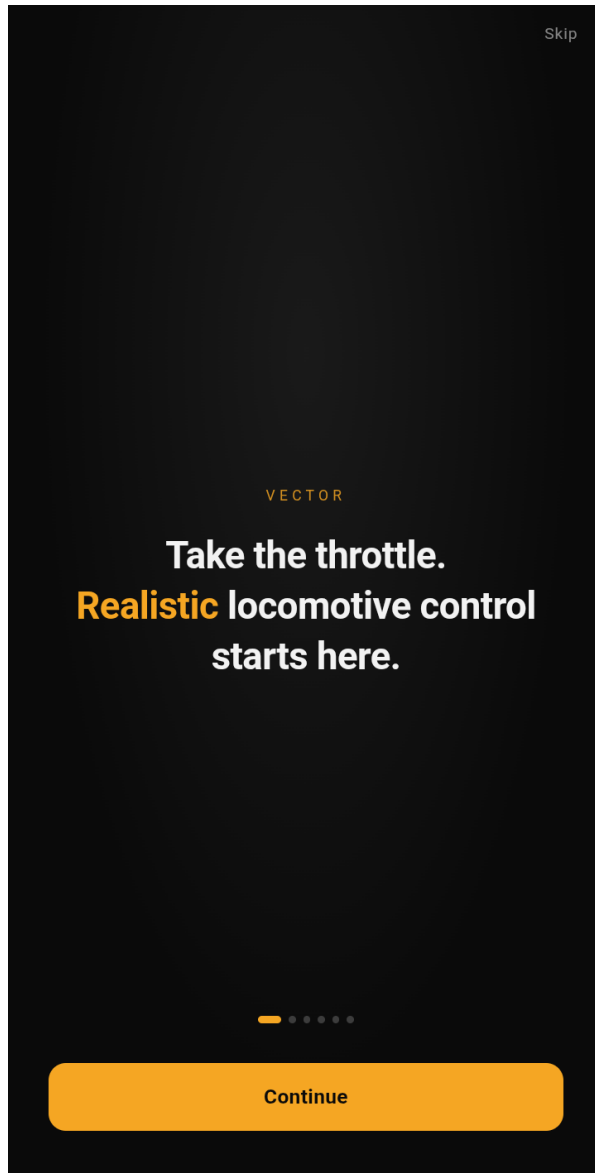


Figure 2.1 The Welcome Tour opens on first launch.

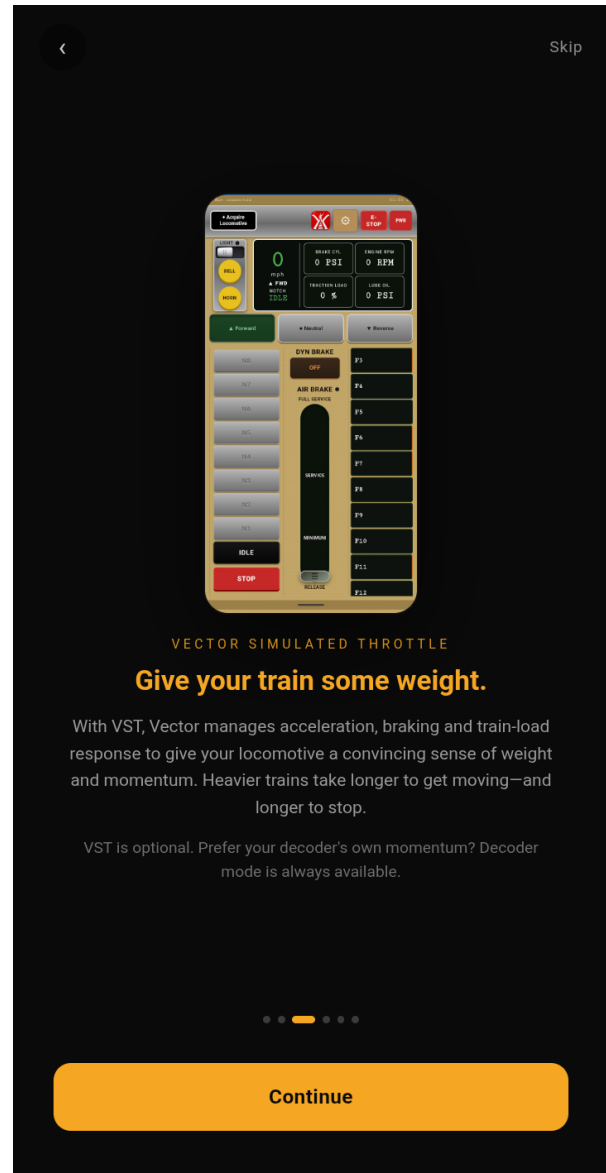


Figure 2.2 The tour introduces momentum and the throttle styles; nothing here needs answering.

The tour doesn't ask you for anything and doesn't change any settings. When it finishes, Vector opens the connection screen (Chapter 3).

You can watch the tour again any time: open **Setup**, scroll to the bottom, and tap **Welcome Tour** under **About**.

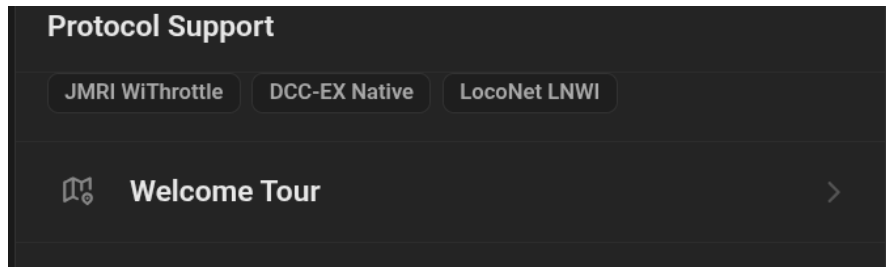
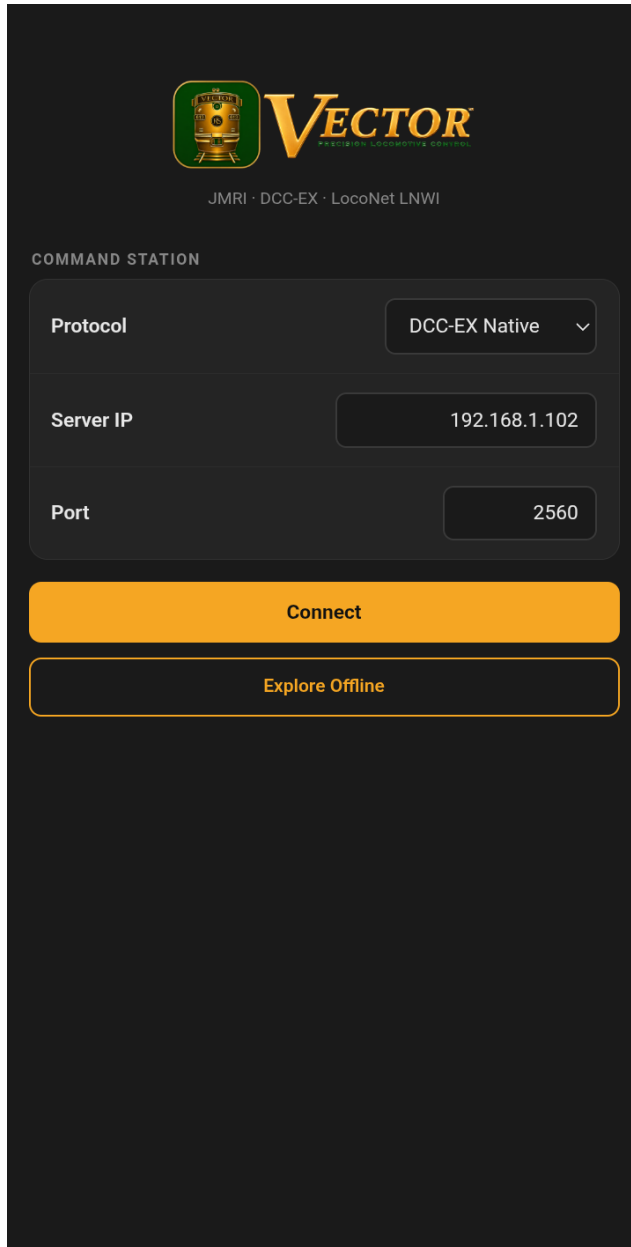


Figure 2.3 *Replay the tour from Setup → About.*

Chapter 3

Connecting to Your Layout

Vector connects to your command station over your Wi-Fi network. You set that up once on the **connection screen**; after that, Vector remembers it and reconnects on its own each time you open the app.



The screenshot shows the Vector app's connection screen. At the top, there is a logo featuring a gold locomotive icon and the word "VECTOR" in a stylized gold font. Below the logo, the text "JMRI · DCC-EX · LocoNet LNWI" is displayed. The main section is titled "COMMAND STATION" and contains three settings: "Protocol" set to "DCC-EX Native", "Server IP" set to "192.168.1.102", and "Port" set to "2560". At the bottom of the screen, there are two buttons: a gold "Connect" button and a white "Explore Offline" button with a gold border.

Figure 3.1 The connection screen. Three settings, then Connect.

Before you start

Make sure your phone is on the same Wi-Fi network as your command station. This is the single most common reason a connection fails, and it's worth checking first every time — phones like to wander back to your home network.

You'll also need the command station's **IP address**. Where to find it:

- **DCC-EX:** shown on the command station's display or serial monitor at start-up, or in the EX-Toolbox app.
- **JMRI:** in JMRI, open the **WiThrottle Server** window (from the Actions menu); the address and port are shown there. If JMRI runs on a computer that's also on Wi-Fi, use that computer's address.
- **Digitrax LNWI:** the LNWI creates its own Wi-Fi network; join it and use the address printed in its documentation.

Setting up the connection

1. **Protocol** — tap the dropdown and choose the kind of command station you have: **JMRI WiThrottle**, **DCC-EX Native** or **LocoNet LNWI**. ("DCC-EX Native" is the menu's name for a DCC-EX command station; Vector talks to it over WiThrottle like the others.) Vector fills in the usual port number for you.

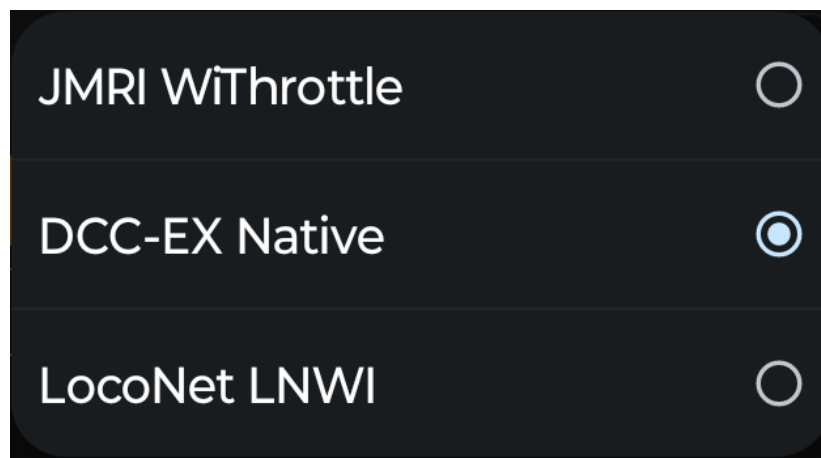


Figure 3.2 Pick the protocol first; the port follows.

2. **Server IP** — type the command station's address, for example 192.168.1.102.
3. **Port** — leave the number Vector filled in unless your setup uses a different one. The usual ports are **2560** for DCC-EX and **12090** for JMRI and the LNWI.
4. Tap **Connect**.

Vector connects and opens your throttle. The status bar across the very top turns green and reads **Connected**.

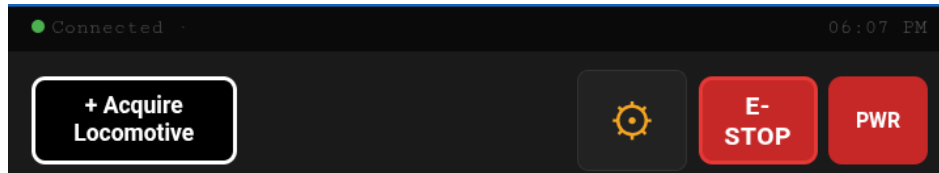


Figure 3.3 Green Connected at the top means you're talking to the command station.

If nothing happens

If Vector can't reach the command station, the connection screen simply stays where it is. There's no error message in this version — the screen not changing is the message. Check, in this order:

1. Is the phone on the layout's Wi-Fi network? (Pull down the phone's Quick Settings and look at the Wi-Fi name.)
2. Is the command station powered up and finished starting?
3. Is the IP address typed correctly, with dots in the right places?
4. Is the protocol right for the station? A JMRI server won't answer on the DCC-EX port.

Then tap **Connect** again. Chapter 27 has a longer troubleshooting list.

Auto-Connect

From the second launch on, Vector connects automatically to the last command station you used, and opens straight onto your throttle. If it can't connect — say you're away from the layout — it shows the connection screen instead, where you can fix the address or choose **Explore Offline**.

You can turn this off in **Setup** → **Command Station** → **Auto-Connect** if you'd rather Vector always start on the connection screen.

Chapter 4

Explore Offline

Explore Offline opens a throttle with no command station at all. Everything on screen works — you can acquire a locomotive from your roster, notch up, watch the gauges, apply the brake — but nothing goes to the track. It's the practice cab.

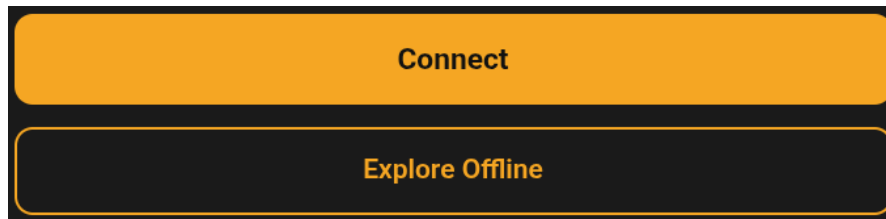


Figure 4.1 Explore Offline is under Connect.

Use it to:

- learn a throttle style before you run a real train,
- set up your roster and function keys somewhere comfortable, away from the layout, or
- show Vector to a friend on the kitchen table.

You can tell you're offline by the status bar at the top of the throttle: it reads **Not connected**, with a red dot.

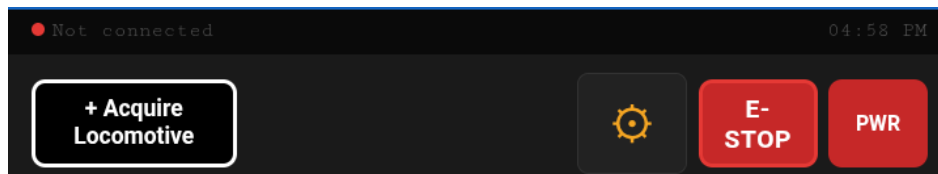


Figure 4.2 Red Not connected: you're in the practice cab.

Everything you set up while offline — locomotives, function labels, consists, settings — is saved exactly as it would be when connected. When you're ready to run for real, close Vector and open it again on the layout's Wi-Fi; with Auto-Connect on it will connect on its own, or land you on the connection screen if it can't.

One thing to know: a locomotive you acquired in Explore Offline was only ever acquired on the phone. The command station has never heard of it. When you do connect, Vector asks the station for it properly, so there's no need to release and re-acquire — but it means the first real command you send is the first the locomotive receives.

Chapter 5

Your First Run in Five Minutes

This chapter drives one locomotive from start to finish on the Diesel throttle, which is what Vector opens with. Everything here is covered again in more detail later; the point now is to get a train moving.

You'll need to be connected (Chapter 3). If you'd rather practise first, do exactly the same thing in Explore Offline.

Step 1 — Acquire a locomotive

Tap **+ Acquire Locomotive** at the top left of the throttle. The acquire panel drops down.

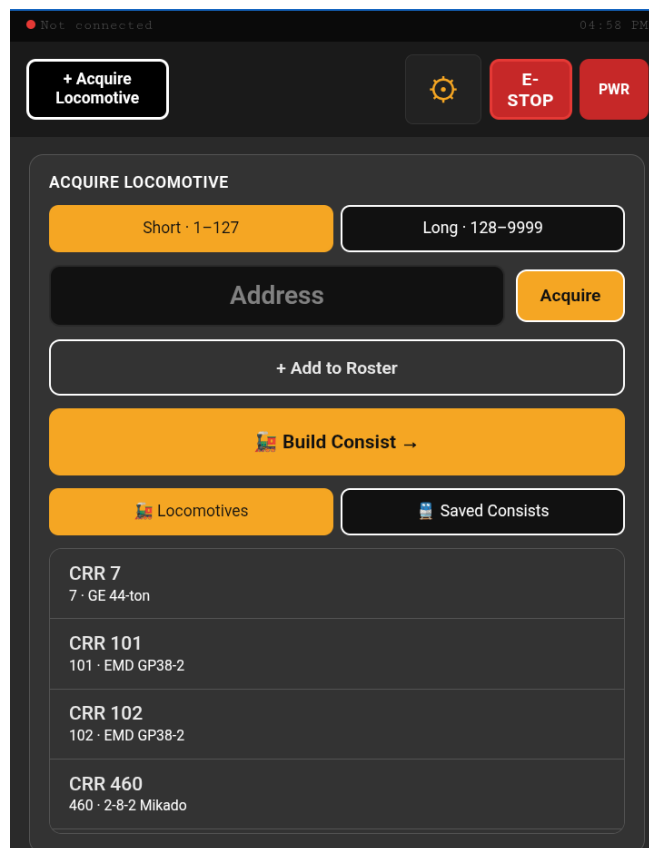


Figure 5.1 The acquire panel: type an address, or tap a locomotive from your roster.

There are two ways to pick a locomotive:

- **From your roster** — tap it in the **Locomotives** list at the bottom of the panel. (If your roster is empty, Chapter 6 shows you how to add locomotives. You can still type an address in the meantime.)
- **By address** — tap **Short** or **Long** to match how the locomotive is programmed, type the address, and tap **Acquire**.

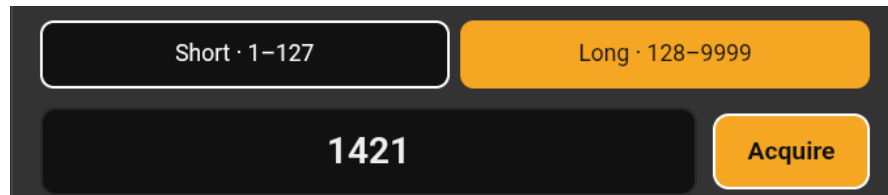


Figure 5.2 Typing an address: Short for 1–127, Long for 128 and up.

Either way, the panel closes and the locomotive's name appears in the top-left pill where **+ Acquire Locomotive** was. That pill is your **Current Assignment** — what you're driving. (If the locomotive has a Default Throttle saved in its setup, the screen may switch to that throttle style as it's acquired — Chapter 7.)

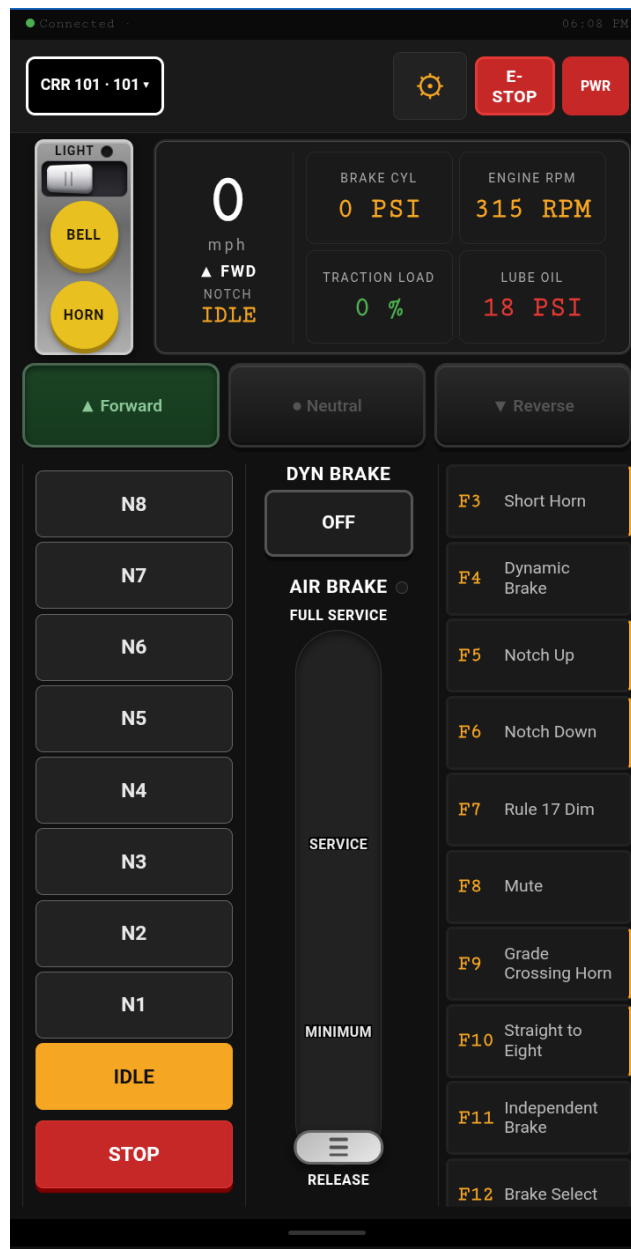


Figure 5.3 CRR 101 acquired. Its name is in the top-left pill, and its function keys have filled in on the right.

If the locomotive was already moving when you took it, Vector picks it up at the speed it's actually doing. It won't stop it or jerk it. If another throttle already has it, what happens next depends on your command station — Chapter 11 explains.

Step 2 — Set direction

The direction row sits under the gauges: **Forward**, **Neutral**, **Reverse**. Check the selected direction before moving — the row shows which one is lit. Tap **Reverse** if you need to back up.

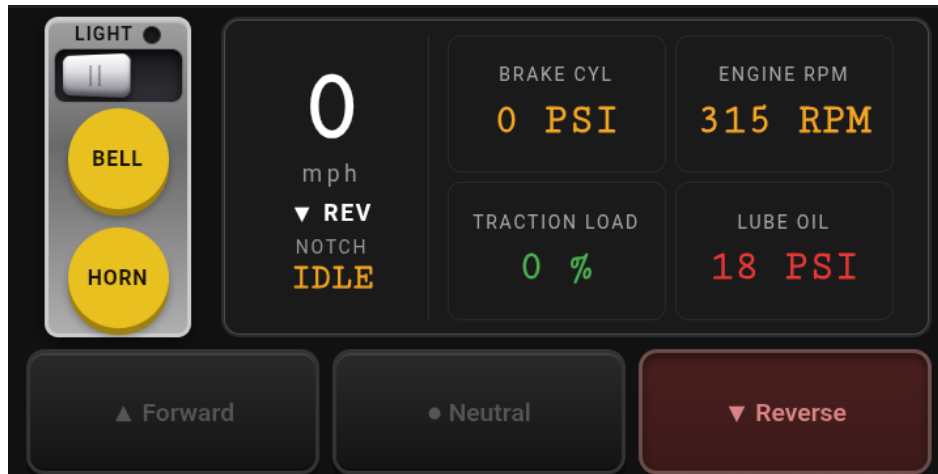


Figure 5.4 Reverse selected; the readout shows REV.

You can only change direction while the locomotive is stopped. If you try while it's moving, Vector tells you to stop first. (That's Direction Lock, Chapter 13, and you can turn it off.)

Step 3 — Notch up

The column of buttons on the left is the throttle: **IDLE** at the bottom, then **N1** up to **N8**. Tap **N2**.

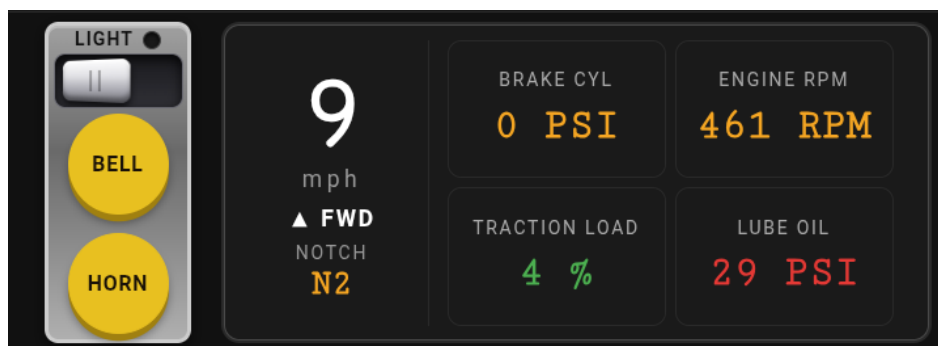


Figure 5.5 Notch 2: the readout climbs, the engine RPM rises with it.

The locomotive starts to move. Depending on your momentum setting the speed builds gradually, the way a real train would, or steps straight to the notch. The speed readout on the left of the gauge panel shows what it's doing. Tap a higher notch to go faster, a lower one to slow down; you can jump straight from N2 to N6 — you don't have to go one notch at a time.

Step 4 — Sound the horn

Press and hold **HORN** on the yellow panel at the left. **BELL** toggles on and off. **LIGHT** is the headlight switch above them. The other functions — the ones your decoder supports — are the numbered keys on the right, labelled with what they do once you've set the locomotive up (Chapter 8).

Step 5 — Stop

Tap **STOP**, the red button under IDLE. The throttle drops to IDLE and the locomotive comes to a stop.



Figure 5.6 STOP is always right there under IDLE.

If you ever need to stop *right now*, use **E-STOP** at the top right. It halts the locomotive immediately, with no momentum. Chapter 13 explains both.

Step 6 — Release

When you're done, give the locomotive back so another throttle can take it. Tap the name pill at the top left — the acquire panel opens with a **Current Assignment** card at the top — and tap **Release**.



Figure 5.7 Release hands the locomotive back to the command station.

Vector stops the locomotive before releasing it (that's the **Stop Locomotive on Release** setting, on by default). You don't need to release just to pick a different locomotive — tapping another one in the list does that for you, and asks first (Chapter 11). Do release a locomotive from any throttle you've finished with, though: on some command stations another throttle can take it while you still hold it (Chapter 11).

That's the whole loop: acquire, direction, notch, stop, release. Everything else in Vector is about making that loop feel more like the real thing.

Part 2

Your Locomotives

You can drive any locomotive by typing its address, but Vector is at its best when your locomotives are in its **roster**. A roster entry remembers the address, a name, what the locomotive is, how fast you'll let it go, how it should feel to drive, and — most usefully — what every function key does. Set it up once and every throttle style uses it.

This part covers the Roster Manager, Loco Setup, function keys, bringing a roster in from JMRI or DCC-EX, and keeping it all safe with backups.

Chapter 6

The Roster Manager

The Roster Manager is your list of locomotives. Open it from **Setup** → **Roster & Consists** → **Roster Manager**. (Setup is behind the gear button on any throttle, then **Full Settings**.)

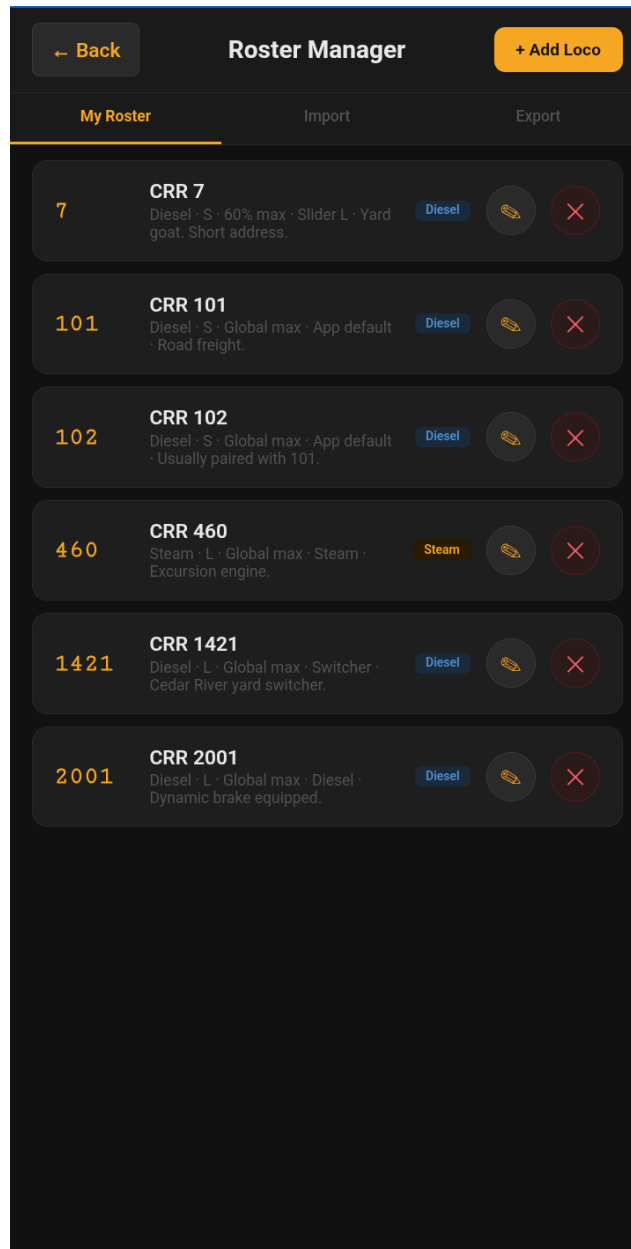


Figure 6.1 The Roster Manager. Each row is one locomotive.

Each row shows the address in large figures, the locomotive's name, and a line summarising its setup: type, short or long address, its speed cap, its Default Throttle (or "App default"), and your notes. The coloured badge on the right is its type — Diesel or Steam.

- **+ Add Loco** (top right) opens Loco Setup for a new locomotive — Chapter 7.
- The **pencil** button opens Loco Setup for that locomotive.
- The red **x** deletes it. Vector asks first.

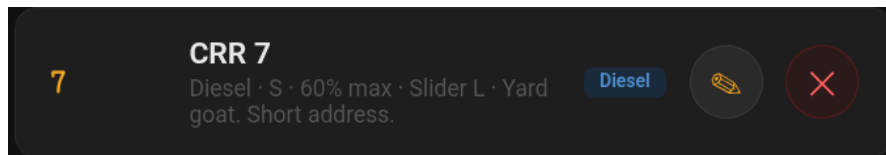


Figure 6.2 Pencil to edit, x to delete.

The tabs under the title — **My Roster, Import, Export** — are covered in Chapters 9 and 10.

A new roster is empty

Vector doesn't come with sample locomotives. A fresh install shows an empty list and a note to tap **+ Add Loco**. The locomotives in this guide's pictures are ours; yours will be your own from the first one you add.

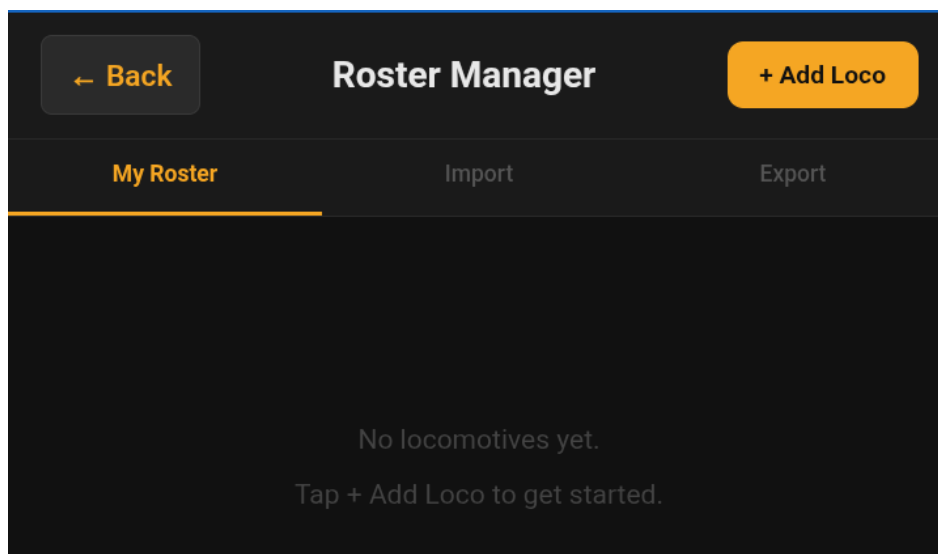


Figure 6.3 A new roster. Nothing here until you add something.

How the roster reaches the throttle

Everything you enter here shows up on the acquire panel's **Locomotives** list (Chapter 5), so acquiring becomes a single tap. Function labels appear on the throttle's keys the moment you acquire. Speed caps and momentum settings are applied automatically.

Chapter 7

Loco Setup

Loco Setup is where one locomotive's details live. It has two tabs: **General** (this chapter) and **F-Keys** (Chapter 8). **Save** is at the top right — nothing is kept until you tap it.

← Back Loco Setup — CRR 101 Save

General F-Keys

BASIC INFO

DCC Address: 101 Short (1–127) ▼

Road Number: CRR 101

Locomotive Type: EMD GP38-2

Notes: Road freight.

LOCO TYPE

Diesel Steam Electric DC

DEFAULT THROTTLE

App Default Diesel Notch Switcher

Steam Slider Left Slider Right

Function Buttons: All (32) ▼

Button Display: Labels + F-Key ▼

How many function buttons the throttle shows for this locomotive, and how each is labelled (F2 Horn, Horn, or F2). Display only — every function still exists and still works. Headlight, Bell and Horn have their own fixed tiles and are unaffected.

Dynamic Brake F-Key: 4

DECODER

Decoder: Tsunami 2 ▼

Decoder Profiles — Standard decoder profiles are provided to help you get started. Factory function assignments may vary between locomotives and decoder versions. Review and customize the assignments to match your locomotive.

Function Defaults: Load Default Function Assignments

Available: Tsunami 2

Figure 7.1 Loco Setup, General tab, for CRR 101.

Basic info

- **DCC Address** — the number the locomotive answers to, and beside it **Short (1–127)** or **Long (128+)**. Vector suggests Short for numbers up to 127 and Long above that, which is right for nearly

every locomotive. If yours was deliberately programmed the other way, change the dropdown.

- **Road Number** — the reporting marks and number as you want to see them on the throttle, for example CRR 101. This is the locomotive's name everywhere in Vector. Address and Road Number are the only two fields you must fill in.
- **Locomotive Type** — the model, for your own reference: EMD GP38-2, 2-8-2 Mikado. It shows under the name in lists.
- **Notes** — anything you like. Shows in the Roster Manager.

Loco Type

Diesel, Steam, Electric or **DC**. This tells Vector which decoder profiles fit the locomotive (steam profiles for steam, and so on) and which type badge to show.

Default Throttle

The throttle style this locomotive should be driven with. **App Default**, the pre-selected choice, means no preference: the locomotive opens on whichever throttle you're already using. Choose **Diesel Notch, Switcher, Steam, Slider Left** or **Slider Right** instead and Vector switches to that throttle automatically whenever you acquire this locomotive on its own — your steam engine brings up the Steam cab, your yard goat the Switcher. If it's already moving when you take it, the new throttle picks it up at the speed and direction the command station reports, with no lurch.

The choice applies to the locomotive by itself. Acquiring a consist never changes throttle style, whatever its members are set to. You can still change style by hand at any time (Chapter 12).

Function Buttons and Button Display

These two only change how the throttle *draws* the function keys, not what they do. **Function Buttons** is how many keys to show — all 32, or fewer if the locomotive doesn't have that many. **Button Display** is how each key is labelled: **Labels + F-Key** (F2 Horn), **Labels Only** (Horn) or **F-Key Only** (F2). Chapter 8 shows the difference.

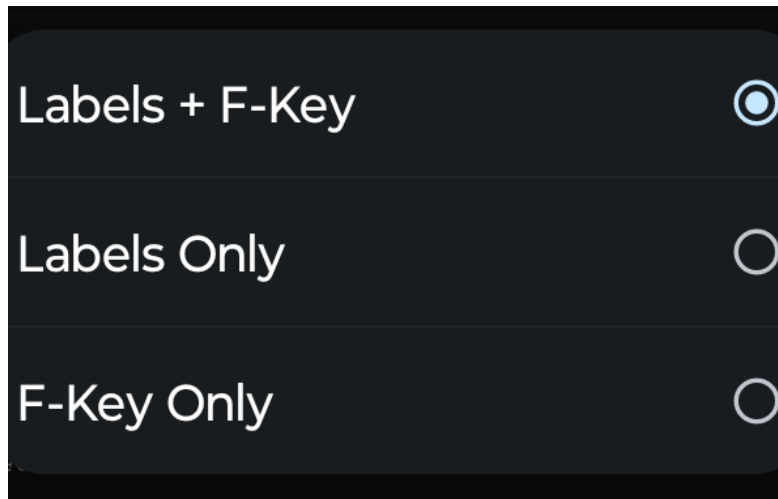


Figure 7.2 Button Display: how the keys are labelled on the throttle.

Dynamic Brake F-Key

Shown when the Default Throttle is App Default or Diesel Notch, because only the Diesel throttle uses it. It's the function number your decoder uses for dynamic brake sound — usually F4, which is the default. The Diesel throttle's DYN BRAKE control turns this function on for you when you apply dynamic braking (Chapter 17).

Decoder

Pick the sound decoder in the locomotive, then tap **Load Default Function Assignments** to fill the F-Keys tab with that decoder's factory function list. Chapter 8 covers this properly. If your decoder isn't listed, choose the closest, or **Other / Not listed**, and label the keys yourself.

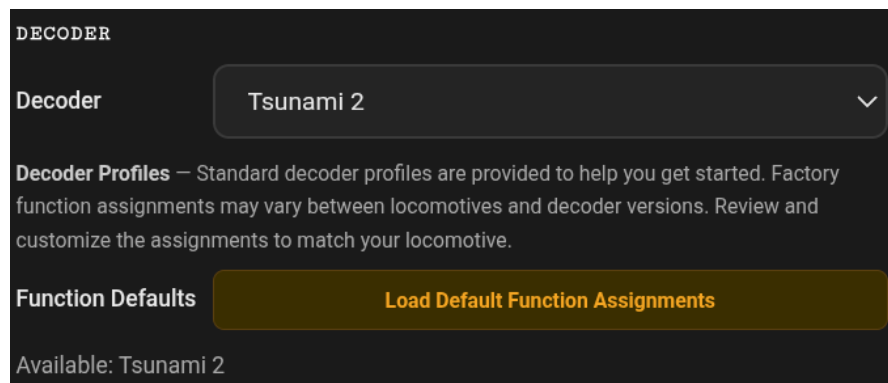


Figure 7.3 Choose the decoder, then load its function list.

Performance — Max Throttle

Some locomotives are simply too fast at full throttle. **Max Throttle** caps this one. **Use global setting** follows the cap in Setup (100% unless you've changed it); **Set for this loco** lets you type a percentage for this locomotive alone.

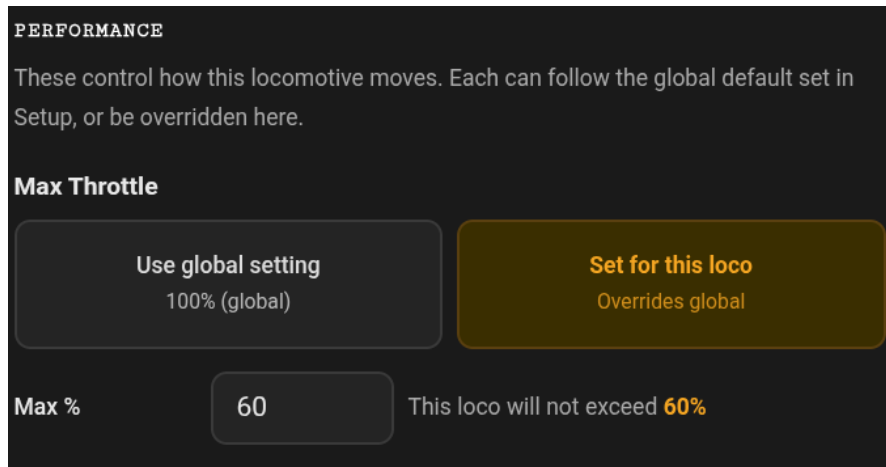


Figure 7.4 CRR 7, a 44-ton switcher, capped at 60%.

The cap works on every throttle style. On the Diesel throttle, N8 becomes 60% instead of 100% and the other notches scale down with it; on the Slider, the top of the slider is 60%. The lowest you can set is 15%, so a locomotive can never be capped into not moving.

Performance — Momentum

How the locomotive responds when you change the throttle: **Use Global** (follow Setup), **Decoder** (let the decoder's own momentum settings handle it) or **VST** (let Vector simulate it). Chapter 14 explains the choice; if you're not sure, leave it on Use Global.

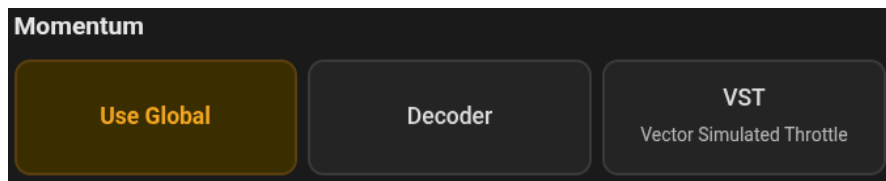


Figure 7.5 Momentum: Use Global, Decoder or VST.

Tap **Save** when you're done. Vector confirms, and takes you back to the Roster Manager.

Chapter 8

Function Keys

A decoder's functions — F0, F1, F2 and up — do whatever the manufacturer wired them to: headlight, bell, horn, coupler clank, engine start. The decoder knows; the throttle doesn't. Function key setup is how you tell Vector what each number means for this locomotive, so its keys read **Bell** and **Horn** instead of **F1** and **F2**.

For rostered locomotives, Vector uses the function assignments saved for that locomotive. A key you haven't labelled shows only its number.

The F-Keys tab

Open the locomotive in Loco Setup and tap **F-Keys**. There's one row per function, F0 to F31, with three controls on each:

← Back Loco Setup — CRR 101 Save

General **F-Keys**

F-KEY ASSIGNMENTS · F0-F31 Reset

Choose a standard F-Key function label from the list, or create your own custom label.

Action determines how the function button behaves. **Momentary** stays active only while the button is pressed. **Latching** turns on with one press and off with the next.

Participates in VCP Consists — If **Yes**, this function can be included when creating VCP mappings for saved VCP consists. If No, Vector ignores this function during VCP mapping.

Headlight Control — Headlight is a special case and uses its own setting instead. **Automatic** lets Vector manage headlights for you, using consist order, each locomotive's facing, and the direction of travel; Headlight is not offered in the VCP editor. **Manual** turns that off, and Headlight becomes available for VCP mapping like any other function.

	Function Label	Action	Consist
F0	Headlight	LAT	AUTO
F1	Bell	LAT	YES
F2	Horn	MOM	YES
F3	Short Horn	MOM	YES
F4	Dynamic Brake	LAT	YES
F5	Notch Up	MOM	YES
F6	Notch Down	MOM	YES
F7	Rule 17 Dim	LAT	YES
F8	Mute	LAT	YES
F9	Grade Crossing Horn	MOM	YES

Figure 8.1 The F-Keys tab for CRR 101, filled in from its Tsunami 2 profile.

- **Function Label** — a dropdown of standard labels in groups: Lights; Horns, Whistles and Bell; Brake and Motion; Engine and Mechanical; Steam; Crew and Miscellaneous; and plain Auxiliary and Sound Slot numbers. Pick the one that matches, or choose **Create Custom Label...** at the top of the list and type your own.

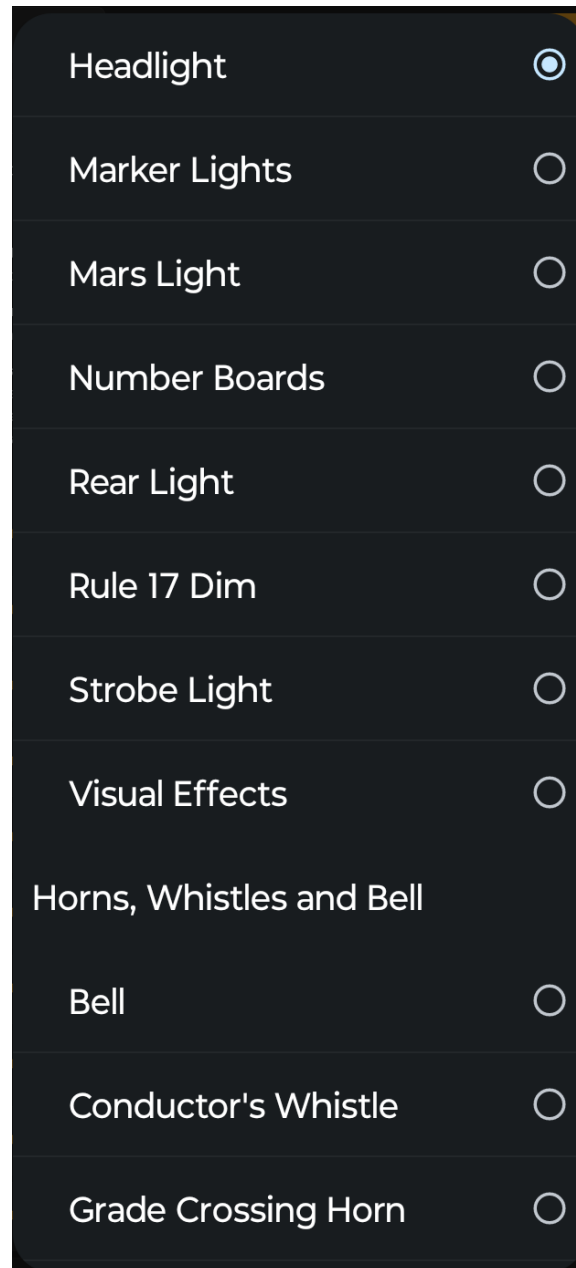


Figure 8.2 Labels are grouped; scroll to find the one you want.

- **Action** — **LAT** (latching) or **MOM** (momentary). A latching function turns on with one tap and off with the next: headlight, bell, mute. A momentary function is on only while your finger is on the key: horn, whistle, coupler. Tap the badge to switch. On the throttle, momentary keys are drawn with an accent bar down their right edge (a dashed border on the Steam throttle) so you can tell them apart.
- **Consist** — **YES** or **NO**: whether this function can be mapped across a consist. Leave it at YES unless Chapter 24 gives you a reason not to.

The **Headlight** row is special. Instead of a Consist switch it has **AUTO / MANUAL** — Headlight Control. On **AUTO** Vector manages the headlights of a consist for you, based on which way each unit faces and the direction of travel. **MANUAL** turns that off. For a single locomotive it makes no difference. Chapter

24 has the details.

Loading a decoder's function list

The quickest way to fill the tab: on the General tab, pick the **Decoder** and tap **Load Default Function Assignments**. Vector fills every row from that decoder's factory function list — labels and latching/momentary — and jumps to the F-Keys tab so you can see what it did.

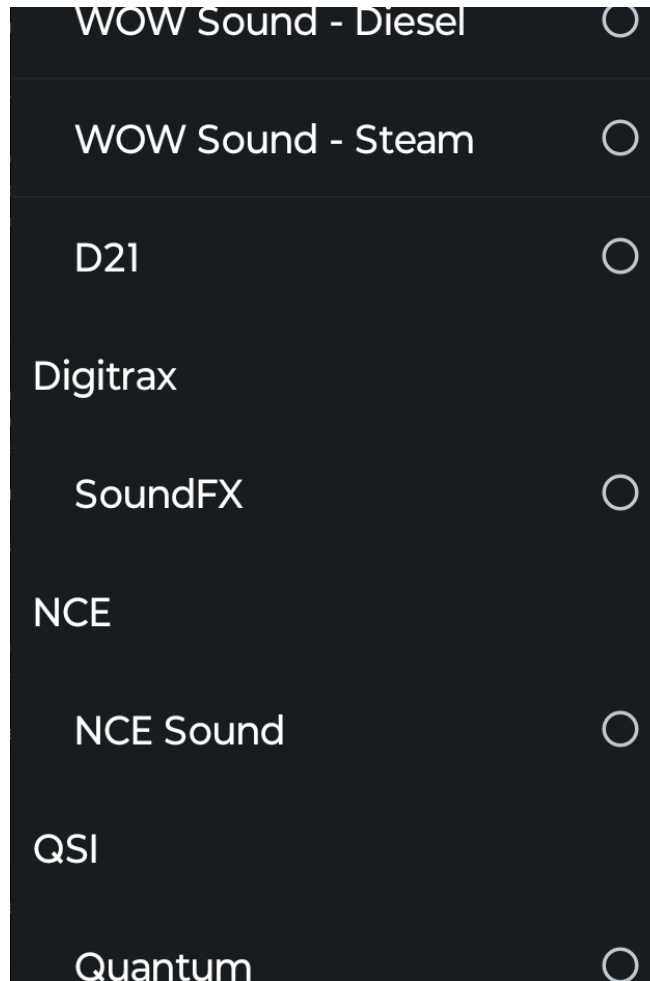


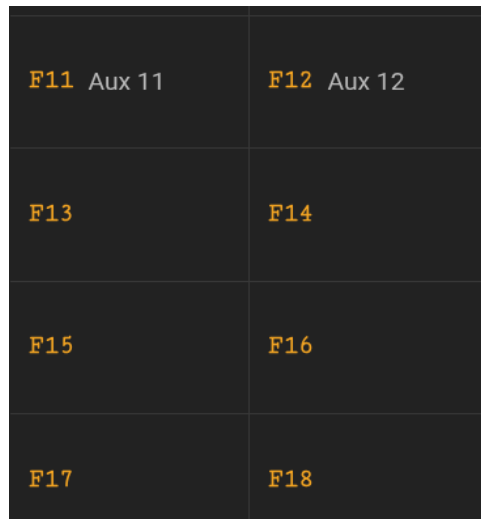
Figure 8.3 Decoders are listed by manufacturer.

Two things to know:

- It **replaces** the whole table. Anything you'd labelled by hand is overwritten, so load the profile first and adjust afterwards.
- Factory assignments vary between locomotive models and decoder versions. Treat the profile as a head start, check it against your locomotive, and fix any key that doesn't match. **Reset** (top right of the tab) clears the table if you'd rather start again.

Keys you don't label

Leave a key blank and the throttle shows just its number — **F13**, **F14**. It still works: tap it and the decoder's F13 turns on. The label is for you, not the decoder.



F11 Aux 11	F12 Aux 12
F13	F14
F15	F16
F17	F18

Figure 8.4 Labelled keys read as words; unlabelled ones keep their number.

How the keys look on the throttle

Button Display (Chapter 7) decides what a labelled key shows. Here's the same locomotive both ways:

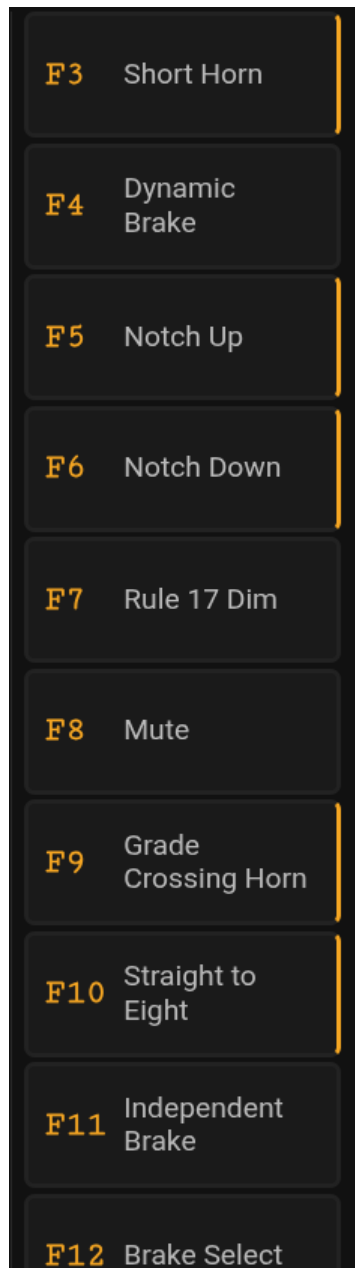


Figure 8.5 Labels + F-Key.

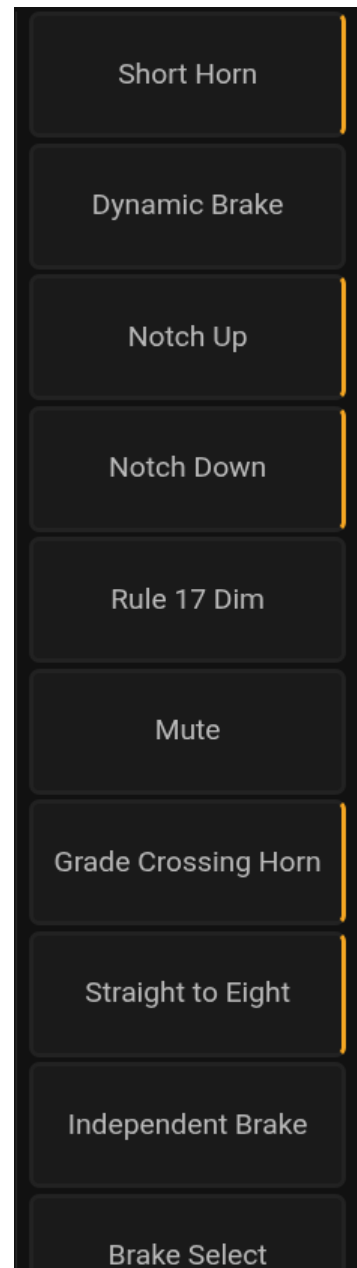


Figure 8.6 Labels Only.

Headlight, Bell and Horn always have their own dedicated controls on the Diesel, Switcher and Steam throttles — the LIGHT switch and the BELL and HORN buttons — whatever you set here. On the Slider they're the three wide buttons across the top.

F-Key Defaults — for locomotives that aren't in your roster

When you acquire a locomotive by typing its address, Vector has no saved function keys for it. **F-Key Defaults** are the labels it uses instead. Set them once at **Setup → Global Defaults → F-Key Defaults**; if most of your fleet uses the same sound decoder, put its common functions here and every un-rostered locomotive gets sensible keys.

← Back

F-Key Defaults

Save

WHAT THESE DO

These labels apply to any locomotive acquired without its own saved F-key settings. A locomotive configured in Loco Setup uses its own settings and will override these, key by key.

MOMENTARY VS LATCHING

MOM **Momentary** – the function is on only while the key is pressed, and releases by itself. Use it for a horn or a whistle.

LAT **Latching** – the function stays on until the key is pressed again. Use it for a headlight, a bell or mute.

On the throttle, a momentary key is drawn with an accent bar down its right-hand edge – on the steam throttle, with a dashed border. A latching key keeps the ordinary border.

DEFAULTS BY F-KEY

F0	Select or Create Function Label	LAT
F1	Select or Create Function Label	LAT
F2	Select or Create Function Label	MOM
F3	Select or Create Function Label	MOM
F4	Select or Create Function Label	LAT
F5	Select or Create Function Label	LAT
F6	Select or Create Function Label	MOM
F7	Select or Create Function Label	MOM
F8	Select or Create Function Label	LAT

Figure 8.7 F-Key Defaults: the fallback labels for locomotives with no saved setup of their own.

A locomotive that *is* in your roster ignores these and uses its own settings, key by key.

Chapter 9

Bringing Your Roster In from JMRI or DCC-EX

If your locomotives are already in JMRI, or defined on a DCC-EX command station, you don't have to type them again. Vector can read them in.

Open the Roster Manager and tap the **Import** tab.

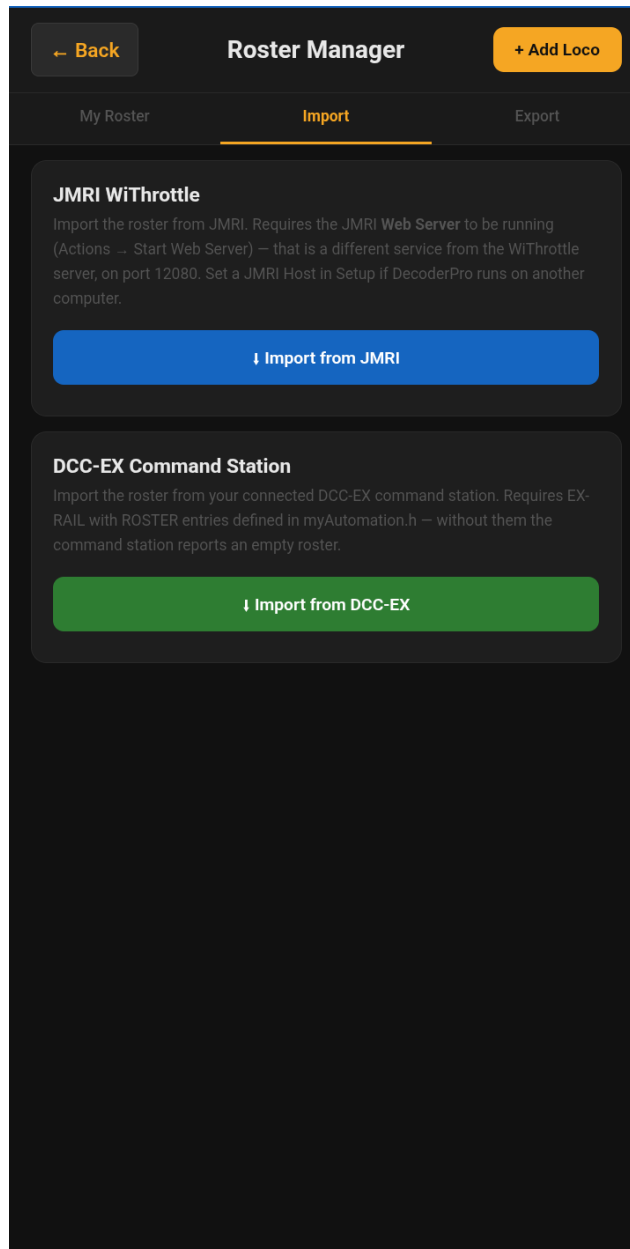


Figure 9.1 The Import tab: one button for JMRI, one for DCC-EX.

An import is a copy, not a link. Once a locomotive is in Vector's roster, Vector owns it: you can rename it, relabel its keys or cap its speed, and nothing changes it back unless you run another import.

From JMRI

Vector reads the JMRI roster through the **JMRI Web Server**. That is a separate service from the WiThrottle server you drive through, and it may even be on a different computer — rosters usually live where DecoderPro runs. In JMRI, start it from **Actions** → **Start Web Server**; it answers on port

12080. Then tap **Import from JMRI**.

For each locomotive, JMRI supplies its address and whether it is short or long, its name (the JMRI entry ID), road name and number, model, decoder, comment, maximum speed and every function label — including which are momentary. Vector takes all of it: the comment becomes the Notes, a maximum speed below 100% becomes a per-locomotive Max Throttle cap, and the function labels are copied exactly as JMRI has them.

If DecoderPro runs on a different computer from the one Vector connects to, type that computer's address into **JMRI Host** in **Setup** → **Roster & Consists** → **Roster Sync** (you can add a port after a colon, 192.168.1.20:12080, if it isn't the standard one). Left blank, Vector uses the address of the command station it is connected to.

From DCC-EX

Tap **Import from DCC-EX**. Vector asks the connected command station for its roster over a separate connection of its own; you don't have to do anything special.

A DCC-EX roster holds just three things per locomotive: its number, a name, and its function labels (with momentary marked). There is no road name, model, decoder, note or speed cap in DCC-EX, so those fields stay blank — or, on a locomotive you already have, stay exactly as they were. Vector treats numbers 1–127 as short addresses and higher numbers as long.

A DCC-EX command station only has a roster if **ROSTER** entries were defined in its `myAutomation.h` file when it was set up. If none were, Vector tells you the station reported an empty roster, and nothing changes.

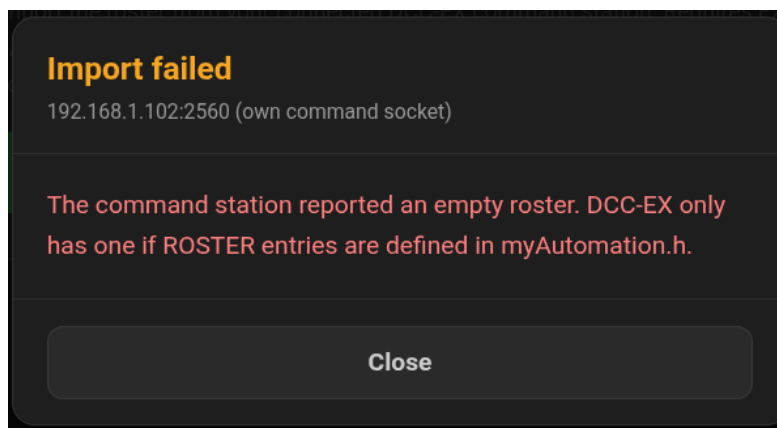


Figure 9.2 A DCC-EX station with no ROSTER entries. Nothing is changed.

What you'll see

The import runs in four short steps, and only one of them can ask you anything:

1. **Contacting** the server.
2. **Preview** — how many locomotives were found, how many are new, how many already exist in your roster, and anything that will be removed. Nothing has been written yet; **Cancel** here leaves your roster untouched.
3. **Duplicates** — only if Duplicate Locomotives is set to Ask *and* some were found (below).
4. **Summary** — what was added, updated and skipped.

What happens to locomotives you already have

Vector matches locomotives by address and address type. Three settings in **Setup** → **Roster & Consists** → **Roster Sync** decide what happens when the source and your roster overlap:

Build, edit and acquire consists

ROSTER SYNC

Source
Where the roster is read from

JMRI

JMRI Host
Leave blank to use the connected server.
Set this only if DecoderPro runs on a
different computer.

Auto

Auto Sync
Pull the roster from the command station on connect

Merge With Existing
Combine with the roster already on this device instead of replacing it

Duplicate Locomotives
When a synced locomotive already exists. Automatic syncs never ask — they skip.

Ask

Figure 9.3 Roster Sync settings.

- **Merge With Existing** (on by default). On, locomotives that exist only in Vector are kept and the import adds the new ones. Off, the source is the master copy: locomotives that aren't in the source

are removed from your roster. The preview warns you how many before you confirm.

- **Duplicate Locomotives** — what to do with a locomotive that's in both places. **Ask** (the default) shows you each one and lets you choose, or **Replace all** / **Skip all** in one go. **Replace** takes the source's details. **Skip** leaves yours completely alone.
- **Auto Sync** (off by default) — run the import automatically every time Vector connects, from whichever source **Source** is set to, JMRI or DCC-EX. An automatic import never stops to ask: if Duplicate Locomotives is Ask, it skips duplicates instead. It also won't run while you have a locomotive acquired. Most people leave this off and import by hand when something changes.

What Replace does — and doesn't — overwrite. Replace changes only the details the source actually supplies. A DCC-EX import has no road name, so replacing from DCC-EX won't blank a road name JMRI gave you or you typed. Function keys work the same way, key by key: a key the source knows gets the source's label and momentary setting; a key the source doesn't mention is left as it was.

Some things are Vector's own and no import ever touches them: the locomotive's Loco Type, Default Throttle, Momentum setting, Dynamic Brake F-Key, Function Buttons and Button Display, and, on each function key, the Consist (VCP) setting and Headlight Control. The Max Throttle cap can be updated by a JMRI import (from JMRI's maximum speed); DCC-EX has no such field, so it never is.

One case Vector refuses: the same number as a short address on one side and a long address on the other — say a long 3 arriving when you already have a short 3. Vector reports it as a conflict and skips it rather than overwrite a locomotive you set up by hand.

Chapter 10

Backup, Restore, Import and Share

Everything Vector knows about your railroad — the roster, every function label, your consists and your settings — lives on the phone. A **backup** puts all of it in one file, named whatever you like, so you can get it back after a new phone or a wiped app, or hand it to another Vector user.

Backups are at the bottom of **Setup**, under **Backup & Restore**.

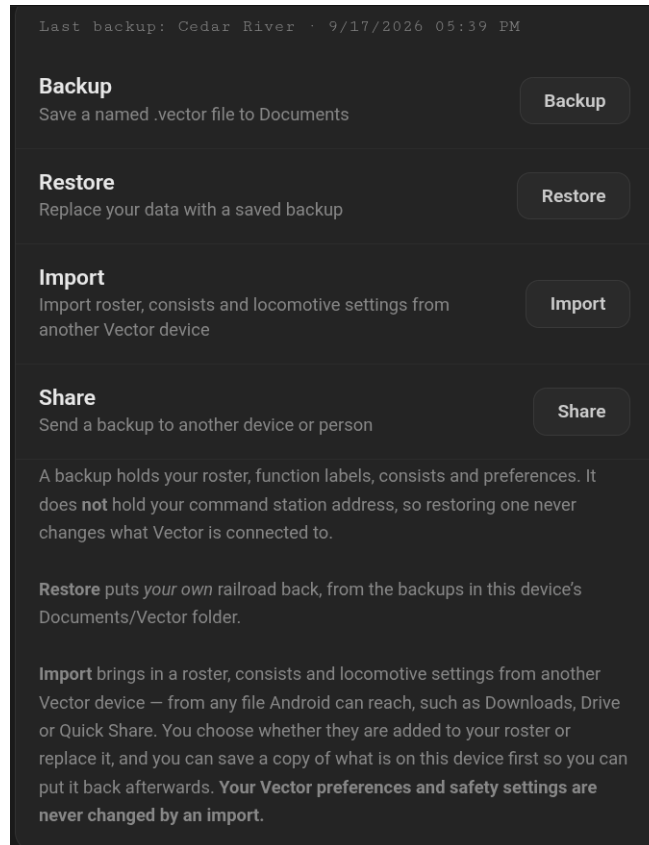


Figure 10.1 Backup, Restore, Import, Share.

Make a backup

Tap **Backup**. Give it a name — or leave the box blank and Vector names it with the date and time — and tap **Save Backup**. The file goes into the phone's **Documents/Vector** folder, and Setup shows when the last backup was made.

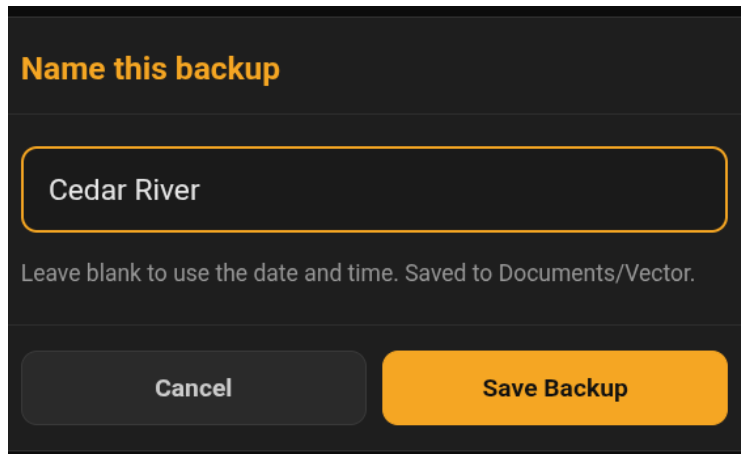


Figure 10.2 Name it, or let the date do it.

Make one whenever you've done a chunk of setup work — after labelling a new locomotive's keys, after building a consist — and always before you replace the phone or reinstall the app. Uninstalling Vector deletes everything it holds.

A backup contains your roster, function labels, consists and preferences. It does **not** contain your command station address, so restoring one never changes what Vector is connected to.

Restore

Restore puts *your own* railroad back on *this* phone, from the backups in its Documents/Vector folder. Tap it and Vector lists them, newest first, with the date and size. Tap one, read the confirmation — it tells you how many locomotives and consists are in the file — and tap **Restore**.

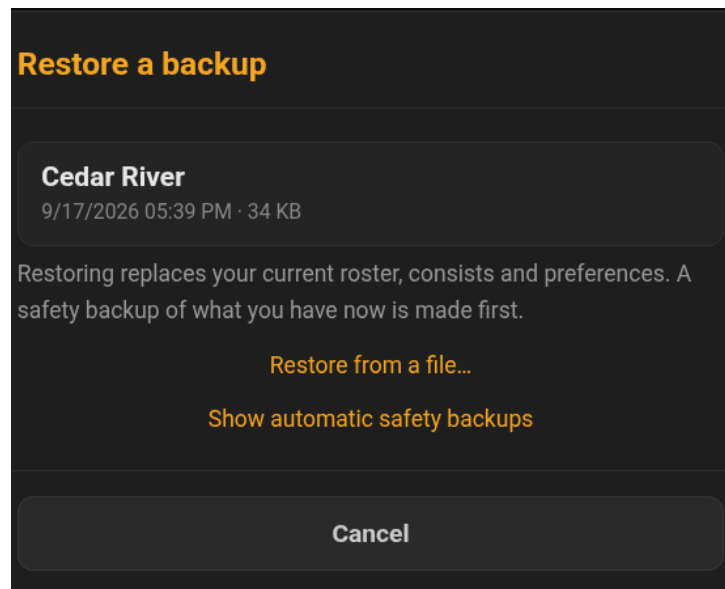


Figure 10.3 Your backups, ready to pick.

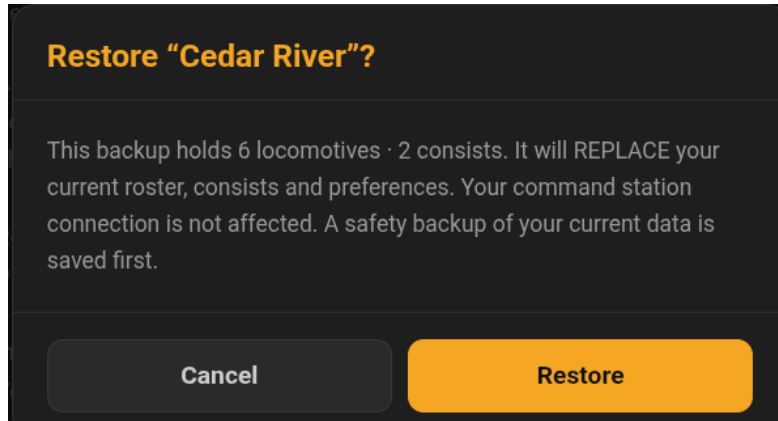


Figure 10.4 Restore replaces what's on the phone. A safety copy is made first.

A restore **replaces** everything — roster, consists and preferences. Before it does, Vector saves a safety backup of what you have now, so a wrong restore can be undone: tap **Show automatic safety backups** in the list. **Restore from a file...** lets you pick a backup from somewhere other than the Vector folder.

Release any locomotive you're driving before you restore. Vector won't restore while one is acquired, because the function keys on the throttle would no longer match the locomotive.

Import — a roster from someone else

Import brings locomotives and consists in from another Vector device — a club member's phone, or your own tablet — from any file Android can reach: Downloads, Google Drive, Quick Share, an email attachment. It opens the phone's file picker; find the `.vector` file and tap it.

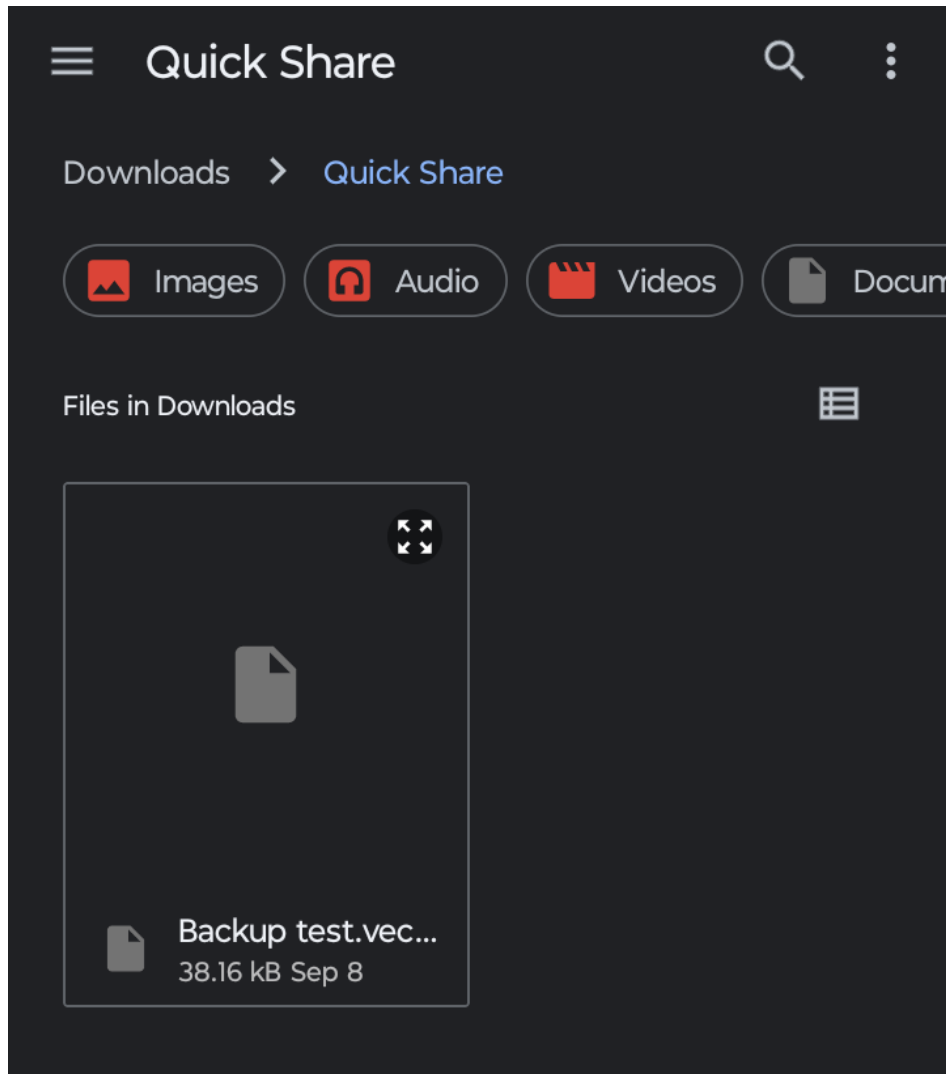


Figure 10.5 Import reads a .vector file from anywhere on the phone.

Import is different from Restore in two ways that matter:

- It brings in **locomotives and consists only**. Your preferences and safety settings are never changed by an import.
- You choose whether the imported locomotives are **added** to your roster or **replace** it, and you can save a copy of what's on the phone first so you can put it back afterwards.

If Vector says the file isn't a readable Vector backup, it wasn't made by Vector's Backup or Share — check you picked the right file.

Share — send your railroad to someone else

Share picks one of your backups and hands it to Android's share sheet, so you can send it by email, Drive, Quick Share or any other app. The person receiving it uses **Import** to bring it in.

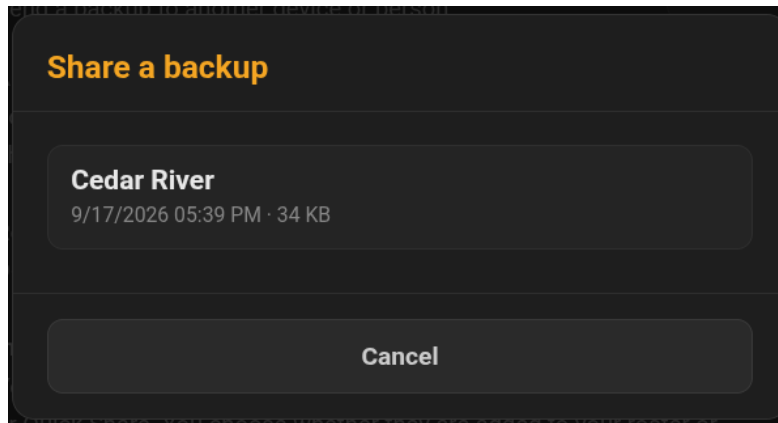


Figure 10.6 Pick a backup to share.

Export — just the roster, as JSON

The Roster Manager's **Export** tab writes the roster alone — no consists, no settings — as a plain JSON file. It's there if you want to look at your roster in a text editor or feed it to something else; for moving between Vector devices, use Backup and Share.

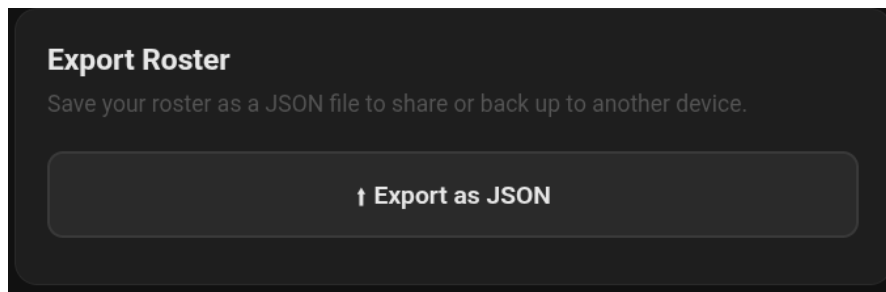


Figure 10.7 Export as JSON: the roster only.

Part 3

Driving

Part 1 got a train moving. This part is about driving it well: the panel you acquire from, the controls every throttle shares, the two ways of stopping, momentum and train load, the air brake, then each of the four throttle styles in turn, and finally the phone's volume keys as a throttle.

Chapter 11

Acquiring and Releasing

Every throttle style has the same acquire panel. Tap the pill at the top left — it reads **+ Acquire Locomotive** when you have nothing, or the name of what you're driving — and the panel drops down over the throttle.

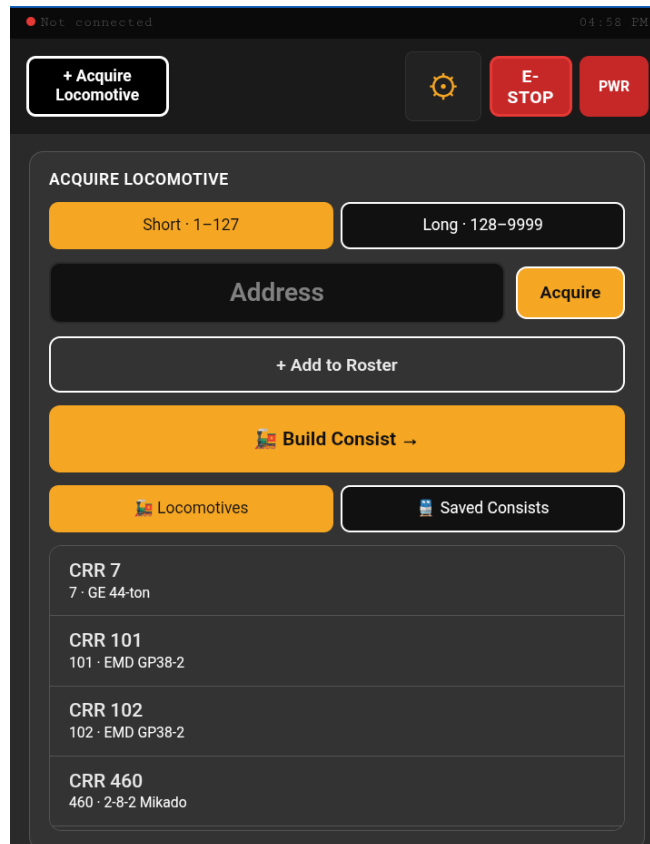


Figure 11.1 The acquire panel with the Locomotives tab showing.

From top to bottom:

- **Current Assignment** — appears once you're driving something: the locomotive's name, model and address, and the **Release** button.
- **Short · 1-127 / Long · 128-9999** — the address type for a typed address. Tap the one that matches how the locomotive is programmed.
- **Address** and **Acquire** — type a number, tap Acquire.
- **+ Add to Roster** — puts the typed address into your roster so it's a tap away next time. Vector asks for a name; you can fill in everything else in Loco Setup later (Chapter 7).
- **Build Consist →** — starts a consist with the roster (Chapter 22).
- **Locomotives / Saved Consists** — the two lists. Tap a row to acquire it.

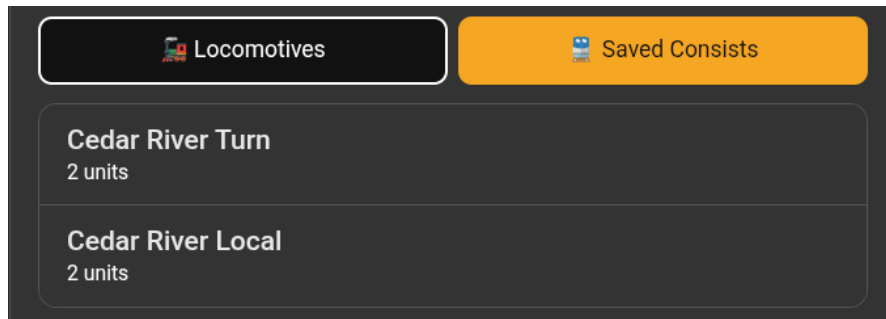


Figure 11.2 The Saved Consists tab: a whole consist in one tap.

Acquiring from the roster

Tap the locomotive in the **Locomotives** list. Vector asks the command station for it, closes the panel, puts the name in the pill and fills in the function keys from the locomotive's saved setup. Its speed cap and momentum setting come along too.

Acquiring by address

Tap **Short** or **Long**, type the address, tap **Acquire**. If the number doesn't fit the type — a long address must be 128 or above — Vector says so under the field and waits for you to fix it. A locomotive acquired by address uses the F-Key Defaults for its keys (Chapter 8) unless it happens to be in your roster, in which case its own setup is used.

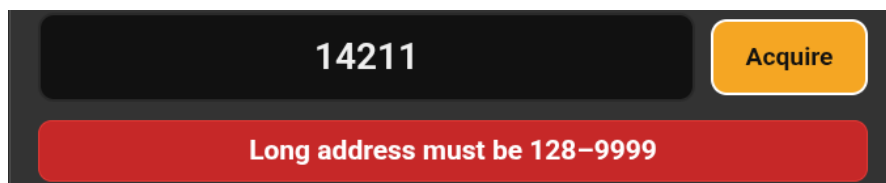


Figure 11.3 A long address has to be 128 or more.

Taking a locomotive that's already moving

If the locomotive is moving when you acquire it, Vector takes it over at the speed and direction the command station reports. It doesn't stop it, and it doesn't send anything until you touch a control. The readout comes up showing what the locomotive is actually doing.

Changing locomotives

You don't release to swap. Tap the next locomotive in the list and Vector asks what you want:

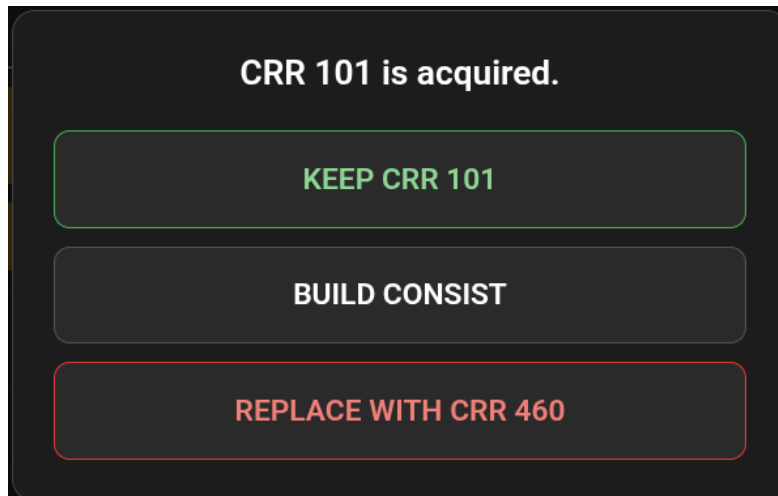


Figure 11.4 Keep what you have, build a consist from both, or replace.

- **Keep** — nothing changes.
- **Build Consist** — take you to the consist builder with both locomotives in it (Chapter 22).
- **Replace with ...** — stop the current locomotive (if Stop Locomotive on Release is on, which it is by default), release it, and acquire the new one. A dynamic brake left on is released with it.

Releasing

Tap the pill, then **Release** on the Current Assignment card. With **Stop Locomotive on Release** on (the default), Vector brings the locomotive to a stop before handing it back; if it was mid-way through slowing down in VST, it finishes stopping first. With the setting off, the locomotive is released at whatever speed it's doing and carries on — which is what you want when you're handing a running train to another operator, and dangerous otherwise.



Figure 11.5 Release is on the card.

One locomotive, more than one throttle

What happens when two throttles want the same locomotive depends on the command station, not on Vector.

DCC-EX does not hold locomotives for one throttle. Any connected throttle can acquire and drive a locomotive that another throttle already has, and the most recent command from any of them is the one the locomotive obeys. Vector can't see commands sent by another throttle, so if someone else is also driving your locomotive the speed and functions on your screen may not match what it's doing. Make a habit of releasing a locomotive from any throttle you've finished with, and of checking who else is

running before you acquire.

JMRI does keep track of who holds a locomotive, and what it does when a second throttle asks for one is a JMRI preference — **Prompt**, **Silent Steal** or **Silent Share** — set in JMRI's WiThrottle server preferences, not in Vector. Vector follows whichever JMRI is set to:

- **Prompt.** If the locomotive is held by another throttle, Vector asks: **Steal locomotive CRR 101?** with **STEAL** and **CANCEL**. Until you answer, it isn't yours — the throttle shows nothing acquired. **STEAL** takes it over: Vector picks it up at the speed and direction the station reports, and sends nothing until you touch a control. **CANCEL** leaves it with the other throttle. If it was one unit of a consist you were acquiring, Vector tells you the unit is in use and the consist was not acquired.
- **Silent Steal.** If another throttle takes a locomotive you're driving, Vector tells you — *Locomotive CRR 101 was taken by another throttle* — and your throttle lets go of it: nothing further is sent to it, and the pill returns to + **Acquire Locomotive**. If it was part of a consist, the rest of the consist is released too, and the message says so.
- **Silent Share.** JMRI lets both throttles drive it, and neither is told. As with DCC-EX, your screen may not reflect what the other throttle is doing.

Digitrax LNWI — Vector drives through the LNWI as a standard WiThrottle server. This guide makes no claims about how it shares locomotives between throttles beyond that.

Chapter 12

Controls Every Throttle Shares

The four throttle styles look different, but the frame around them is the same. Learn it once.



Figure 12.1 Top of every throttle: status bar, name pill, gear, E-STOP, PWR.

The status bar and toolbar

- **Status bar** — a green dot and **Connected**, or a red dot and **Not connected**, with the time. Glance here first when anything seems odd.
- **Name pill** — what you're driving; tap it for the acquire panel.
- **Gear** — the quick-setup panel (below).
- **E-STOP** — emergency stop. Chapter 13. It can be hidden in Setup if you never want to hit it by accident.
- **PWR** — track power. Lit when the command station reports power on; tap it to turn track power off or on. It only works while connected.

Headlight, bell and horn

On the Diesel, Switcher and Steam throttles, the three functions you use most have their own controls: a **LIGHT** switch, a **BELL** button and a **HORN** (or **WHISTLE**) that sounds while you hold it. They are F0, F1 and F2. The Slider has them as three wide buttons across the top instead.

Direction

Forward and **Reverse**, with **Neutral** between them on the Diesel and Switcher. The lit button is the current direction, and the readout repeats it — **FWD**, **REV** or **NEU**. Check it before you open the throttle. Neutral is not a stop: it's a coast, with the throttle disconnected (Chapters 17 and 18).

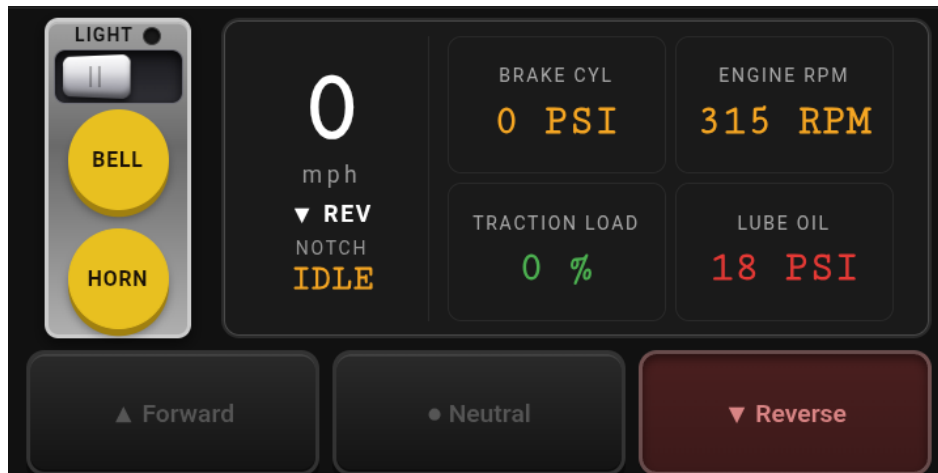


Figure 12.2 Reverse lit; readout reads REV.

By default Vector won't change direction while the locomotive is moving — that's Direction Lock, Chapter 13.

The speed readout

Every throttle shows the speed in the unit you choose: **MPH**, **km/h**, **% Throttle** (percentage of full speed) or **Steps** (the raw DCC speed step, 0–126). Change it from the gear panel. The Diesel and Switcher can also show the whole instrument panel as **Analog** dials instead of digits.

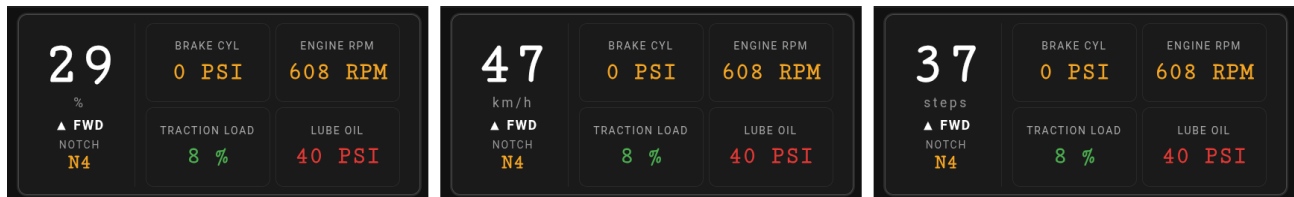


Figure 12.3 The same speed three ways: %, km/h, steps.

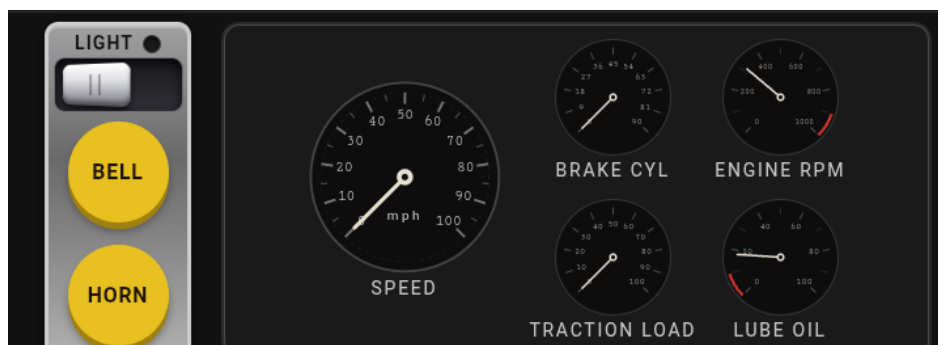


Figure 12.4 Analog display style on the Diesel throttle.

The gear panel (quick setup)

Tap the **gear** and a panel drops down with the settings you're most likely to want mid-session. What's on it depends on the throttle — the Diesel has the most:

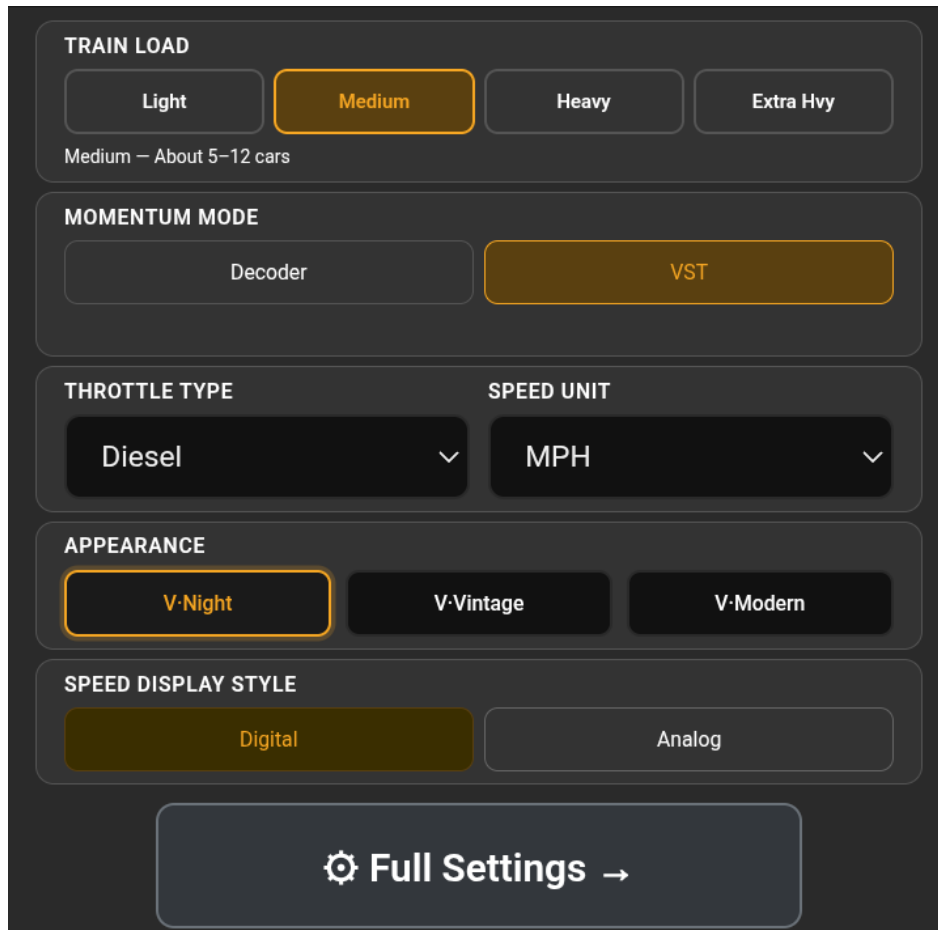


Figure 12.5 The Diesel throttle's gear panel.

- **Train Load** (Diesel, Steam) — what's behind the drawbar. Chapter 15.
- **Momentum Mode** (Diesel, Switcher, Steam) — Decoder or VST. Chapter 14.
- **Throttle Type** — switch to another throttle style.
- **Speed Unit** — MPH, km/h, % or Steps.
- **Appearance** — the theme (below).
- **Speed Display Style** (Diesel, Switcher) — Digital or Analog.
- **Full Settings** → — everything else. Chapter 25.

Tap the gear again to close it.

Changing throttle style

Pick a different **Throttle Type** on the gear panel, or in Setup. Your locomotive comes with you — same speed, same direction, same functions — and the new throttle picks up where the old one left off. Vector only allows the change while the locomotive is stopped: if it's moving, you'll be told to stop first.

A locomotive with a **Default Throttle** saved in Loco Setup (Chapter 7) switches for you: acquire it on its own and Vector opens the throttle it's set for, even if it's already moving. Consists never switch style on

their own.

Appearance

Three themes on the Diesel and Switcher — **V-Night** (dark, the default), **V-Vintage** (olive and cream) and **V-Modern** (tan) — and a light **V-Day** theme on the Slider for running in daylight. The Steam throttle has its own cab finish and no theme choice. The default theme for new sessions is set in Setup.



Figure 12.6 V-Night, V-Vintage, V-Modern.

Chapter 13

Stopping

Two buttons stop a locomotive, and they are not the same.



Figure 13.1 E-STOP top right; STOP at the bottom of the throttle.

STOP

STOP is the normal way to bring a locomotive to a halt. It sets the throttle to zero — IDLE on the Diesel and Switcher, the regulator closed on the Steam, the slider to the bottom — and commands speed zero.

- In **Decoder** momentum mode, the decoder's own momentum settings decide how the locomotive comes to rest from that command.
- In **VST**, pressing STOP commands an immediate stop, bypassing the simulated deceleration. Normal throttle reductions — notching down, closing the regulator — still follow VST's simulated momentum; only STOP skips it.

The readout drops to zero once the command station has taken the command. If Vector couldn't deliver it — you've lost the connection — the readout stays where it was and Vector tells you. Chapter 26 covers that.

E-STOP

E-STOP is the emergency stop. It sends the DCC emergency-stop command, which every decoder obeys immediately, ignoring its own momentum. The locomotive stops dead. Use it when a train is about to hit something, not to end a run — a hard stop on a long train is hard on the couplers.

Two settings in **Setup** → **Safety** shape it:

- **Show E-STOP** — hide the button if you find yourself hitting it by mistake. On by default.
- **Confirm E-STOP** — ask before firing. Off by default; it adds a tap between you and the stop, so turn it on only if you're hitting E-STOP by accident more than you're needing it on purpose.

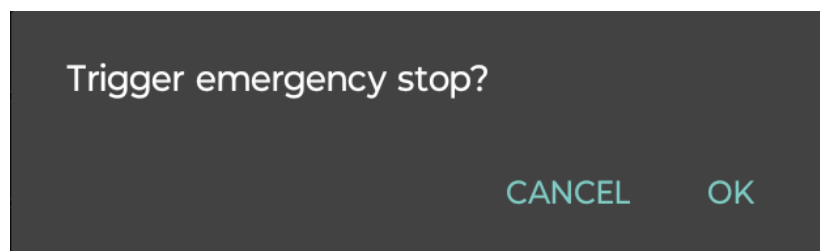


Figure 13.2 With Confirm E-STOP on, Vector asks first.

Direction Lock

Reversing a moving locomotive is bad for it and for the train. With **Direction Lock** on (the default), Vector refuses to change direction until the locomotive is stopped, and says so.

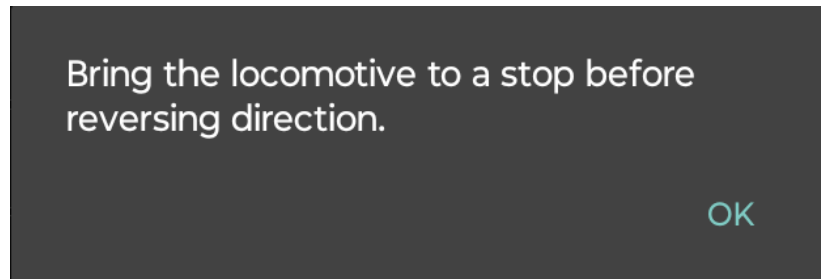


Figure 13.3 Direction Lock: stop first.

Turn it off in **Setup** → **Safety** if you run locomotives that need a quick reversal — a switcher working a yard, say — and you're happy to manage it yourself.

Stops Vector makes for you

Three more settings in **Setup** → **Safety**, all on by default, stop the locomotive when something happens to Vector rather than to the train:

- **Stop on App Interrupt** — a phone call, or switching to another app, stops every locomotive you hold.
- **Stop Locomotive on Exit** — closing Vector sends a stop first.
- **Stop Locomotive on Release** — releasing a locomotive stops it first (Chapter 11).

They're there so a train never keeps running because you looked away from the phone. Chapter 26 has more on when they do and don't help.

Chapter 14

Momentum: Decoder vs Vector Simulated Throttle

A real locomotive doesn't jump to speed; it builds. There are two places that feel can come from, and Vector lets you choose.

Decoder momentum

Most decoders have their own momentum settings — CV3 for acceleration, CV4 for deceleration. In **Decoder** mode, Vector sends the speed you ask for, once, and the decoder does the smoothing. The locomotive behaves exactly as it would from any other throttle. If you've spent time tuning CV3 and CV4, this keeps that work.

Vector Simulated Throttle (VST)

In **VST** mode, Vector holds the momentum itself. Ask for notch 6 and Vector walks the speed up toward it at a rate a real train would manage — you watch the readout climb, the RPM rise, the traction load peak and fall away. Set your decoder's CV3 and CV4 to zero, or near it, so the two aren't fighting.

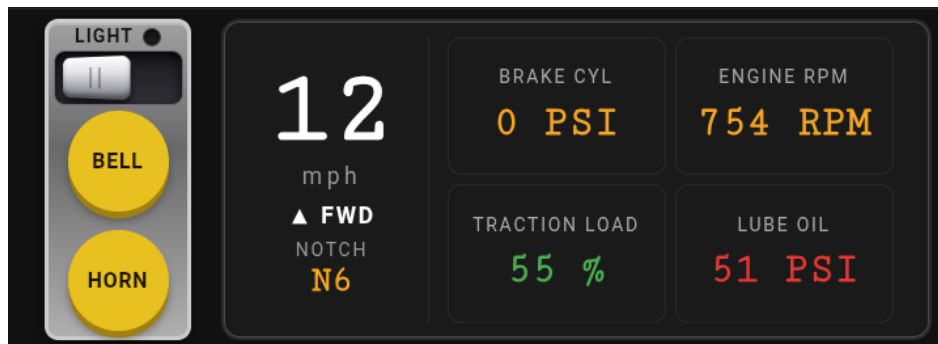


Figure 14.1 VST mid-ramp: notch 6 set, 12 mph and climbing, traction load high.

VST is what makes the rest of this part work. Train Load (Chapter 15) changes how fast the speed builds and how long it takes to stop. The air brake (Chapter 16) fights the throttle the way a real one does. On the Steam throttle, cutoff and boiler pressure matter. None of that has anywhere to act if the decoder is doing the momentum.

Choosing

You can set the mode in three places, and they stack. This works the same way on the Diesel, Switcher and Steam throttles:

1. **Setup** → **Global Defaults** → **Momentum Mode** — the default. A locomotive acquired by address, or one whose Loco Setup says **Use Global**, gets this.

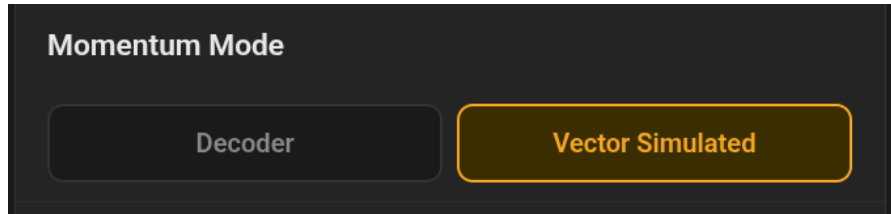


Figure 14.2 The global default: Vector Simulated unless you change it.

2. **Loco Setup → Performance → Momentum** — per locomotive: **Use Global, Decoder** or **VST**. A locomotive whose decoder momentum you've tuned can stay on Decoder while the rest of the fleet runs VST.
3. **The gear panel → Momentum Mode** — a switch for the locomotive you're driving right now. It lasts for the session (and survives a reconnect), and it changes neither the global default nor the locomotive's saved setting. Handy for comparing the two on the same locomotive.



Figure 14.3 Switch modes mid-session from the gear panel.

A consist starts in the global default, whatever its members are set to (Chapter 23). The Slider doesn't use either: it sends speed directly, always.

Chapter 15

Train Load

A light engine gets away smartly; forty loaded hoppers don't. **Train Load** tells VST what's behind the locomotive, and it changes how the whole throttle feels — slower to accelerate, slower to coast down, and above all longer to stop under the brake.

It lives on the gear panel of the Diesel and Steam throttles — the two whose momentum models use it — not on the throttle face, because a real cab has no "train weight" lever. The engineer knows what's coupled on.

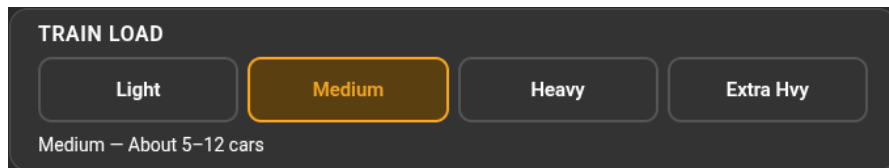


Figure 15.1 Train Load on the Diesel gear panel.

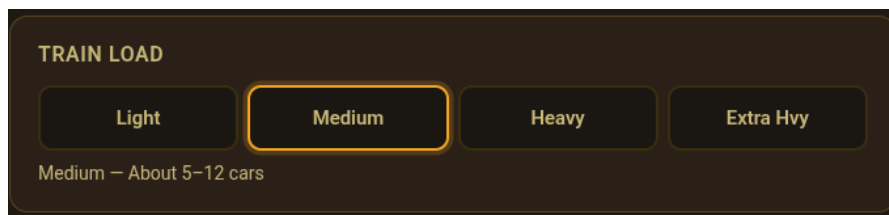


Figure 15.2 ...and in the same place on the Steam gear panel.

Four settings, with the car counts as a rough guide — you decide what counts as heavy on your railroad:

Roughly	
Light	A light engine, or 1–4 cars
Medium (default)	About 5–12 cars
Heavy	About 13–20 cars
Extra Heavy	20 or more, or a loaded drag

Train Load is one setting for the session, not a locomotive setting: you're driving one train at a time, and swapping the locomotive on the front doesn't change what's behind it. It stays put when you change throttle style or acquire a different locomotive. It has no effect at all in Decoder momentum mode, and it never changes top speed — only how you get there and back.

Chapter 16

The Air Brake

The Diesel, Switcher and Steam throttles have an air brake, and it works the same way on all three. It is not a slower STOP button. It's a brake — you set it, it takes hold, and it holds.

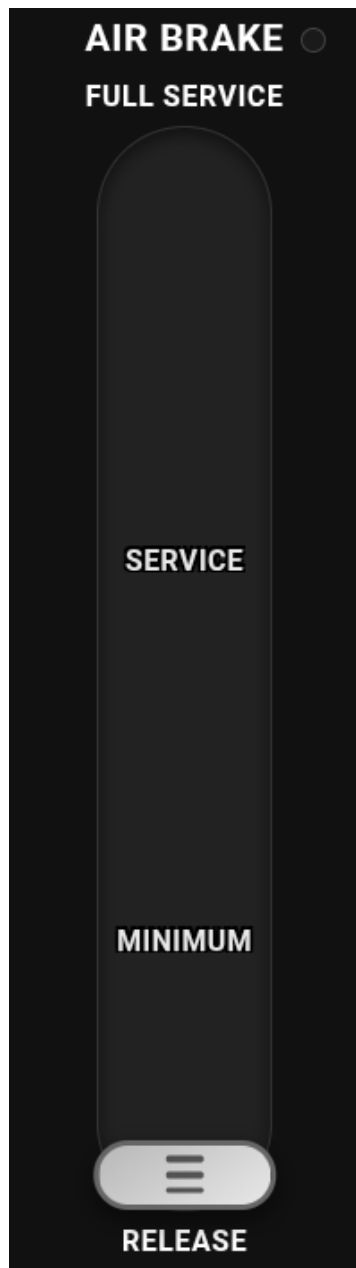


Figure 16.1 The Diesel brake handle at RELEASE.

How it works

The handle has four marked positions: **RELEASE**, **MINIMUM**, **SERVICE** and **FULL SERVICE**, and you can set it anywhere between. Moving the handle doesn't brake the train directly — it commands the **brake cylinder**, and the cylinder does the braking. Watch the **BRAKE CYL** gauge: after you move the handle, the pressure builds over two or three seconds, and when you release it falls away more slowly, over about five. That lag is deliberate, and it's the whole skill of using the brake — you set it before you need it, and you release it before you're stopped.

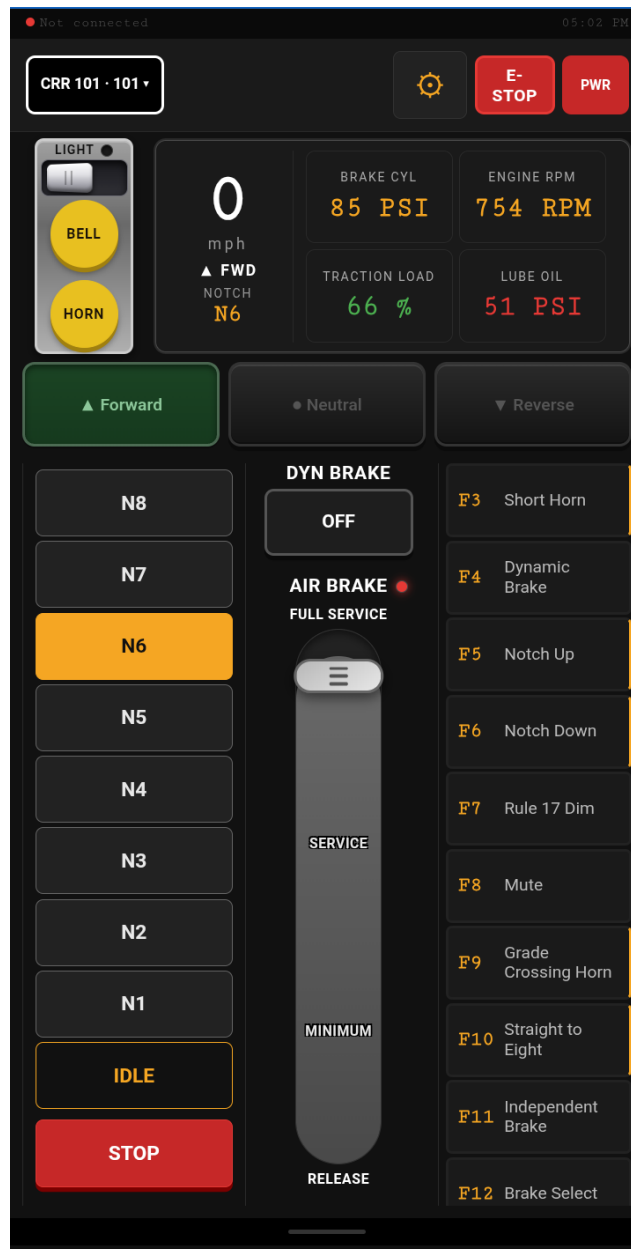


Figure 16.2 Full service: 85 PSI in the cylinder, the locomotive held at zero — with notch 6 still selected.

The brake opposes the throttle. A partial application slows the locomotive to a lower speed and holds it there while the throttle stays open, the way a real engineer holds a train down a grade. **FULL SERVICE**

always brings the locomotive to a stop and holds it, whatever notch is set — and it stays held until you release. The small lamp beside the AIR BRAKE label lights whenever the handle is off RELEASE.

Train Load (Chapter 15) is felt here more than anywhere: a heavy train takes much longer to stop from the same application. If you brake late with Extra Heavy set, you'll go through the crossing.

On each throttle

- **Diesel** — the vertical handle in the centre column, under DYN BRAKE.
- **Switcher** — the vertical handle between the lever and the function keys.

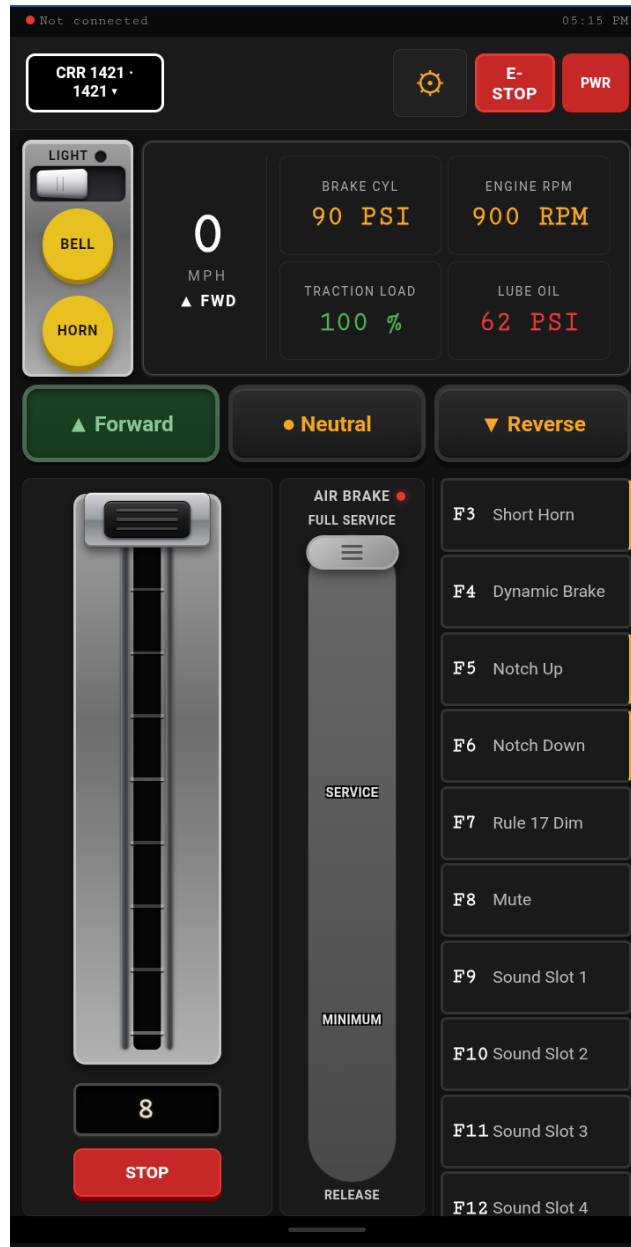


Figure 16.3 Switcher, full service, 90 PSI.

- **Steam** — a horizontal slider across the cab under the direction row, with the same four marks.



Figure 16.4 Steam, brake applied, 72 PSI and falling speed.

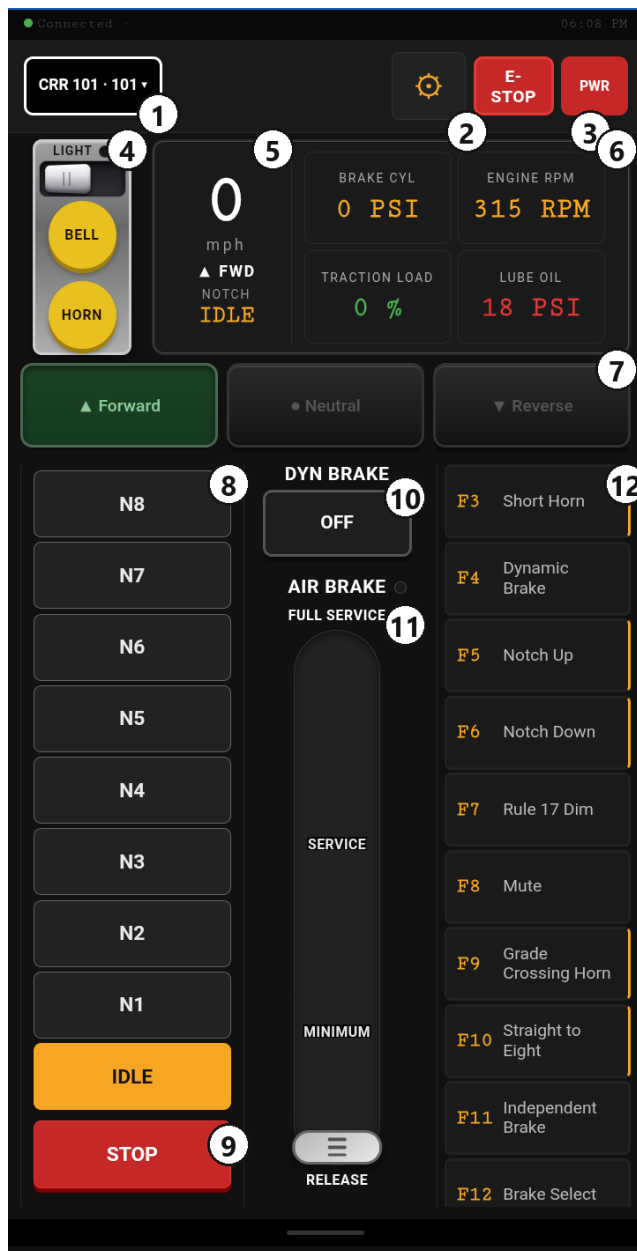
The brake works in VST. In Decoder momentum mode, moving the handle lowers the speed Vector asks the decoder for, and the decoder's own deceleration takes it from there — usable, but without the cylinder lag or the hold.

When you acquire a different locomotive the brake is released and the cylinder emptied; nothing is inherited from the last one.

Chapter 17

The Diesel Throttle

The Diesel throttle is a control stand: an eight-notch throttle, a dynamic brake, an air brake, and an instrument panel that tells you what the engine is doing. It's the throttle Vector opens with.



Key to Figure 17.1

1. **Name pill** — what you're driving; tap for the acquire panel
2. **Gear** — quick setup
3. **E-STOP** and **PWR**
4. **LIGHT / BELL / HORN** — F0, F1, F2
5. **Speed readout** — speed, direction, notch
6. **Gauges** — BRAKE CYL, ENGINE RPM, TRACTION LOAD, LUBE OIL
7. **Direction** — Forward / Neutral / Reverse
8. **Notch stand** — IDLE, N1 to N8
9. **STOP**
10. **DYN BRAKE**
11. **AIR BRAKE**
12. **Function keys** — F3 upward, labelled from the locomotive's setup

Figure 17.1 The Diesel throttle.

The notch stand

IDLE at the bottom, **N1** to **N8** above it. Tap a notch and the locomotive goes to that speed — through the momentum ramp in VST, or as the decoder sees fit in Decoder mode. You don't have to step through the notches; N2 straight to N7 is fine. The notch spacing isn't even: the low notches are close together for switching speeds, the high ones spread out for the road. **N8** is the locomotive's Max Throttle, whatever that's set to (Chapter 7).

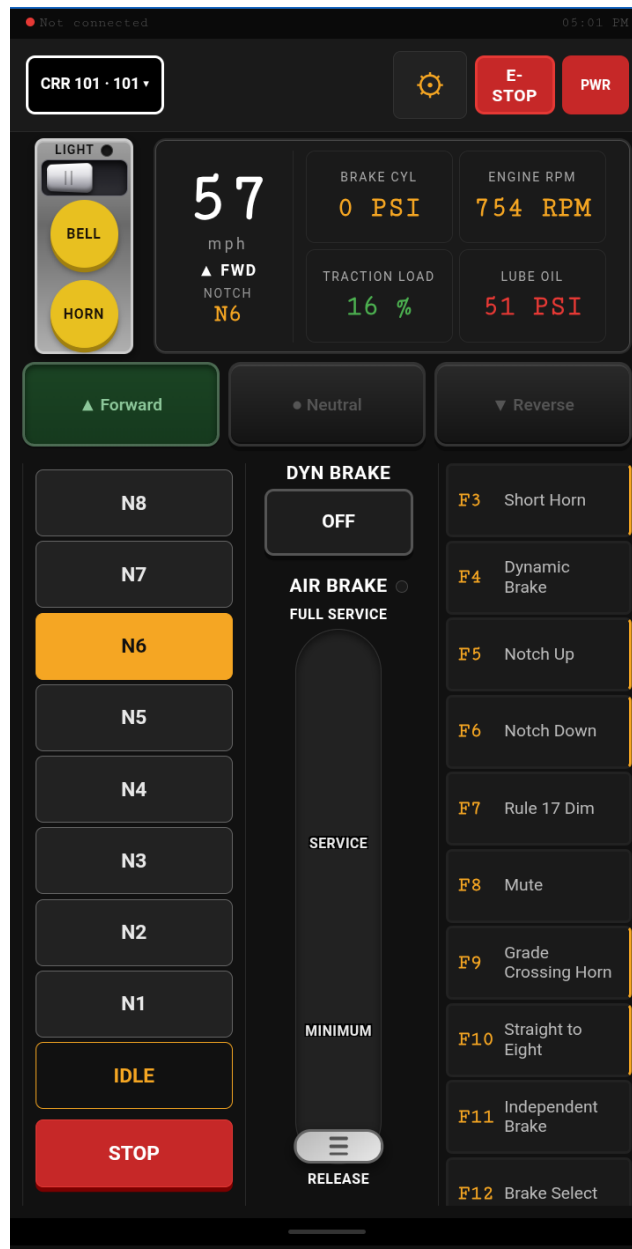


Figure 17.2 Running in notch 6: 57 mph, RPM up, traction load settled.

Neutral disconnects the throttle without stopping the locomotive — it coasts, and the notch you left set is held but not applied. Tap Forward or Reverse to re-engage, and the locomotive picks that notch up again through the ramp.

The instrument panel

- **ENGINE RPM** follows the notch: idle at IDLE, climbing as you notch up.
- **TRACTION LOAD** is how hard the locomotive is working — high while it's accelerating or pulling a heavy train, dropping back once it's up to speed.
- **LUBE OIL** rises and falls with RPM.
- **BRAKE CYL** is the air brake (Chapter 16).

None of these come from the locomotive; they're Vector's model of an engine, driven by what you're asking of it. They tell you at a glance whether the train is still gathering speed or has settled.

Dynamic brake

Tap **DYN BRAKE** and the notch stand changes job. The button reads **ACTIVE**, the notches turn teal, and they now set braking effort — **DB N1** is light, **DB N8** heavy. The readout shows the DB notch, the RPM drops toward idle, and the traction load reads the retarding effort. Tap **DYN BRAKE** again to release and get the throttle back.

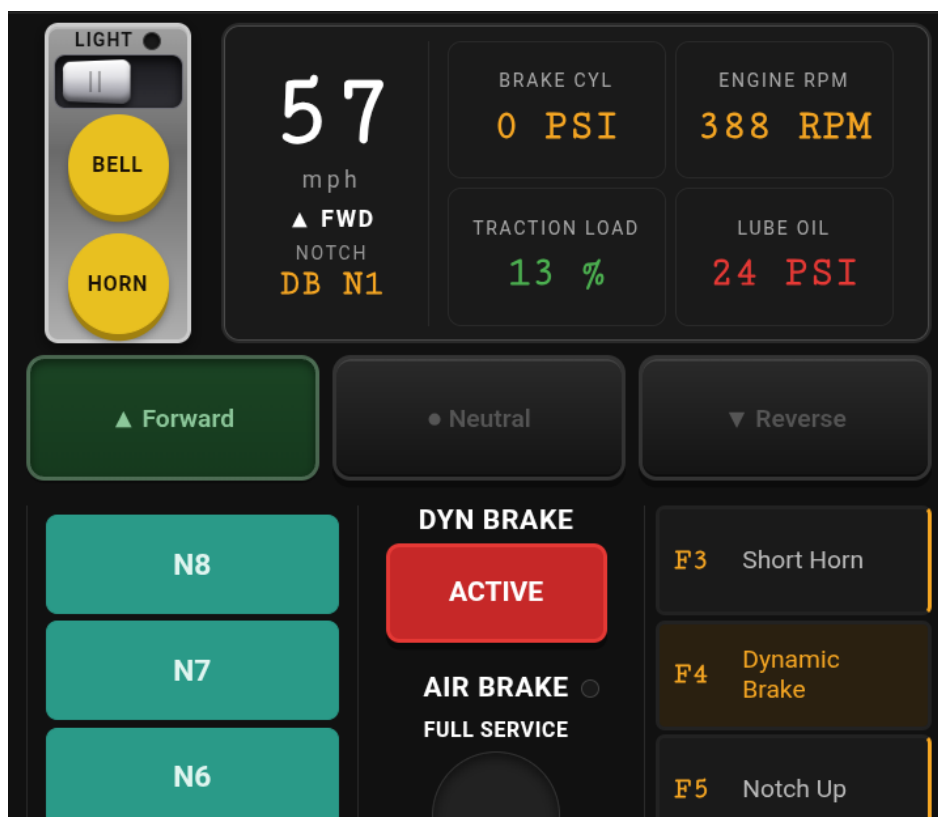


Figure 17.3 Dynamic brake ACTIVE: the stand turns teal and the readout reads DB N1.

If the locomotive's decoder has a dynamic brake sound, tell Loco Setup which function it's on (**Dynamic Brake F-Key**, usually F4) and Vector switches it on and off with the DYN BRAKE button. In the picture, F4 is lit for exactly that reason.

Dynamic braking works in VST. Like the prototype, it's for controlling speed on a grade, not for stopping — it fades out at low speed. Use the air brake to finish.

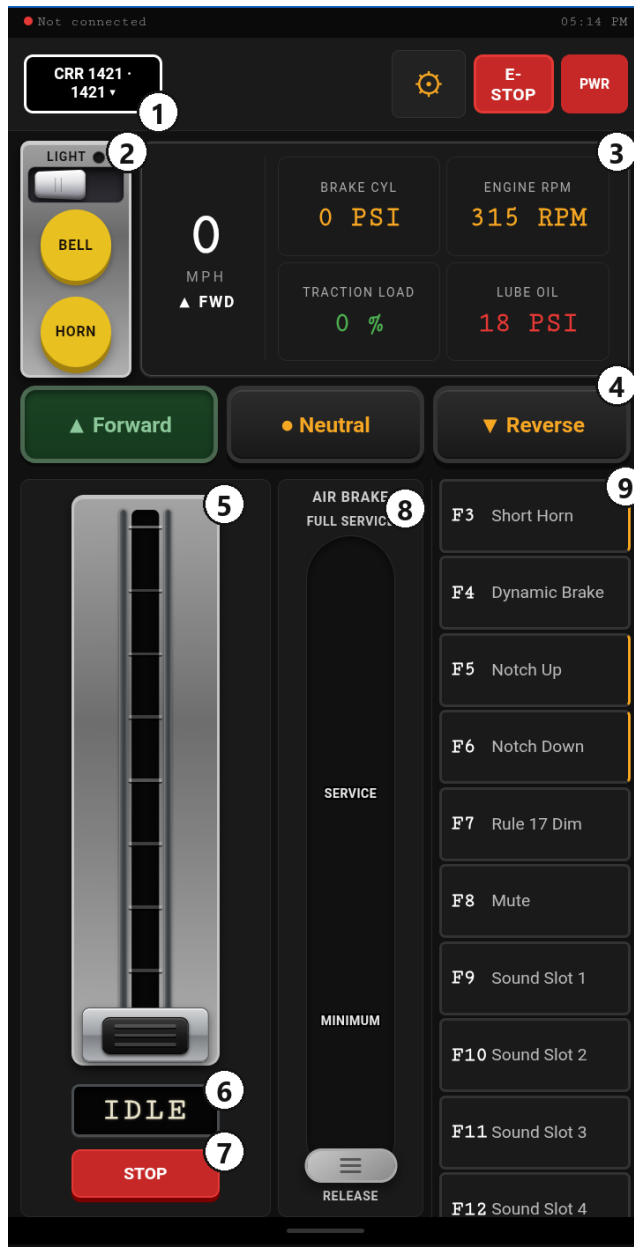
Themes

V·Night, V·Vintage and V·Modern, from the gear panel (Chapter 12). The controls are in the same places in all three.

Chapter 18

The Switcher Throttle

Yard work is different: short moves, constant reversing, speed by feel. The Switcher throttle is a single lever you drag, with the same instrument panel, air brake and function keys as the Diesel, and a quicker response.



Key to Figure 18.1

1. Name pill, gear, E-STOP, PWR
2. LIGHT / BELL / HORN
3. Speed readout and gauges
4. Direction — Forward / Neutral / Reverse
5. **Throttle lever** — drag up for more
6. **Notch readout** — IDLE, or 1 to 8
7. STOP
8. AIR BRAKE
9. Function keys

Figure 18.1 The Switcher throttle.

The lever

Drag the handle up from **IDLE**. It clicks into eight detents, and the box below it shows which — **4**, say. Each detent is a step of speed, and the locomotive responds faster than the Diesel's ramp; a switcher shouldn't feel like a road unit.

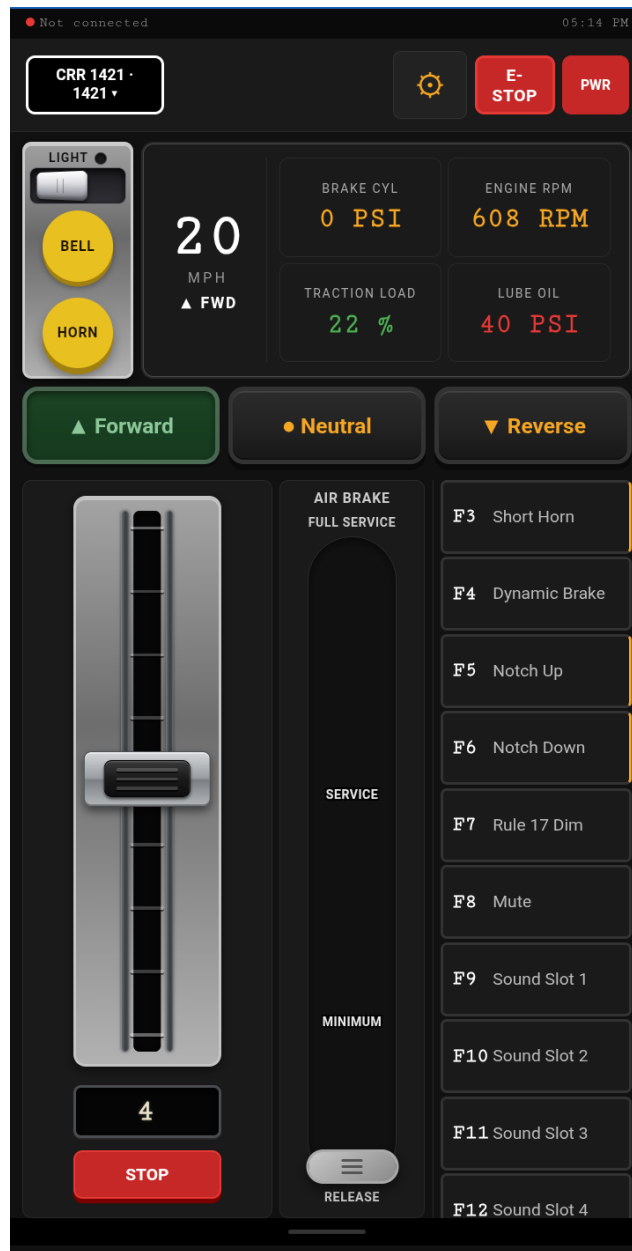


Figure 18.2 Lever in detent 4, 20 mph.

A switcher's lever tops out at a working speed rather than the locomotive's flat-out maximum, so detent 8 is brisk yard speed, not a road speed. If the locomotive has a lower Max Throttle set in Loco Setup, that applies instead.

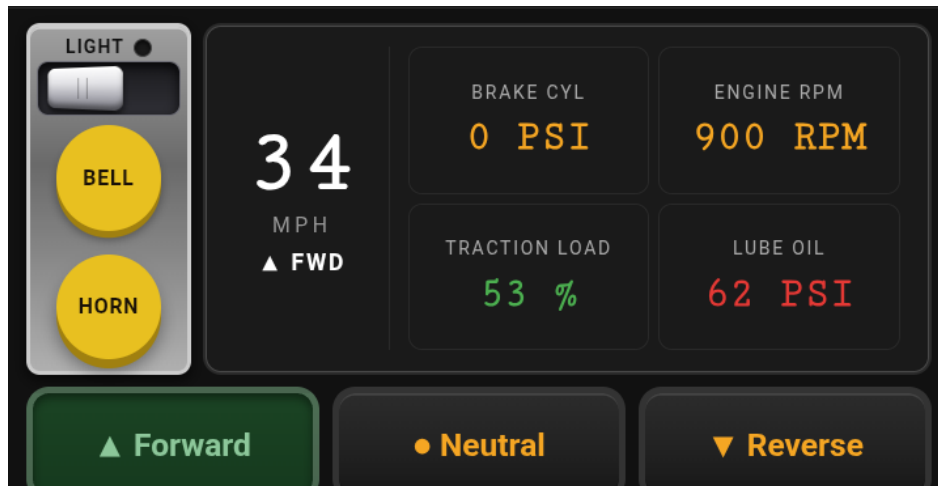


Figure 18.3 Detent 8: 34 mph, about as fast as a switcher wants to go.

Neutral

Tap **Neutral** and the locomotive coasts: the lever stays where it is but does nothing, the readout shows **NEU**, and traction load drops to zero. Tap **Forward** or **Reverse** to re-engage, and the lever's setting is applied again through the ramp. Handy for drifting up to a car before a coupling.

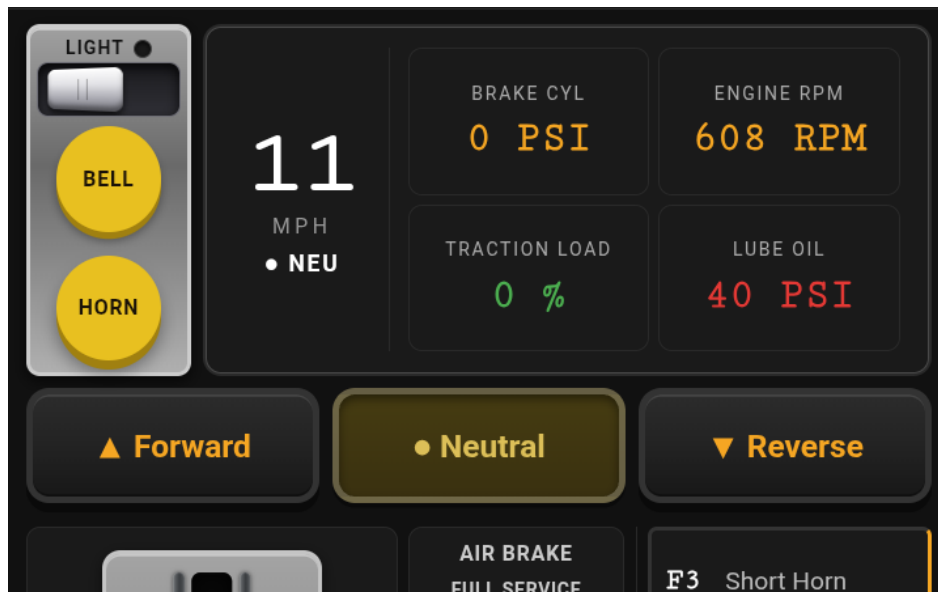


Figure 18.4 Neutral: coasting at 11 mph, traction load zero.

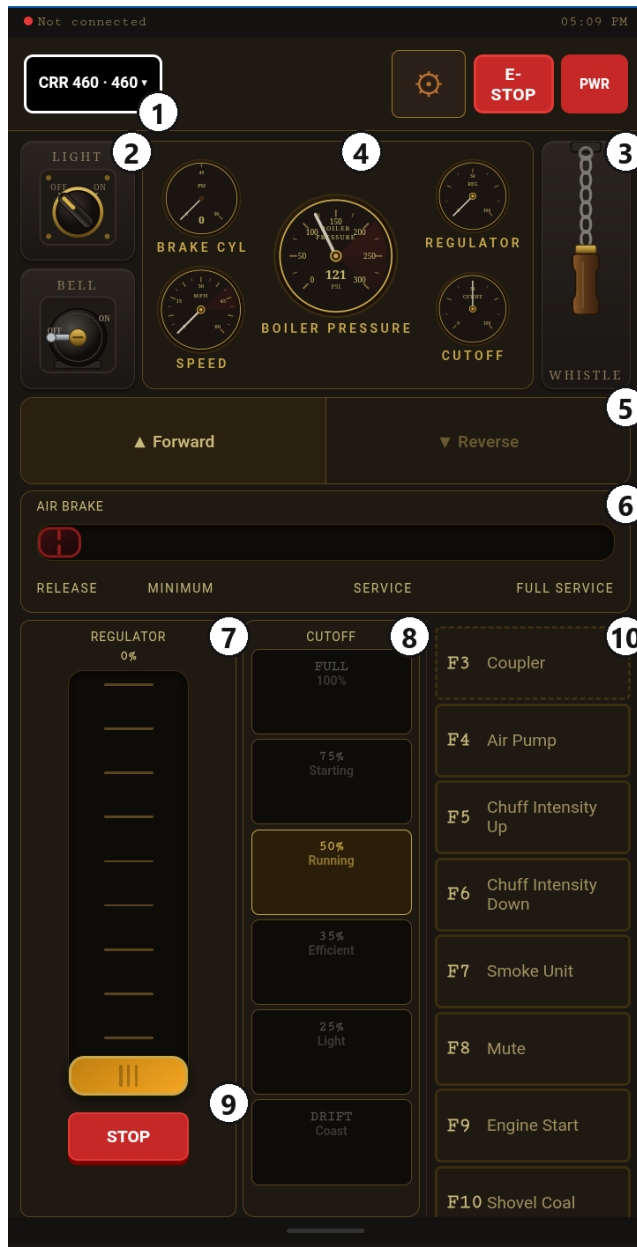
Everything else

The air brake (Chapter 16), gauges, function keys and STOP work exactly as on the Diesel. There is no dynamic brake — switchers don't have one. The gear panel offers Momentum Mode, Throttle Type, Speed Unit, Appearance and Speed Display.

Chapter 19

The Steam Throttle

A steam locomotive is driven with two hands. The **regulator** (throttle) decides how much steam goes to the cylinders; the **cutoff** (reverser setting) decides how long each stroke admits it. Vector's Steam throttle gives you both, and they interact the way the real ones do.



Key to Figure 19.1

1. Name pill, gear, E-STOP, PWR
2. **LIGHT** rotary switch and **BELL**
3. **WHISTLE** — pull the chain (hold)
4. **Gauges** — BRAKE CYL, SPEED, BOILER PRESSURE, REGULATOR, CUTOFF
5. Direction — Forward / Reverse
6. **AIR BRAKE** slider
7. **REGULATOR** lever
8. **CUTOFF** positions
9. STOP
10. Function keys

Figure 19.1 The Steam throttle, CRR 460 stopped with the boiler coming up.

Regulator

Drag the **REGULATOR** lever up to open it. The percentage above it is how far open; the REGULATOR gauge repeats it. This is what asks for speed. Close it (drag to the bottom) and the locomotive drifts.

Cutoff

Six positions, from **FULL 100%** at the top to **DRIFT** at the bottom, with a word beside each for what it's for:

- **FULL 100%** and **75% Starting** — long cutoff, maximum effort, for getting a train moving or lifting a heavy one up a grade.
- **50% Running** — the everyday setting.
- **35% Efficient** and **25% Light** — short cutoff, for a light train at speed. Efficient, but with less in reserve.
- **DRIFT Coast** — steam off the pistons; the locomotive coasts.

Start in a long cutoff, and shorten it as speed builds — that's how the prototype is driven, and Vector rewards it. A long cutoff at speed wastes steam and pulls the boiler down; too short a cutoff for the load and the locomotive can't hold its speed, and it slows.

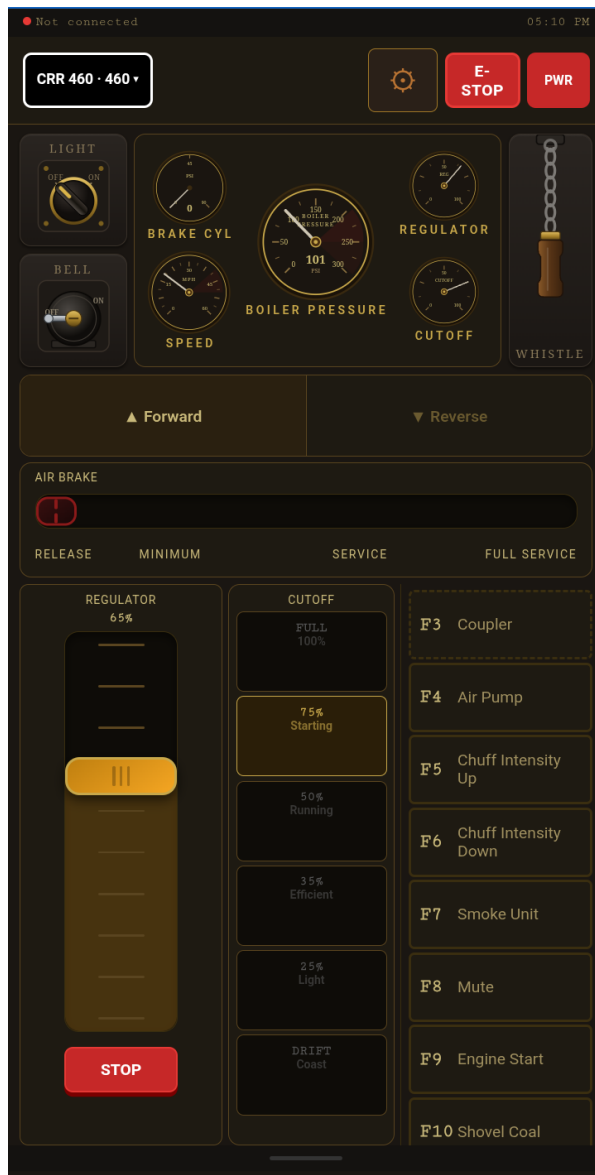


Figure 19.2 Regulator 65% open, cutoff at 75% Starting: getting under way.

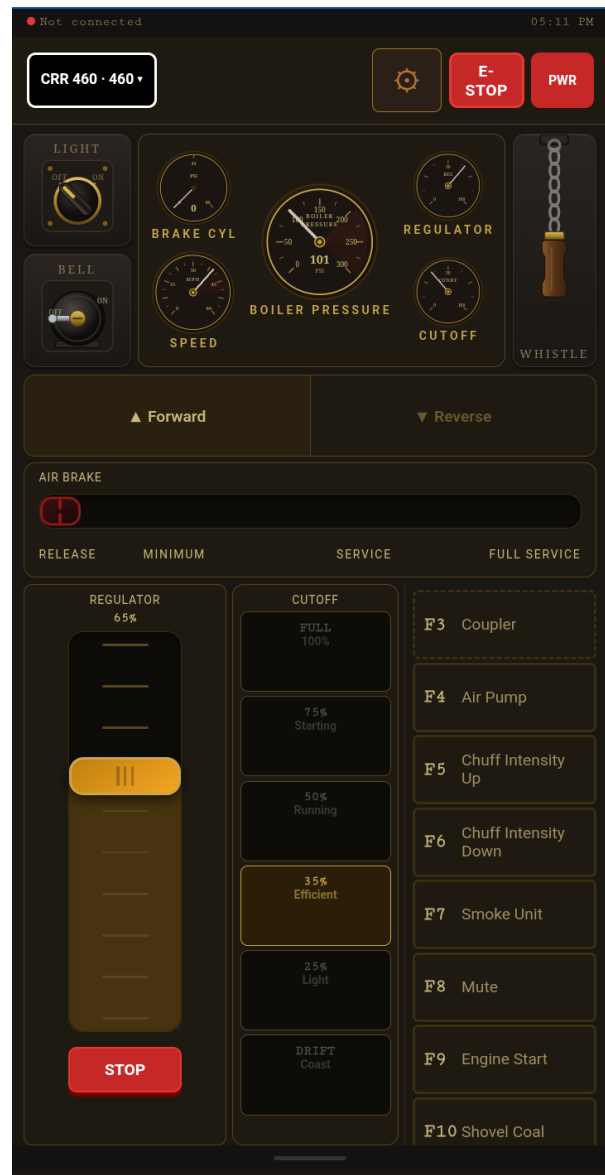


Figure 19.3 Up to speed and cut back to 35% Efficient.

Drift

Tap **DRIFT** and the locomotive coasts, regulator or no regulator. The speed falls off slowly under its own rolling resistance — faster with a heavy train load. Pick a working cutoff again to get back on steam.

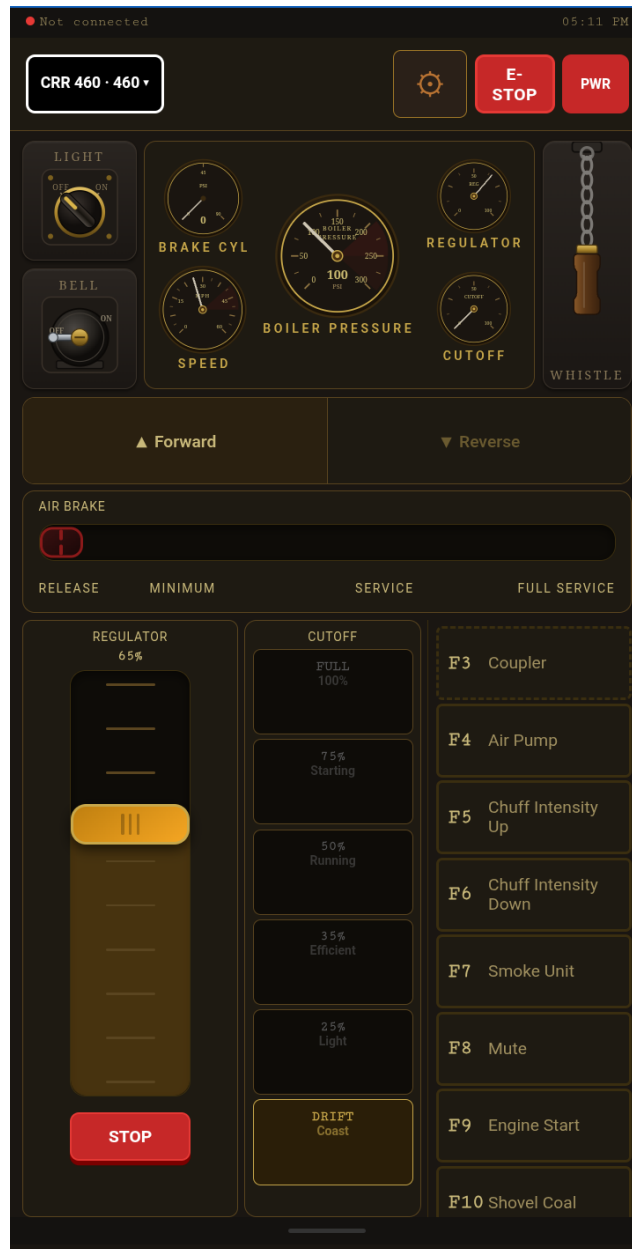


Figure 19.4 Drifting.

Boiler pressure

The big gauge in the middle. Pressure builds while you're stopped or working lightly, and it falls when you demand a lot — long cutoff, wide regulator, heavy train. Let it drop too far and the locomotive simply has less to give. It's the steam throttle's version of the Diesel's traction load: a picture of how hard the engine is working, and a reason to ease off before you have to.

Brake, direction, stop

The **AIR BRAKE** slider runs across the cab (Chapter 16). Direction is **Forward** and **Reverse** — there's no Neutral; use DRIFT. **STOP** sits under the regulator, and closes it. Train Load is on the gear panel, and matters here as much as anywhere.

Function keys

The same keys as the other throttles, with one visual difference: on the Steam throttle a momentary function has a dashed border instead of the accent bar.

Chapter 20

The Slider Throttles

Sometimes you just want to run a train. The Slider is a single vertical control: push it up for more speed, pull it down for less, and that's what the locomotive does — immediately, with no momentum simulation and no gauges.

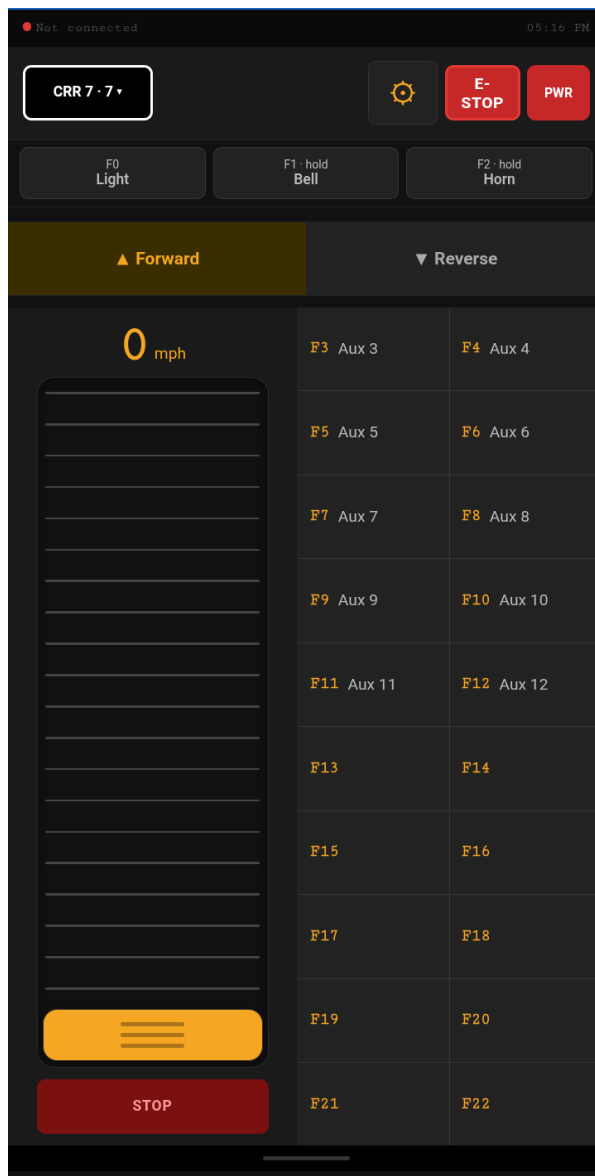


Figure 20.1 Slider (Left): the slider on the left, keys on the right.

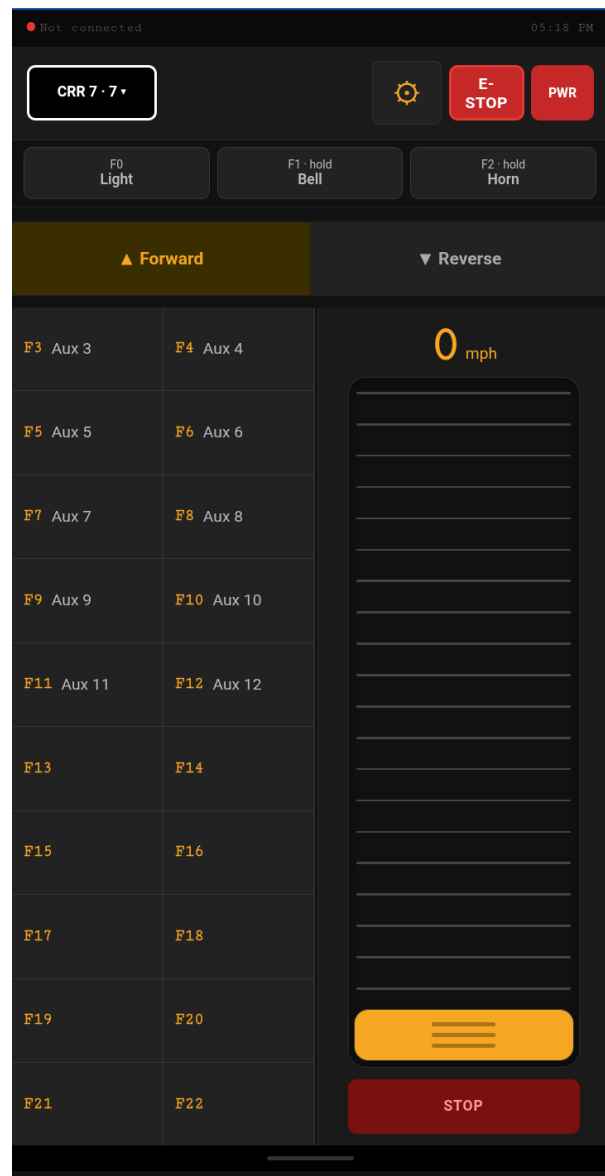


Figure 20.2 Slider (Right): mirrored for the other hand.

Choose **Slider (Left)** or **Slider (Right)** as the throttle type to put the slider under whichever thumb you drive with. Apart from the mirror image they're identical.

Driving it

- **Slider** — drag the handle. The speed readout above it shows the result in your chosen unit. Vector sends every change straight to the locomotive; if you want momentum on the Slider, use the decoder's own (CV3/CV4).
- **Forward / Reverse** — the wide bar under the function buttons. Direction Lock applies here too.
- **Light, Bell, Horn** — the three buttons across the top; Bell and Horn are marked *hold*.
- **STOP** — under the slider.
- **Function keys** — the grid on the other side, two per row.

Max Throttle on the Slider

The whole travel of the slider is the locomotive's range, so a locomotive with a Max Throttle of 60% reaches 60% at the top of the slider, not full speed. The readout shows what you're getting.

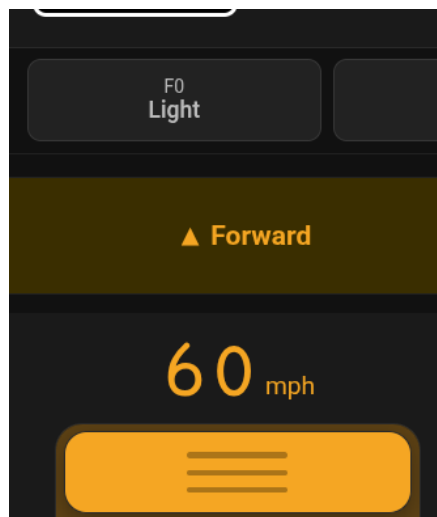


Figure 20.3 CRR 7 at the top of its slider: 60%, its cap.

V-Day

The Slider is the throttle you'd run in the garden, so it has a light theme the others don't: **V-Day**, from Appearance on its gear panel.

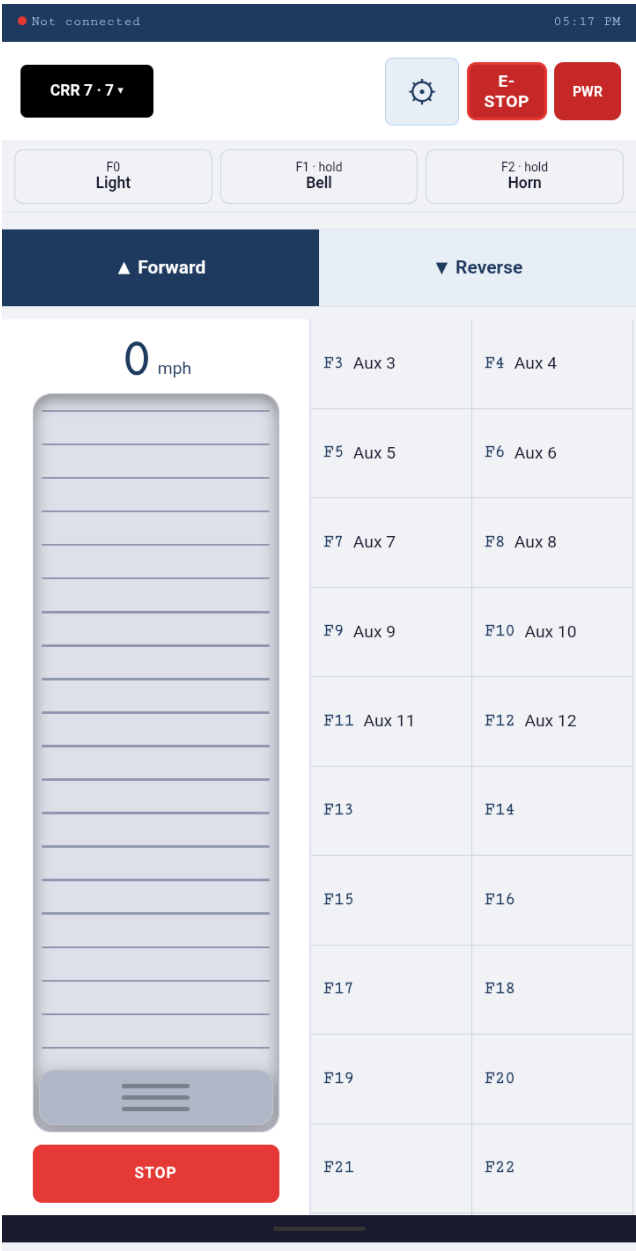


Figure 20.4 V-Day: the Slider in daylight colours.

Chapter 21

Volume Keys as Throttle

When your eyes are on the train rather than the phone, the volume buttons make a throttle you can feel. Turn on **Setup** → **Device** → **Volume Keys as Throttle**.

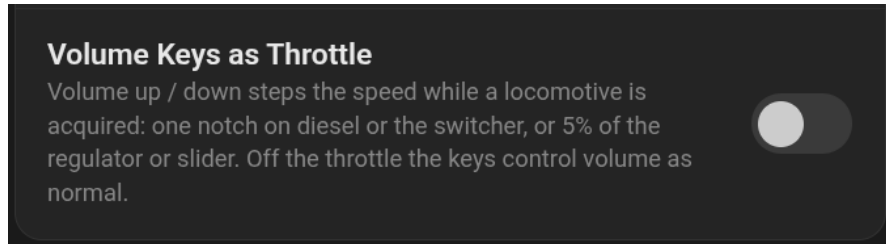


Figure 21.1 Off by default; turn it on in Setup → Device.

With it on, and a locomotive acquired, and a throttle on screen:

- **Volume up / down** is one step: a notch on the Diesel or Switcher, 5% of the regulator on the Steam, 5% of the slider on the Slider.
- Each press is one step. Holding the button doesn't repeat.
- Every step goes through the same control you'd tap on screen, so Max Throttle, Direction Lock and everything else still apply.

Anywhere else — in Setup, on the connection screen, with no locomotive, or with Vector in the background — the keys control the phone's volume as usual. Vector never drives a train from your pocket.

Part 4

Consists

Two or more locomotives on the same train are a **consist**. Vector drives a consist as one: one throttle setting, one direction, one brake, and every unit follows — including the ones coupled backwards. You build a consist once, save it under a name, and acquire the whole thing with one tap thereafter.

Chapter 22

Building a Consist

There are three ways into the consist builder, and they all open the same screen:

- **Setup → Roster & Consists → Consist Manager → + Build New**
- **Build Consist** → on the acquire panel (Chapter 11)
- **Build Consist** on the dialog Vector shows when you tap a second locomotive while already driving one — the builder opens with both units in it

Adding units

Add locomotives either way:

- **From your roster** — tap + **Add** beside a locomotive in the list at the bottom.
- **By address** — type the number, choose **Long** or **Short**, tap + **Add**.

Each locomotive becomes a row in the consist, in the order you added them. Up to six units.

Order and facing

The first row is the **LEAD** unit; the last is **TRAIL**; anything between is mid-train. Order matters — the lead unit's function keys are the ones you'll see on the throttle (Chapter 24). Drag a row by the handle at its left to change the order.

Each row has a **FACING** button: **FORWARD** or **REAR**. Tap it to match how the locomotive actually sits in the train. A unit facing **REAR** is driven in the opposite direction from the rest, so the whole consist moves the same way when you tap Forward.

Build Consist

Cedar River Turn
2 units · 101 · 102

Consist name (optional) Cedar River Turn

Add locomotives by DCC address

Address Long + Add

Drag locomotive to change consist position.

101 LEAD CRR 101 · 101 FACING FORWARD ×

102 TRAIL CRR 102 FACING REAR ×

Add more locos above to build a consist · up to 6 units

Or add from roster

CRR 7 7 · S + Add

CRR 101 101 · S + Add

CRR 102 102 · S + Add

CRR 460 460 · S + Add

CONSIST PROTOCOL Lead Only Configure VCP

Only the lead locomotive receives consist function commands. Speed, direction and braking always drive every locomotive.

Cancel Save Consist Save & Acquire

Acquire Without Saving

Figure 22.1 Cedar River Turn: CRR 101 leading, CRR 102 trailing and facing REAR.

Getting facing wrong is the classic consist mistake — one unit pulls, the other pushes the other way — so check it before the first move. The red × removes a unit.

Name

Consist name at the top is optional but worth filling in — it's what you'll see in the Saved Consists list and on the throttle's name pill. Without one, the pill shows the lead unit's name with the number of extra units — **CRR 101 +1** — and the Current Assignment card is headed **2 Unit Consist**.

Consist protocol

The **CONSIST PROTOCOL** card at the bottom is **Lead Only** to begin with. It decides where function commands — horn, bell, lights — go. Leave it for now; Chapter 24 explains the choice and how to switch to **VCP**.

Saving and acquiring

Four buttons along the bottom:

- **Cancel** — throw the draft away.
- **Save Consist** — keep it in Saved Consists without driving it yet.
- **Save & Acquire** — keep it and take it to the throttle now.
- **Acquire Without Saving** — drive it once and forget it. Good for a one-off double-header.

The Consist Manager

Setup → **Roster & Consists** → **Consist Manager** lists every saved consist with its unit count and protocol — **LEAD ONLY** or **VCP** — and three buttons.

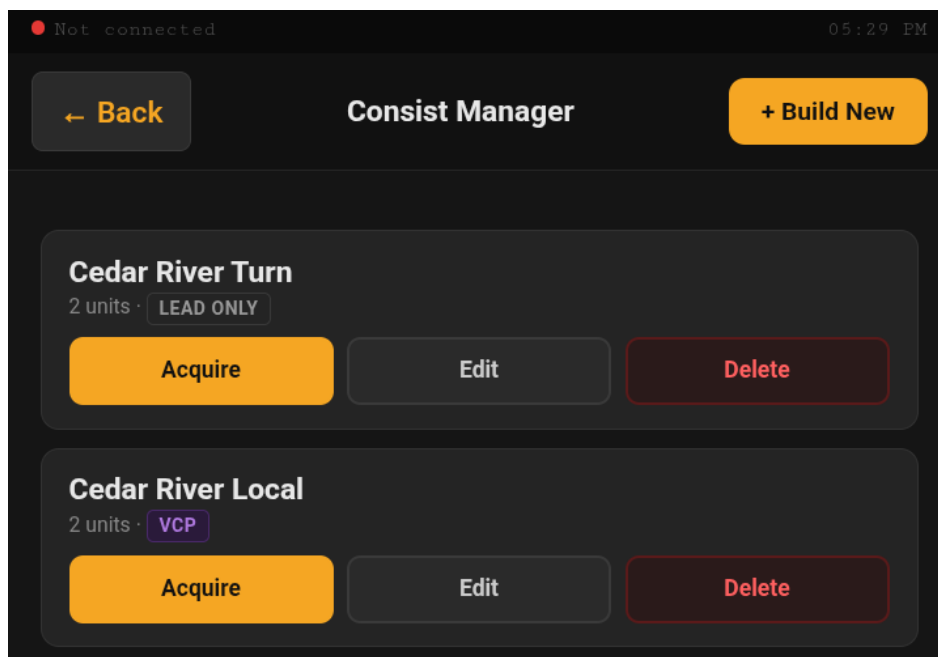


Figure 22.2 Saved consists: Acquire, Edit or Delete.

- **Acquire** — take it to the throttle.
- **Edit** — reopen it in the builder to add or remove units, change facing or order, rename it, or change its protocol. Its name and settings come with it; **Save Consist** keeps your changes under the same name.
- **Delete** — remove the saved consist. The locomotives stay in your roster.

Chapter 23

Driving a Consist

Acquiring it

Three ways, all ending at the same place:

- the **Saved Consists** tab on the acquire panel — tap the consist

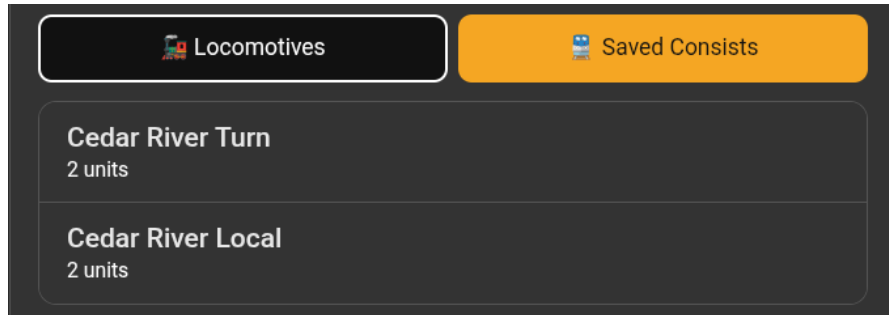


Figure 23.1 Saved Consists on the acquire panel.

- Acquire** in the Consist Manager
- Save & Acquire** or **Acquire Without Saving** in the builder

If you're already driving a locomotive, Vector asks whether to keep it or replace it with the consist — the same three-choice dialog as for a single locomotive (Chapter 11). Replace stops the current locomotive first, if Stop Locomotive on Release is on.

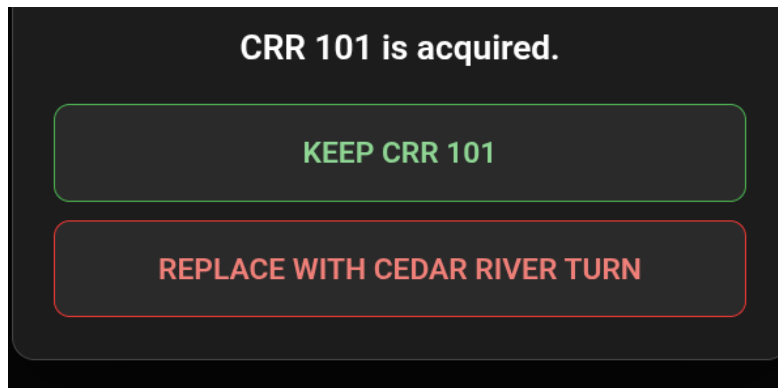


Figure 23.2 Replacing a single locomotive with a saved consist.

Vector acquires every unit from the command station, one after another. If any unit can't be acquired, Vector releases the units it had already taken, tells you which unit failed, and leaves the throttle empty — it never leaves you with half a consist. In the rare case that it can't confirm one of those releases, the message names the unit so you can check it on the layout before trying again.

What you see

The name pill shows the consist's name. Tap it and the Current Assignment card lists the units and their positions.

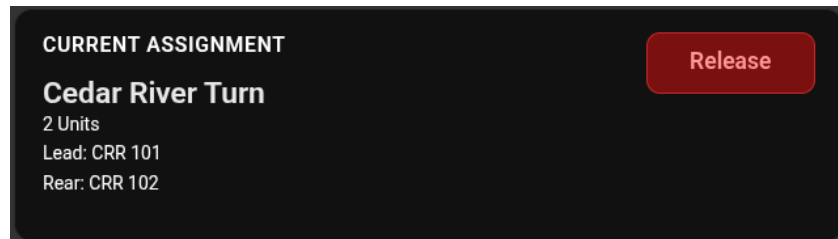


Figure 23.3 Cedar River Turn: two units, lead and rear named.

The function keys are the **lead** unit's — its labels, its latching and momentary settings. Where a function is sent depends on the protocol (Chapter 24).

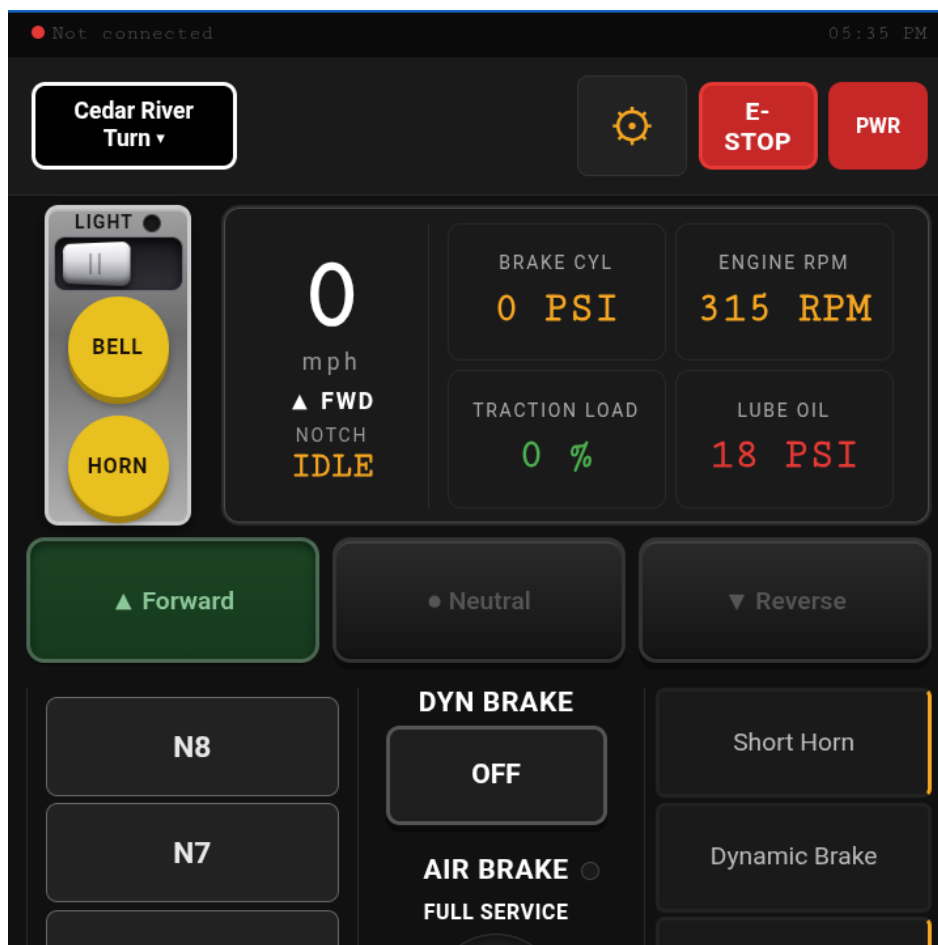


Figure 23.4 The consist's name in the pill; the lead unit's keys on the right.

Driving

Everything drives every unit: throttle, direction, air brake, dynamic brake, STOP and E-STOP. Facing is handled for you — tap Forward and the REAR-facing unit is told to go backwards, so the train goes forward.

The consist's speed cap is the **lowest** Max Throttle among its members. If CRR 7 (capped at 60%) is in a consist, the whole consist is capped at 60%, because a consist can't run faster than its slowest unit is allowed to.

Momentum and Train Load work exactly as for a single locomotive, with one difference: a consist doesn't use any unit's own Momentum setting from Loco Setup. It starts in the global Momentum Mode from Setup. You can switch it between Decoder and VST from the gear panel while you're driving the consist; that choice is for the session only, and doesn't change the global default or any locomotive's own setting.

Releasing

Release on the Current Assignment card releases every unit. With Stop Locomotive on Release on, the consist is stopped first.

Direction on a running consist

If the consist was already moving when you acquired it, Vector picks up the speed and direction the command station reports for the lead unit, just as it does for a single locomotive.

Chapter 24

Consist Functions: Lead Only vs VCP

Speed, direction and brakes go to every unit in a consist, always. Functions are the question: when you press **Horn**, which locomotives should sound it? When you press **Bell**, should one ring or all of them? Vector gives you two answers, and each saved consist picks one.

Lead Only

The default. Function commands go to the lead unit only. The horn sounds on the lead; the bell rings on the lead; the trailing units keep quiet — which, for sound, is often exactly right on a model railroad, where two horns a foot apart sound like a mess.

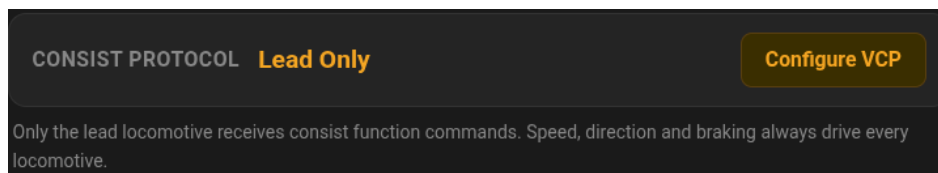


Figure 24.1 Lead Only: only the lead receives function commands.

Headlights are the exception, and they're handled for you. With the lead unit's **Headlight Control** on **AUTO** (Chapter 8), Vector manages the headlights across the consist using the consist order, each locomotive's facing and the direction of travel — so the light is on the end that's leading. Set it to **MANUAL** if you'd rather the headlight behaved like any other function.

VCP — the Vector Consist Protocol

VCP lets a function reach whichever units you choose — the bell on all of them, the horn on the lead only, the couplers on the units that have them. And it does it **by label, not by key number**. That matters because the same function is rarely on the same key across two different decoders: on CRR 2001 (a LokSound 5) *Coupler* is F3; on CRR 102 (a Tsunami 2) it's F13. Press **Coupler** on a VCP consist and each unit gets the command on its own key.

To switch a consist to VCP, open it in the builder and tap **Configure VCP** on the protocol card. (It needs two or more units.)

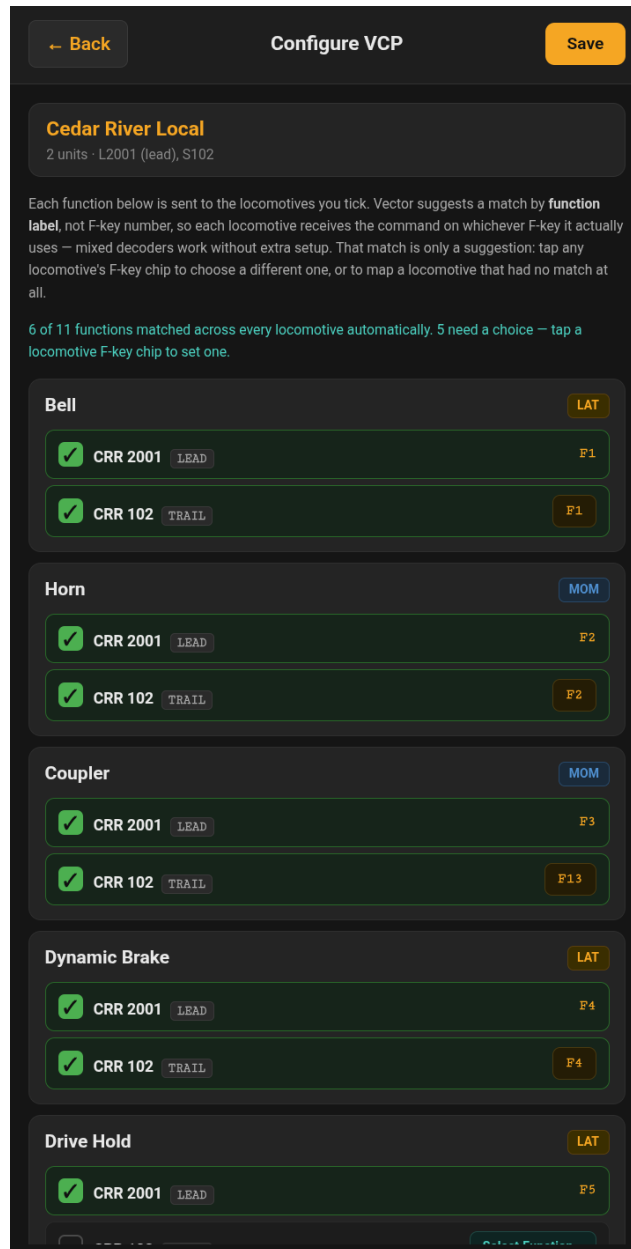


Figure 24.2 Configure VCP for Cedar River Local. Each function lists every unit, with the key that unit uses.

Reading the VCP editor

There's one card per function the lead unit has — its label and whether it's latching or momentary — and inside it one row per unit in the consist:

- A **ticked** row means that unit receives the function. The chip on the right is the key it will receive it on — **F1** on both units for Bell, **F3** and **F13** for Coupler.
- Vector fills these in for you by matching labels. Where every unit had a matching label, the row is ticked and the key is shown; the note at the top tells you how many functions matched automatically and how many need a choice.

- A row showing **Select Function...** means that unit has no function with the same label. Tap the chip to pick the key it should use, or leave it unticked to leave that unit out of the function.
- Tap any chip to override the automatic match if a decoder's labels don't line up with reality.

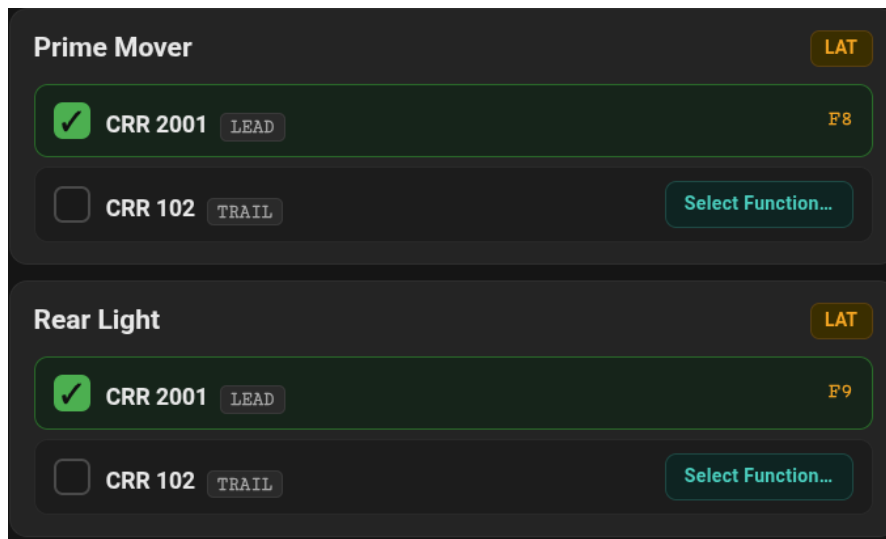


Figure 24.3 Functions the trailing unit doesn't have wait for a choice — or leave them lead-only.

Tap **Save** when you're done. The mapping is saved with the consist; the protocol card reads **VCP · 11 functions mapped**, and **Edit VCP** reopens it. **Convert to Lead Only...** drops the mapping.

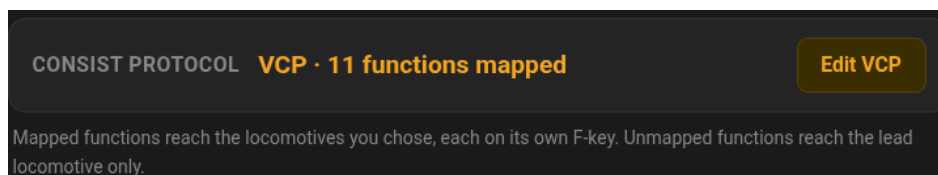


Figure 24.4 A VCP consist in the builder.

Which functions appear in the editor

Only functions whose **Consist** setting is **YES** in the lead unit's Loco Setup (Chapter 8) appear as cards. Set a function to **NO** to keep it out of VCP altogether — a mute or a volume control you never want mapped, say.

Headlight is managed automatically and is not listed, unless the lead's Headlight Control is **MANUAL**, in which case it becomes an ordinary function you can map like any other.

Which to choose

- **Lead Only** if you mostly want the sounds from one locomotive and the lights to sort themselves out. It needs no setup.
- **VCP** if you want bells on every unit, couplers on the right ends, or you run mixed decoders and want the same button to mean the same thing on all of them. It takes a minute in the editor, once.

You can change your mind: it's a property of the saved consist, and the same locomotives can be in one Lead Only consist and another VCP one.

Part 5

Settings Reference

Chapter 25

Settings, Screen by Screen

Setup is Vector's full settings screen: tap the gear on any throttle, then **Full Settings** →. It's one long page, in the sections below. Each setting is described in a line; the chapter that explains it is in brackets. Defaults are in **bold**.

Global Defaults

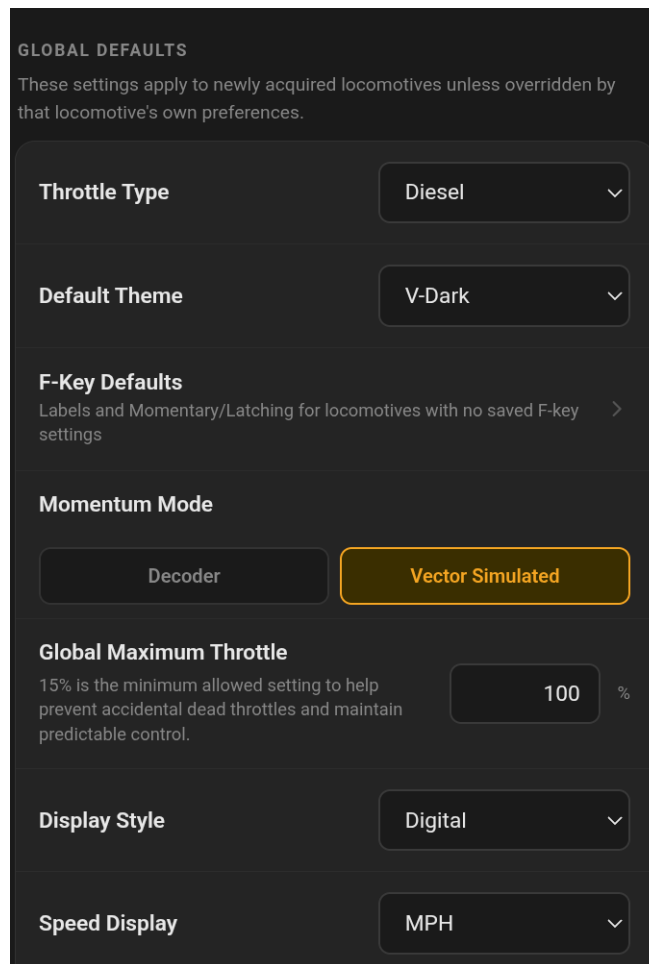


Figure 25.1 Setup: Global Defaults.

These apply to any locomotive that doesn't have its own setting in Loco Setup.

Setting	What it does	Default
Throttle Type	The throttle style Vector opens with: Diesel, Steam, Switcher, Slider (Left) or Slider (Right). (Ch. 12)	Diesel
Default Theme	V-Dark, V-Vintage or V-Modern for the Diesel and Switcher; V-Day is Slider-only. (Ch. 12)	V-Dark

Setting	What it does	Default
F-Key Defaults	Opens the F-Key Defaults screen: labels for locomotives acquired without a roster entry. (Ch. 8)	—
Momentum Mode	Decoder or Vector Simulated, for locomotives set to "Use Global". (Ch. 14)	Vector Simulated
Global Maximum Throttle	Speed cap for locomotives set to "Use global setting". Minimum 15%. (Ch. 7)	100%
Display Style	Digital or Analog instrument panel, Diesel and Switcher. (Ch. 12)	Digital
Speed Display	MPH, KPH, % Throttle or Speed Steps. (Ch. 12)	MPH

Safety

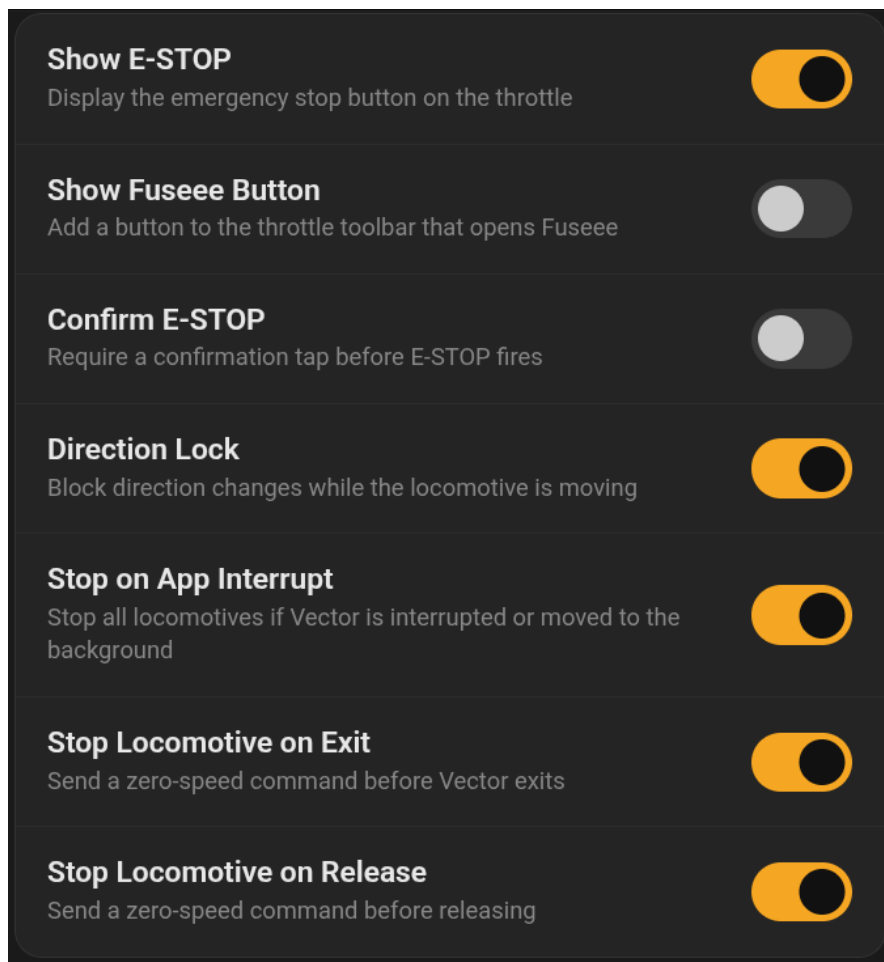


Figure 25.2 Setup: Safety.

Setting	What it does	Default
Show E-STOP	Show the emergency stop button on the throttle. (Ch. 13)	On

Setting	What it does	Default
Show Fuseee Button	Adds a button to the throttle toolbar that opens the Fusee app, if you use it.	Off
Confirm E-STOP	Ask before E-STOP fires. (Ch. 13)	Off
Direction Lock	Refuse direction changes while moving. (Ch. 13)	On
Stop on App Interrupt	Stop all locomotives if Vector is interrupted or sent to the background. (Ch. 13, 26)	On
Stop Locomotive on Exit	Send a stop before Vector closes. (Ch. 13)	On
Stop Locomotive on Release	Stop a locomotive before releasing it. (Ch. 11)	On

Roster & Consists

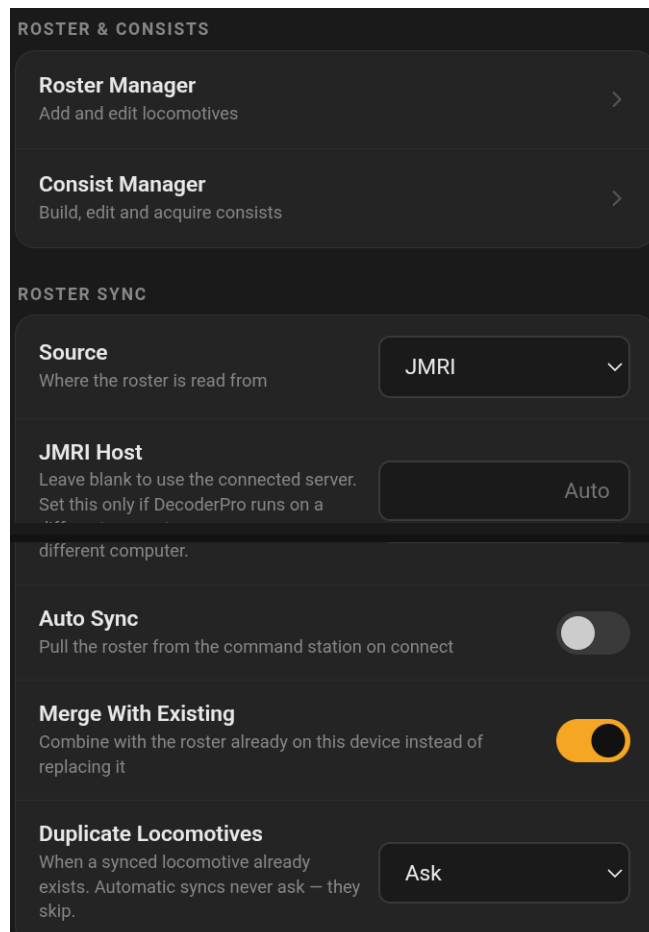


Figure 25.3 Setup: Roster & Consists, Roster Sync.

Setting	What it does	Default
Roster Manager	Opens the roster. (Ch. 6)	—
Consist Manager	Opens saved consists. (Ch. 22)	—
Roster Sync — Source	Where an automatic sync reads from: JMRI or DCC-EX. (Ch. 9)	JMRI
JMRI Host	Address of the computer running the JMRI Web Server, if it isn't the one Vector connects to. Blank = the connected server. (Ch. 9)	blank (Auto)
Auto Sync	Pull the roster from the source every time Vector connects. (Ch. 9)	Off
Merge With Existing	Keep locomotives that are only in Vector when importing. Off = the source replaces the roster. (Ch. 9)	On
Duplicate Locomotives	When an imported locomotive already exists: Ask, Replace or Skip. Automatic syncs never ask — they skip. (Ch. 9)	Ask

Command Station

Setting	What it does	Default
Auto-Connect	Connect to the last command station automatically at launch. (Ch. 3)	On

Device

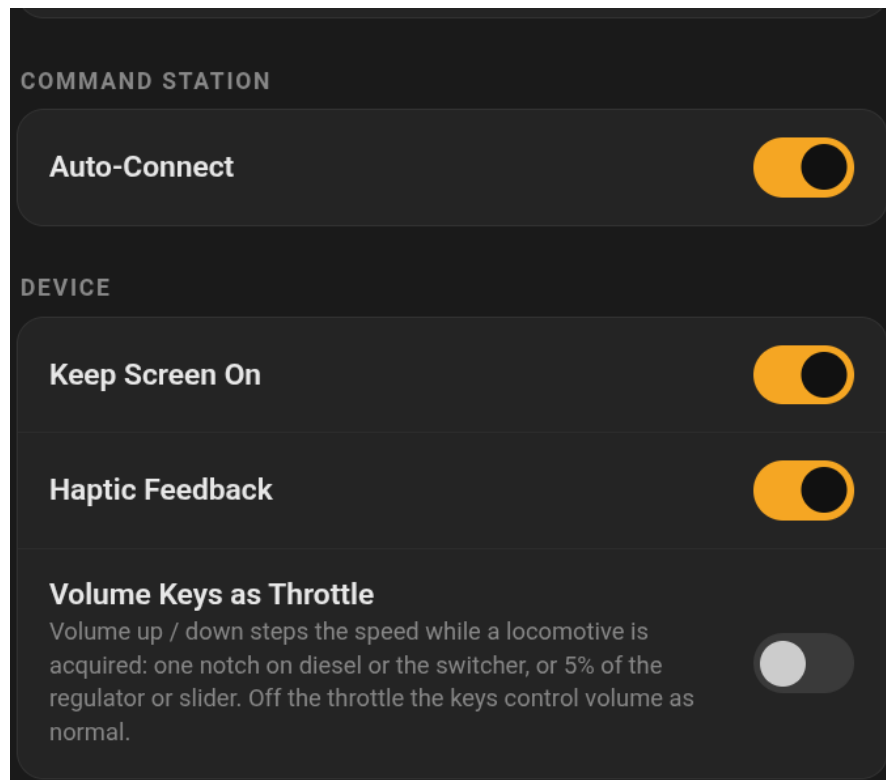


Figure 25.4 Setup: Command Station and Device.

Setting	What it does	Default
Keep Screen On	Stop the phone's screen from sleeping while Vector is open.	On
Haptic Feedback	A small vibration on notches, detents and buttons.	On
Volume Keys as Throttle	Volume up/down steps the speed while a locomotive is acquired. (Ch. 21)	Off

Backup & Restore

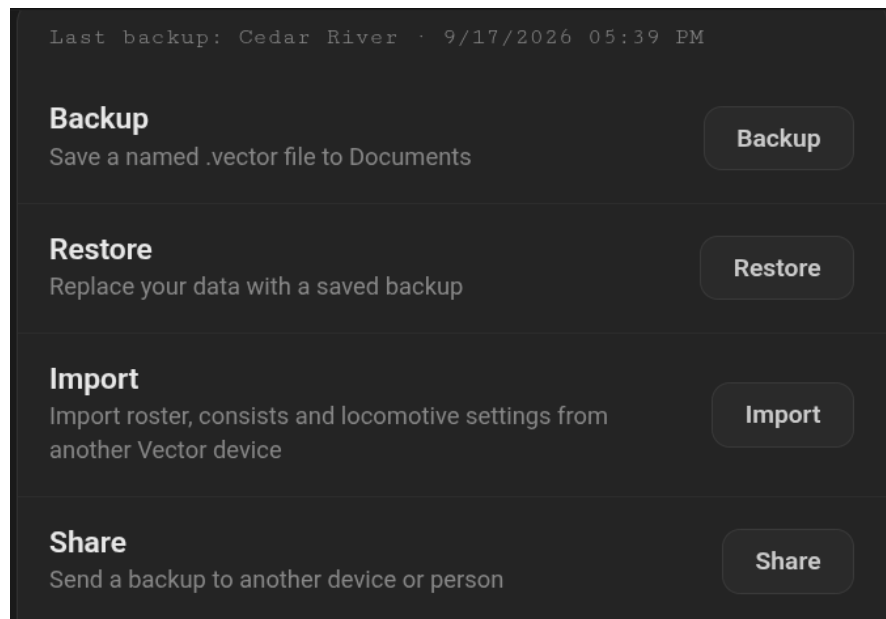


Figure 25.5 Setup: Backup & Restore.

Button	What it does
Backup	Save a named .vector file to Documents/Vector. (Ch. 10)
Restore	Replace everything on this phone with one of your backups. (Ch. 10)
Import	Bring locomotives and consists in from another Vector device's file. (Ch. 10)
Share	Send one of your backups to another device or person. (Ch. 10)

About

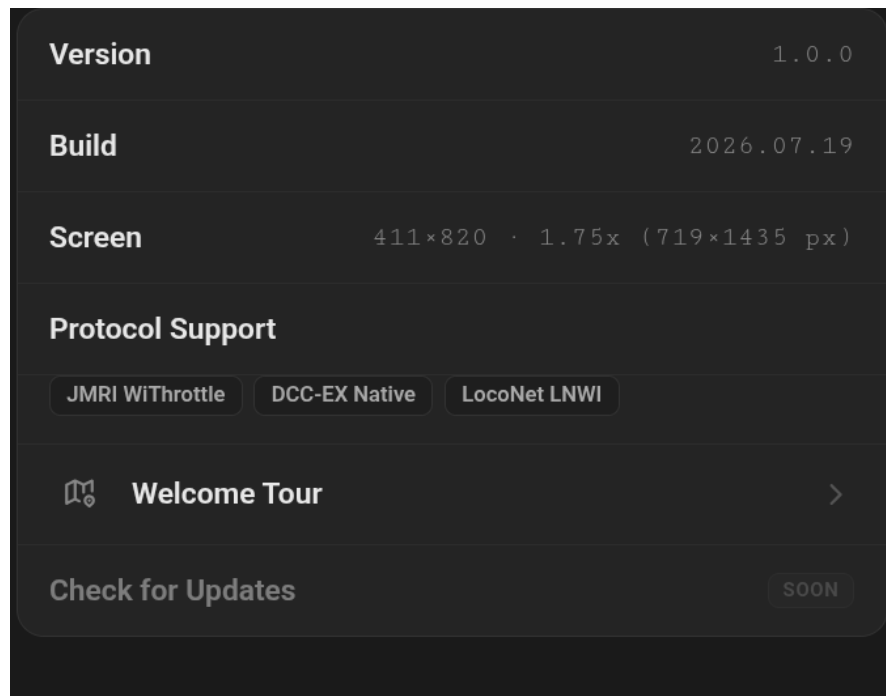


Figure 25.6 Setup: About.

Version and build, the screen size Vector sees, the protocols it supports, **Welcome Tour** (replays the first-launch tour, Chapter 2) and **Check for Updates**, which is marked *Soon* in this release.

Part 6

When Something Goes Wrong

Chapter 26

Disconnects and Reconnecting

Wi-Fi drops. Somebody trips over the router's power cord, the phone wanders onto a different network, the command station reboots. This chapter is what Vector does when that happens, what the command station does, and what you should do.

What Vector does

The moment Vector loses the connection, the status bar goes red and Vector freezes the throttle — the controls stop sending, so nothing you do in the next few seconds reaches a locomotive you can't see. Then it starts trying to reconnect, on its own, and keeps trying.

When the connection comes back, Vector re-acquires the locomotive or consist you were driving and reads back what the command station says it's doing — speed and direction. The readout updates to match, and the throttle unfreezes at that speed. You carry on. Nothing is sent to the locomotive until you touch a control, so a reconnect never lurches the train.

If you'd acquired a locomotive in Explore Offline, or while Vector was still reconnecting, it's acquired properly from the command station at this point too (Chapter 4).

What the command station does — and doesn't

This is the part to understand. **Losing Vector doesn't necessarily stop the train.** The locomotive keeps doing whatever it was last told until something tells it otherwise, and what that something is depends on how the connection was lost.

We have tested this with a DCC-EX command station (a CSB1); what follows is what we saw there. Other command stations may behave differently, and this guide makes no claims about them.

- If the **phone's** connection disappears — Wi-Fi turned off on the phone, the phone walks out of range — the DCC-EX station notices that the throttle has gone quiet and stops its locomotive itself, about 20 to 30 seconds later.
- If the **network path** disappears without the station detecting that the throttle connection is gone — the router loses power — the locomotive can **continue running**. Nothing stops it until a throttle reconnects or track power is cut.

So: **if the status bar goes red and the train is moving, watch the train, not the phone.** If it doesn't stop and Vector hasn't reconnected, cut track power at the command station. Then sort out the network.

STOP and E-STOP during a dropout

There's a short window, a few seconds long, after a connection dies but before the phone knows it has. A STOP or E-STOP pressed in that window may go into the phone's outgoing queue and never arrive, and Vector will show the locomotive stopped because, as far as it can tell, the command was sent. That's a limit of how networks work, not something Vector can see through. Once Vector knows the link is down,

a STOP is refused and you're told the locomotive could not be reached — the readout stays at the last speed. The advice is the same either way: if the train hasn't stopped, cut power.

Stop on App Interrupt

A phone call, a notification you tap, switching apps — anything that puts Vector in the background — triggers **Stop on App Interrupt** (on by default): Vector stops every locomotive it holds before it goes. When you come back, you're where you were, with the train stopped. Turn it off in **Setup** → **Safety** only if you'd rather a train kept running through an interruption, and you know what that means on your layout.

The phone's own Wi-Fi

Android phones prefer networks with internet access. A layout Wi-Fi that has no internet — many DCC-EX setups — may be dropped by the phone in favour of your home network without telling you, and Vector loses its connection through no fault of its own. If it happens regularly, tell the phone to stay on the layout network (in Android's Wi-Fi settings, the option is usually called "auto-connect" or "stay connected"), or turn off the home network's auto-join while you operate.

Chapter 27

Troubleshooting

Symptom first; the likeliest cause; what to do.

It looks like...	Usually because...	Try...
Connect does nothing — the connection screen stays put	The command station can't be reached: wrong network, wrong address, station not running	Check the phone's Wi-Fi name. Check the IP address. Make sure the station has finished starting. Tap Connect again. (Ch. 3)
Connected, but the locomotive won't move	Track power off; wrong address type; the address isn't what's programmed; on DCC-EX, another throttle holds it and has stopped it	Check PWR. Try the other address type. Check the number on the locomotive's decoder. Ask who else is running. (Ch. 11, 12)
It moves, but the wrong way	Direction was Reverse when you notched up; a consist unit's facing is wrong	Check the direction row before moving. In a consist, check FACING in the builder. (Ch. 12, 22)
It's slow — won't reach full speed	A Max Throttle cap on the locomotive, or the global cap; in a consist, the slowest member's cap	Check Loco Setup → Performance, and Setup → Global Maximum Throttle. (Ch. 7, 23)
The speed on screen doesn't match the train (DCC-EX)	Another throttle is also driving it	Release it from the other throttle. (Ch. 11)
Function keys show only numbers	The locomotive isn't in your roster, or its keys haven't been labelled	Add it to the roster and load a decoder profile, or set F-Key Defaults. (Ch. 6, 8)
A key doesn't do what its label says	The decoder profile's factory assignment doesn't match your decoder's	Fix the label on that key in Loco Setup → F-Keys. (Ch. 8)
Horn stays on / bell won't stay on	Latching and momentary are the wrong way round for that key	Tap the LAT/MOM badge in Loco Setup → F-Keys. (Ch. 8)
Vector won't change direction	Direction Lock: the locomotive is moving	Stop first, or turn Direction Lock off. (Ch. 13)
Vector won't change throttle style	The locomotive is moving	Stop first. (Ch. 12)
E-STOP asks "Trigger emergency stop?"	Confirm E-STOP is on	Tap OK — or turn the setting off. (Ch. 13)
The train keeps running after Wi-Fi dropped	The command station doesn't stop a locomotive when the network goes away	Cut track power at the station. Then reconnect. (Ch. 26)

It looks like...	Usually because...	Try...
The train stopped by itself when Vector went into the background	Stop on App Interrupt did its job	That's the setting working. Turn it off only if you mean to. (Ch. 26)
Import from DCC-EX says the roster is empty	The command station has no ROSTER entries in myAutomation.h	Add them on the station, or enter locomotives by hand. (Ch. 9)
Import from JMRI fails	The JMRI Web Server isn't running, or it's on another computer	Start it (Actions → Start Web Server); set JMRI Host in Setup if needed. (Ch. 9)
"This file is not a readable Vector backup"	The file you picked wasn't made by Vector's Backup or Share	Pick the .vector file. (Ch. 10)
Restore says to release the locomotive first	You're driving something	Release it, then restore. (Ch. 10)
The volume keys just change the volume	Volume Keys as Throttle is off, no locomotive is acquired, or you're not on a throttle	Turn it on; acquire; go to the throttle. (Ch. 21)
Everything's gone — empty roster, default settings	Vector was uninstalled and reinstalled, or the app's data was cleared	Restore your latest backup. If you don't have one: this is why Chapter 10 nags. (Ch. 10)
Vector opens on the connection screen every time	Auto-Connect is off, or it couldn't reach the station at launch	Turn Auto-Connect on; check the network. (Ch. 3)

Chapter 28

Glossary

Acquire — Take control of a locomotive or consist on your throttle. Vector asks the command station for it. The opposite is **release**.

Address — The number a DCC decoder answers to. **Short** addresses run 1–127, **long** addresses 128–9999. A decoder is programmed for one or the other; Vector has to ask with the right kind.

Air brake — Vector's simulated train brake on the Diesel, Switcher and Steam throttles: a handle that commands a brake cylinder, which builds and releases over a few seconds and holds the locomotive at rest under Full Service. (Ch. 16)

Command station — The equipment that generates the DCC signal on the track. Vector connects to it, or to JMRI in front of it, over Wi-Fi.

Consist — Two or more locomotives driven together as one. Vector's consists are built and saved on the phone. (Part 4)

Cutoff — On the Steam throttle, how long each piston stroke admits steam: long (100%, 75%) for starting and heavy pulling, short (35%, 25%) for running light at speed, Drift to coast. (Ch. 19)

DCC — Digital Command Control, the standard for driving model locomotives individually over the rails.

DCC-EX — An open-source command station. Vector connects to it over WiThrottle; the connection screen calls this "DCC-EX Native".

Decoder — The circuit board in the locomotive that receives DCC commands and drives the motor, lights and sounds. Its **functions** are numbered F0 and up.

Direction Lock — The setting that refuses a direction change while the locomotive is moving. On by default. (Ch. 13)

Dynamic brake — On the Diesel throttle, braking by turning the traction motors into generators; for holding speed on a grade rather than stopping. (Ch. 17)

E-STOP — Emergency stop. Sends the DCC emergency-stop command, which the decoder obeys at once regardless of momentum. (Ch. 13)

Explore Offline — Running a throttle with no command station, for practice and setup. (Ch. 4)

F-key / function — A decoder function, F0–F31, and the throttle button that operates it. **Latching** functions stay on until pressed again; **momentary** ones are on only while held. (Ch. 8)

F-Key Defaults — The function labels Vector uses for a locomotive that isn't in the roster. (Ch. 8)

Facing — In a consist, which way a unit is coupled: Forward or Rear. A Rear-facing unit is driven backwards so the train moves as one. (Ch. 22)

Gear panel — The quick-setup panel behind the gear button on every throttle: train load, momentum mode, throttle type, speed unit, appearance, and Full Settings. (Ch. 12)

JMRI — Free software that, among many other things, runs a WiThrottle server in front of most DCC systems. (Ch. 3, 9)

Lead / Trail — The first and last units of a consist. The lead unit's function keys are the ones shown on the throttle. (Ch. 22)

Lead Only — The consist protocol that sends function commands to the lead unit only. The default. (Ch. 24)

LNWI — Digitrax's LocoNet Wi-Fi Interface; a WiThrottle server for Digitrax systems.

Max Throttle (Max %) — A speed cap, global or per locomotive. Full throttle on the screen becomes that percentage of the decoder's full speed. Minimum 15%. (Ch. 7)

Momentum — The gradual build and decay of speed. From the decoder (CV3/CV4) in **Decoder** mode; from Vector in **VST**. (Ch. 14)

Neutral — On the Diesel and Switcher, a coast: the throttle is disconnected but the locomotive isn't stopped. (Ch. 17, 18)

Notch — One of the eight throttle positions on the Diesel (N1–N8), or detents on the Switcher, above IDLE. (Ch. 17, 18)

Regulator — The steam locomotive's throttle: how much steam goes to the cylinders. (Ch. 19)

Release — Give a locomotive back to the command station when you're done with it. (Ch. 11)

Roster — Your list of locomotives and their settings, kept on the phone. (Part 2)

Speed steps — The units DCC uses for speed: 0 to 126 in 128-step mode. "Steps" is one of Vector's speed display units.

STOP — The normal stop: throttle to zero, speed zero commanded. (Ch. 13)

Train Load — What the locomotive is pulling — Light, Medium, Heavy, Extra Heavy — which changes how VST accelerates, coasts and brakes. (Ch. 15)

VCP — Vector Consist Protocol — The consist protocol that maps each function to the units that should receive it, by label, each on its own key. (Ch. 24)

Vector Simulated Throttle (VST) — Vector's own momentum model, which makes train load, the air brake, the dynamic brake and steam cutoff meaningful. (Ch. 14)

WiThrottle — The protocol Vector uses to talk to command stations over Wi-Fi, spoken by JMRI, DCC-EX, the LNWI and others.