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AMTRAK F40PH LOCOMOTIVE PRODUCT GUIDELINES

Thank you for purchasing this model of Amtrak's F40PH locomotive. Our F40PH is a phase 1 version, which means it is an accurate representation of the first order of F40 locomotives delivered in 1976. These 30 locomotives worked across the country until the very last days of F40PH operation, and many survive today as NPCU or "Cabbages."

If one of those annoying know-it-alls visiting your house tells you that your F40 never operated in the west so shouldn't be used on your California-based layout, you have our permission to kick him out of your house. Phase 1 F40 locomotives operated all over the United States right until retirement.

Please read the manual carefully as this model probably works differently from EVERYTHING ELSE YOU OWN.

We've put a ton of love and care into the design, production and packaging of this Amtrak F40PH. That's an imperial ton, rather than a metric tonne. We will do our best to avoid using foreign spelling in this manual, but as we are furtive foreigners, we can't avoid it completely. In fact, we should warn you that this manual does contain one "tonne," four "colours," six "modellers" (with two Ls), 18 "moulds," a bit of "humour," and a whole lot of "eh?" But don't you worry, eh? These words only appear in this paragraph, so you are well and truly passed them now.

There is always the possibility that you've found something wrong with your locomotive. Maybe a grab iron has come loose in transit; maybe there is a fingerprint on the model and you are shocked to discover that our models are not assembled by robots; or maybe you are upset because you thought you were ordering a GEVO. Whatever it is, please don't hesitate to get in touch! More warranty information is available towards the back of this manual.

You can reach us by email: trains@rapidotrains.com, by phone (1-855-LRC-6917 or +1-905-474-3314) or by snail mail at the address below.

Please do not send any models back to us for repair without first speaking to us to get authorization. If it's the year 2072 and you've opened this box for the first time because you can finally afford to retire and start your layout at age 103, chances are we are all dead. You can try contacting our grandkids to ask for a replacement dynamic brake fan but chances are they won't know what the heck you are talking about and they will call the police. Good luck. And maybe you should have started that layout a few decades earlier. Or maybe you should choose a new hobby at age 103, like being one of those guys dozing all day by the entrance to the nursing home.

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DCC QUICK START FOR PEOPLE WHO DON'T LIKE READING MANUALS

OK – We know that more than half of our customers will not read this manual and then call us complaining when their F40PH doesn't work properly. It does, but they didn't read the manual.

But if you have got this far and you are really impatient to get your locomotive on the track, please take note of the following.

We have tried our best to recreate the actual way an F40PH locomotive operates with this model. This means:

1. To operate your F40PH locomotive with a modern passenger train (such as Amfleet, Superliner, Horizon or Viewliner cars – i.e. not old steam-heated junk) on a DCC layout, you need to press F4 and then F5 before you start accelerating.

If you press F4 but don't press F5, YOUR LOCOMOTIVE WILL NOT MOVE.

That's right – the locomotive will NOT move when just F4 is pressed. Press F5 if you want it to move. Those of you who read the rest of the manual will find out why. If you have a really short attention span and you simply can't read manuals then you can wonder about this odd feature for the rest of your life and make uninformed comments on our YouTube channel.

2. If you don't press F4 or F5, your F40PH locomotive will operate like a freight engine and will not provide power to your passenger cars.
3. The rear (backup) light will only go on when you are switching cars. It won't go on when you are backing up.
4. If you are running DC, just go play trains. Whatever sounds come out are what you get. And the rear (backup) light will never go on. Not that we're trying to convince you to upgrade to DCC or anything...

You can read more about these weird features, along with our reasons for introducing them, in the **Prototypical Operation – DCC** section below.

If you are using DCC and you really don't like operating your F40PH prototypically, you can turn off all of these features. Please turn to page 11 for step-by-step instructions on how to do this.



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F40PH DCC FUNCTION QUICK REFERENCE

F0	HEADLIGHT
F1	BELL
F2	HORN
F3	DOPPLER HORN
F4	GO INTO/OUT OF "STANDBY"
F5	GO INTO/OUT OF "RUN"
F6	STROBE LIGHTS – ON/OFF
F7	DIM THE HEADLIGHTS
F8	STARTUP/MUTE/SHUTDOWN
F9	DYNAMIC BRAKE
F10	STROBE LIGHTS TOGGLE
F11	BRAKE
F12	HOSTLER (SWITCHING) LIGHTING
F14	DYNAMIC BRAKE

BREAK-IN

No, we don't mean you should break into your buddy's layout room so you can take his Rapido F40 locomotives. And don't stand in a Santa outfit ringing a bell for your hobby budget. That money is not supposed to be for model train purchases. Go get a job.

Every locomotive needs a break-in period. Your F40PH has been tested at the factory... for about 30 seconds. That is not enough time to get the gears to mesh nicely or to even out any jerky operation in a new motor. We suggest that, after reading this manual, you put your F40PH on a test loop and just let it run in each direction for an hour or two. Fast and slow. If your layout is purely imaginary, you can probably skip this step.

There already should be enough grease in the gearbox so you don't need to add any more. Just let the thing run.

CHECKING AND ADJUSTING YOUR LOCOMOTIVE

We try and make sure that every locomotive is perfectly up to spec before it leaves the factory, but if Jason was visiting China when your model was assembled it means he took everyone to the karaoke bar and they were probably overtired when they assembled your model. Doing a quick pre-service check will solve most common glitches.

- Check to see that all wheelsets are correctly in gauge using an NMRA RP-2 Standards Gauge. (We will never write "gage." That's not American spelling; it's just terrible English.) If any of the wheelsets are out of gauge, remove the affected wheelset from the truck by prying off the bottom lid of the gearbox with a small flat screwdriver. The wheelset can be regauged by grabbing each wheel and twisting. Reverse the steps to replace the wheelset, and ensure the gearbox cover is snapped into place before placing on the track.
- Check that all underbody piping and appliances are firmly installed and clear of the track. Of particular note are the air hoses on the ends of the locomotive and both coupler trip pins. Bend up any low coupler trip pins so they don't interfere with your switches and crossings. We recommend using Kadee part #237 (Trip Pin Pliers) or Micro-Mark part #80600 (Trip Pin Bending Plier).
- Make sure that the trucks swivel freely and without binding. If they catch on anything, check to ensure that the ends of the trucks don't bind against the steps. If they do, see that everything is firmly installed.

MISSING OR DAMAGED PARTS

If you open your F40PH box and discover that something has obviously been bumped in transit and is damaged, please contact us. We know that some of you don't like to touch your models, but if it is a matter of gluing a grab iron back on you can do it yourself in less than a minute with a drop of white glue. If you really want to send your model back

to us for us to install that grab iron, we would be happy to. But if you do send it back to us for us to put that one part back on and other stuff falls off when we send it back to you, then tough tooties. We're not fixing it again.

If there are big gaping holes where grab irons obviously fell out and no such grab irons in the box, then please give us a shout as that should not be the case! More information about our limited lifetime warranty can be found towards the end of this manual.

REMOVING THE SHELL

If you need to open up your F40PH (to install a crew, install a decoder, etc.) it is actually quite easy to do. Just be sure to remember these important points:

- Our starship currently in orbit has a transporter lock on the molecular pattern of your locomotive. If something pops off while you are removing the shell, our starship's transporters will automatically lock on to the little part and beam it directly into the heart of the sun. Don't bother looking for it. It's gone. You might hear the transporter effect as the part is beamed away. We know it would have been more useful for us to beam the part back onto your workbench but someone's been fiddling with our transporters and we haven't been able to fix them because our transporter repair guy was assigned to a space station in the Denorios Belt. Sorry.
- To that end, please make every effort to ensure nothing flies away. Work on a clean, white surface. In fact, paint all the walls, the floor and the ceiling white, wear white coveralls, and remove everything else from within a three-mile radius of your workbench, especially (but not limited to) vegetation, people and air.
- Turn the locomotive upside down in a foam cradle (painted white, of course) and remove the coupler screws. Pull the coupler boxes out of the ends and turn the loco right-way up. Now pry the shell walls apart and wiggle the shell off. Carefully. Remember the transporter lock.
- That's it, really.

OPERATION – DC (SILENT)

Put the F40PH on the track. Make it go. That's it.

In DC operation, the only lights that work are the headlights (when going forward) and the front red marker lights (when going in reverse). The light on the rear of the locomotive is only used when switching and cannot be turned on using a DC controller.

If you are new to the hobby (or just like to occasionally "play trains") and you have a DC-powered train set, please contact us before operating your F40PH as it may not be safe (for your engine and/or your wallet) for you to use your controller.

Some train set throttles put out a very high maximum voltage that is not suitable for scale model trains. The maximum recommended voltage is 16 volts DC. Similarly, controllers designed for large scale trains put out a much higher voltage than your F40PH can handle.

If you use a train set throttle or a throttle designed for large scale trains, your locomotive's circuitry may end up looking like those "your brain on drugs" commercials. In such situations, we'll try our best to fix it for you. But we may have to charge you for the replacement parts and/or the labor involved. That's because you didn't read this bit of the manual.

INSTALLING A DCC DECODER

The F40PH contains an ESU-designed motherboard which is connected to the track, motor and lighting outputs. A blind plug is attached to the motherboard using a 21-pin connector. To install a decoder, remove the blind plug and install a 21-pin decoder (recommended) or a 21-pin adapter to attach an 8-pin or a 9-pin decoder. Your chosen decoder should have six function outputs.

At the time of writing, we recommend the following 21-pin decoder:

- ESU #54615 - LokPilot V4.0 DCC with 21MTC

We feel the 21-pin connectors are superior because there are enough pins to ensure that all your lighting functions are connected. The necessary resistors are included on our ESU-designed motherboard so you don't have to futz around with resistors. Just plug in the recommended decoder and you have DCC.

ESU has made an F40PH function mapping which can be downloaded into their non-sound decoder (54615) so that the function buttons and motor control are exactly the same as our factory-released sound versions. This is available for download on the F40PH page in the Support section of our web site. You will need an ESU LokProgrammer to write the function mapping to the 54615 decoder. If you don't have a LokProgrammer, you can adjust CVs in the usual way.

If you have F40PH locomotives from other manufacturers, sell them and buy more of our F40s. If you are not in a position to do that, sell your other models and buy more of our F40s. If you insist on keeping your old, not-nearly-as-awesome-as-our-model F40s, you can buy Rapido/ESU F40PH sound decoders from Rapido's web site.

OPERATION – DC (SOUND)

To operate your sound-equipped F40PH locomotive on a DC layout, just give the throttle some juice. The engine will start up once sufficient voltage has been reached (around seven volts). See the note above (in **Operation – DC (Silent)**) about using train-

set or large-scale throttles. With DC layouts, you have very little control over the sounds of your model.

WARNING: *If you have purchased a sound-equipped F40PH and you operate your trains with a Model Rectifier Corporation RailPower 1300 DC controller, stop what you are doing immediately. Do not pass Go. Do not collect \$200. The RailPower 1300 is notorious for voltage spikes and it WILL destroy your locomotive. There is no "if" about it. We will not repair any F40PH destroyed by a 1300 or any other "train set" DC controller. "Train set" DC controllers should not be used with sound-equipped locomotives.*

The only lights that work in DC are the headlights and strobe lights (when going forward) and the front red marker lights (when going in reverse). You can't adjust the strobe flash pattern in DC, nor can you turn the strobes off. Still happy that you haven't switched to DCC? The light on the rear of the locomotive is only used when switching and cannot be turned on using a DC controller. Sorry. Your buddy with the DCC layout can turn on that light. The number boards and step lights are always lit.

Some throttle manufacturers produce special doo-dads which are meant to trigger the sounds in locomotives on DC layouts. As we have no involvement in the development of those doo-dads, we have absolutely no idea how they will affect your F40PH, for good or for ill. As always, we'll try to help you fix your F40PH if one of these doo-dads scrambles your locomotive's circuitry, but we can't guarantee we'll be able to.

If you like running sound-equipped locomotives and advanced lighting features, you might want to think about upgrading to DCC. If you are one of those guys who thinks that modern inventions like the telephone and the gasoline-powered automobile are new-fangled rubbish and just passing fads, by all means stick with DC.

If you want a taste of what you are missing, please read on...

PROTOTYPICAL OPERATION – DCC (SOUND)

We've taking a bold, new step in North American model locomotive operation with our Bombardier LRC, VIA F40PH-2D and Amtrak F40PH locomotive models. This is sure to upset some people, but we feel the enormous amount of added realism is worth the extra couple of buttons you need to press on your DCC controller. Hopefully you will quickly get used to this prototypical operating method and it becomes second nature.

If you don't want to have anything to do with prototypical operation and you just want to turn these !@\$#%& features off, turn to **HEP Mode: How To Turn Off This Annoying Feature** on page 11 and follow the instructions.

Here's a quick overview that explains how the real F40PH locomotive works, and then we'll explain how it affects the model's operation.

HEAD END POWER IS THE KEY

The F40PH is a 3000 HP locomotive designed for hauling passenger equipment. Because the locomotive generates Head End Power (HEP) for its trailing passenger cars, it does not operate like a conventional diesel locomotive. (By the way, HEP is pronounced “aitch ee pee” in the United States but it is pronounced the far cooler “hep” as in “hep cat” in Canada. You are encouraged to adopt the Canadian pronunciation for coolness’ sake.) The 480-volt HEP allows for the heating, lighting and air conditioning of the train; it is generated by an alternator connected to the prime mover (diesel engine) via a 2:1 ratio gearbox.

In order for the HEP alternator to turn at the needed speed of 1786 RPM, the prime mover must always be running at its maximum speed of 893 RPM. So rather than hear an F40PH labor through the notches from idle to eight, it always sounds like it is screaming at notch eight.

The throttle does not control the prime mover’s speed; instead, it controls the flow of current in the Traction Alternator, which in turn controls the amount of power delivered to the Traction Motors. From our perspective as model railroaders, the locomotive sounds pretty much the same no matter what speed it’s going or how heavy a load it is pulling.

HEP MODE: IDLE, STANDBY AND RUN

Inside the cab of a real F40PH is the Head End Power Mode Switch. The three positions are Idle, Standby and Run. This switch is key to how the locomotive sounds and operates.

IDLE: When the HEP Power Mode Switch is set to Idle, the F40PH operates like a freight engine – as you increase the throttle, the prime mover speed increases from its idling speed of 460 RPM up to its maximum of 893 RPM. The locomotive power is directly tied to the prime mover speed.

By default, your model is set to Idle. If you put it on the track and advance your throttle, the HEP alternator is not engaged and the locomotive will operate and sound like a freight engine. If you are running your locomotive in freight service or you are pulling steam-heated passenger cars (which would be a bit anachronistic for the Amtrak F40, but what the heck), then you will want to keep the Head End Power Mode Switch at Idle.

STANDBY: Standby is meant to be used when the train is idling for a long time at a station, such as between runs. The HEP is provided by the Traction Alternator rather than the HEP Alternator. Since the Traction Alternator is being used for HEP and not for the Traction Motors, the locomotive cannot move. The prime mover rotates at 720 RPM, which roughly sounds like Notch Six.

RUN: Once the F40PH is in Run, the prime mover is rotating at 893 RPM and the second engineer can turn on the HEP to the passenger cars. From a railfan’s perspective, there is no noticeable difference in the sound of the locomotive between Run without

the HEP turned on and Run with the HEP turned on. So we don't have an extra button for that. In general practice, the locomotive is kept in Run for its entire trip – i.e. from terminus to terminus — even if it is making several station stops along the way.

Note that the locomotive must be stationary when changing between Head End Power modes. This is not like switching to third-rail on a New Haven FL9. You can't switch on the fly or you'll blow up the engine.

MODEL OPERATION

We've tried our best to simulate the Head End Power Mode Switch with the F4 and F5 function buttons on your DCC controller. Once the F40PH model is on the track, press F8 to turn on the sounds and put your locomotive into Idle.

Press F4 to put it into Standby. The prime mover will rev up to 720 RPM. (If you don't press F4, the locomotive operates like a freight engine.)

IN STANDBY, YOUR LOCOMOTIVE WILL NOT MOVE, EVEN IF YOU ADVANCE THE THROTTLE.

When your F40PH is in Standby, you can put it into Run by pressing F5.

If you don't need to go to Standby, then just hit F4 and F5 in rapid succession. The prime mover will rev right up to 893 RPM and your locomotive will be in Run. It will move when you advance the throttle. This simulates turning the Head End Power Mode Switch directly to Run.

IMPORTANT: IF YOU DON'T FIRST PRESS F4, PRESSING F5 WILL HAVE NO EFFECT.

To go back down to Standby, press F5 again – you are essentially “turning off” the Run mode on the decoder. Then press F4 again to “turn off” the Standby mode and go back down to Idle. If you are in Run and you don't need to go into Standby, press F5 and F4 quickly, in that order. The locomotive will skip Standby and go straight down to Idle.

HEP MODE: CONSISTING

Every DCC system treats consisting a little bit differently. On some systems, you will need to put your locomotives into Run before you consist them. On most systems, you can decide which functions are controlled by consist address so you can switch all of your units into Run simultaneously.

In Amtrak practice, when two or more F40PH locomotives are operating in a consist, only the rear locomotive is providing HEP so only the rear locomotive should be operated in Run. This applies whether the locomotives are running elephant style or back to back. The remaining locomotives are operated in Idle.

If your Amtrak F40 fails for whatever reason, your layout's top brass can lease a VIA F40PH-2D or LRC from Canada. That means you need to go buy those models too. Coincidentally, Rapido Trains Inc. is the only company ever to manufacture the VIA F40PH-2D and LRC.

HEP MODE: HOW TO TURN OFF THIS ANNOYING FEATURE

If you don't want to futz around with F4 and F5 and you just want to put the F40PH on the track and make it go, but you still want to hear the sound of the HEP, we have a solution for you.

On your programming track (or using a LokProgrammer), input the following (in order):

CV31=16, CV32=2, CV400=0, CV445=128, CV447=16

This puts your F40PH into Run as soon as you press F8 to start it up, and it will stay in Run until you press F8 again to shut down the locomotive. You won't hear the startup or shut down sequences.

But if you do that and you want to run your locomotive in a non-HEP environment, such as in freight service or pulling conventional passenger cars, you can't. Your F40PH will always be screaming at notch 8.

LOCOMOTIVE ADDRESS

Your Rapido F40PH comes from the factory with a decoder address of 3. We suggest if you are using DCC control that you first test that the locomotive responds on address 3. Once you have verified that the locomotive is responding you should assign it a unique address (we suggest the road number of the locomotive) before going any further. This can be done either on your programming track (recommended) or on the main if your system supports programming on the main. Be aware however that if you do program the locomotive on the main and you have any other locomotives on your layout assigned to address 3 (the normal default address for new locomotives) that ALL of them will likely also be changed to your new address! Also be aware that if you give your locomotive a four-digit address it will not work at all if you try to run it on a friend's DC layout.

Also please keep in mind that some DCC systems do not have sufficient power to program sound-equipped locomotives on the mainline. If your sounds do not operate correctly on a Digitrax DCC system, this likely means that you need to clear the memory on your system, achieved by "clearing slot #36." A basic summary of how to do this can be found on the F40 page in the Support section of our web site. More detailed information can be found on the Digitrax web site.

If you have a really old DCC system, you may find that this locomotive won't work at all – nor will many other new models. Go update DCC your system to a newer version.

Your computer is updated regularly. Your DCC system should be updated as well.

TURN ON THE SOUND

Press F8 and you will hear the F40PH startup sequence followed by the sound of it idling. You can adjust CVs to prevent the locomotive from moving until the startup sequence has played out. Jason is really impatient so he turned this feature off. Refer to a full ESU LokSound Select decoder manual for more information. You can download it from the F40 page in the Support section of our web site. The feature is called the "Prime Mover Startup Delay" and at the time of writing it was on page 35 of the ESU manual.

If you press F8 when the locomotive is already moving, it will skip the startup and the sound will just turn on. Press F8 again to turn the sound off.

If you want the F40PH to be making noise as soon as it is put on the track, you need to change some CVs. On a programming track (or using a LokProgrammer), input the following in order:

CV31=16, CV32=2, CV435=32

Note that if you are listening to your F40PH idling nicely and then you select another engine with your throttle, your locomotive still thinks F8 is pressed so it will keep idling along. However, if someone else selects your locomotive's number and F8 isn't pressed on his or her controller, the F40PH will promptly shut down. He or she will need to press F8 again.

"She?" you ask. "You mean there are female model railroaders?" Well, yes. We have at least three female customers. We're keen to increase that number, so the next bit of this manual is a "women's interest" section specially tailored for the women who have bought this locomotive.

FUNCTIONS

- F0 Headlights
- F1 Bell
- F2 Horn
- F3 Doppler Horn
- F4 Go Into/Out of "Standby"
- F5 Go Into/Out of "Run"
- F6 Strobe Lights – On/Off
- F7 Dim the Headlights
- F8 Startup/Mute/Shutdown
- F9 Front Classification Lights (Markers)
- F10 Strobe Lights Toggle
- F11 Brake

- F12 Hostler (Switching) Lighting
- F14 Dynamic Brake
- F20 Sarco Valve (Spitter) – Slow
- F21 Sarco Valve (Spitter) – Fast
- F22 Sarco Valve on Shutdown
- F23 Brake Release On/Off

FUNCTIONS: MORE INFORMATION

F1 Bell and F2 Horn

Your F40PH is programmed with an accurate recording of an Amtrak F40PH steel air-operated bell. We also include an E-Bell, just because Jason likes E-Bells. No, we're not sure why either.

Whenever you operate the bell, the strobe lights will automatically come on. This is prototypical. If it really bugs you, there is probably a way to turn it off. We have no clue how, though. Go ask Matt at ESU. Tell him Rapido sent you. We advise stopping by his house between 23:45 and 04:00.

The default horn is ~~an injured hippopotamus being squashed by a moose~~ a Nathan "Old Cast" P5a. All Phase 1 Amtrak F40PH locomotives were delivered with this horn. Many were replaced with a "New Cast" P5a, and that is an available option.

When you blow the horn, you should also turn on the bell. On the prototype locomotive (and on some of our other locomotive models), the bell comes on automatically with the horn. We couldn't include that feature on the Amtrak F40PH (long story involving strobe lights and a lot of swearing) so you will need to turn the bell on and off manually.

To change which bell and horn versions you hear, you need to change CV 48. CV 48 controls the bell and horn (and other stuff, but we're ignoring them). Your choice of bell determines the initial value of CV48, and then your choice of horn determines how much you need to add to that initial value.

CV 48 initial value:

- 64 = Air Bell (default)
- 0 = E-Bell

CV 48 horn options and values:

- 0 = Nathan Old Cast P5a
- 1 = Nathan New Cast P5a
- 2 = Nathan M5
- 3 = Nathan K5LA
- 4 = Nathan Old Cast P5a (Alternate)
- 5 = Nathan New Cast P5a (Alternate)

The default is the Air Bell and the Nathan Old Cast P5a. Add the two values above (64

for the Air Bell and 0 for the Old Cast P5a) and you have a default value of 64 for CV 48.

Say you want to keep the Air Bell but you want a New Cast P5a. Add 64 for the Air Bell and 1 for the New Cast P5a and you get a value of 65 for CV 48.

If you want the E-Bell and the Nathan K5LA, add 0 for the E-Bell and 3 for the K5LA, and you get a value of 3 for CV 48. Hopefully you get it now. If you are following everything precisely and you can't seem to change the settings, read the note below which we should have told you before.

IMPORTANT: You need to change CV 48 using a programming track or a LokProgrammer. (Sorry. Next time we will try to remember to include that important bit of information at the top of Bell and Horn section of the manual instead of at the bottom.)

F3 Doppler Horn

You can play this when approaching level crossings at speed. It is a real recording of an Amtrak F40PH (with train) approaching a level crossing at high speed with its P5a blaring away. We think this is awesome. Thanks to Matt Donnelly for this brilliant recording.

F4 and F5 – Standby and Run

See **Prototypical Operation – DCC (Sound)** on page 8 above.

F6 Strobe Lights – On/Off

The Amtrak F40PH strobe lights operate automatically with the bell, but can also be operated separately by the engineer. When operating your model, there may be circumstances where you want the strobe lights to operate without the bell: hence function F6. For example, if you are using the Doppler horn (F3), you should press F6 to operate the strobes at the same time. Even though you can't really hear it from trackside, the bell on the prototype would have been ringing when that train was approaching the crossing at 80 MPH.

All Amtrak F40PH locomotives came equipped with strobe lights. However, just to make things difficult for model train manufacturers 40 years later, there are variations to the strobe light design and function. The early strobe lights were smaller and flashed together. Starting in the late 1980s, all Amtrak F40s (except locomotive 216) were retrofitted with Star 200BC strobe lights. These are larger than the original strobes and flashed randomly, independent of each other.

Your model has the smaller strobe lights installed at the factory, but the larger strobe lights are in a polybag in the box. If you prefer to model the larger strobe lights, you can do some transplant surgery. If you want to operate the strobes randomly (which looks awesome, even with the smaller strobe light castings), press F10. See below for more info.

The strobes on our model are not super bright. To do this would have necessitated either removing all of the cab interior detail or adding about \$20 to the retail price of the model. Neither was an acceptable option. If you want to make the strobes super bright, we recommend you wire new SMDs into the bottom of the strobe light castings and connect those to the AUX1 and AUX2 and +UB (common) outputs on the motherboard. This is something relatively easy for an experienced modeler to do but extremely difficult to do in mass production. If you don't understand what the heck we were just talking about, don't worry about it. Most people wouldn't. And our strobes sure look nice and don't need to be upgraded at all!

F7 Dim the Headlights

When approaching a station stop or an oncoming train, turn off your ditch lights and then press F7 to dim your lights – you don't want to blind your passengers or the oncoming train's engineers.

F9 Front Classification Lights (Markers)

The F40PH is regularly used in push-pull service. When pushing a train, the locomotive should have the red markers turned on. F9 operates independently of locomotive direction, just like the prototype.

F10 Strobe Lights Toggle

When F10 is not pressed, the strobe lights flash together. When F10 is pressed, the strobe lights flash independently and at random. If your layout is set in the 1990s or 2000s, you will probably want to press F10 each time you are running your F40PH. You just need to press it once. As long as your F40PH is communicating with your throttle, the strobes will flash randomly each time you press F6 or turn on the bell. If it loses connection to the throttle, you will probably need to press F10 once or twice again to get the strobes to operate randomly. It depends on the brand of your DCC system.

F11 Brake

F11 works just like the brakes on a real engine. Press F11 and you put on the brakes. Turn off F11 and the brakes come off so you start moving again.

F12 Hostler (Switcher) Lighting

A common misconception on cab units is that the big light in the back should be on whenever the engine is moving backwards. Actually, it's only on when the engine is running light or switching cars. And in those situations, both the front and rear headlights are on, and they are dim. Pressing F12 will put both headlights on dim.

F14 Dynamic Brake

F14 operates the sound of the dynamic brake. We know four of you are going to email us and complain that this isn't in the "top eight" or "top 12" function buttons. We felt

features like the Doppler horn and the ability to easily choose your strobe light function would be appreciated and used by more customers. But never fear! All of the functions can be remapped to different buttons by advanced users. If you are one of the four customers that uses the dynamic brake button, chances are you are advanced enough to remap the functions.

F15-F19

There is no F15-F19. Pressing those function buttons may be detrimental to your health and that of everyone you know.

F20 and F21 Sarco Valve (Spitter)

These functions turn on or off the Sarco Valve. On the real F40PH, it's always going. But you often can't hear it from a distance. In contrast, if you are close to the engine you can hear the Sarco valve pretty prominently. We feel that on many sound-equipped engines, the Sarco Valve is way too loud. So we've included two versions of it, controlled by functions. You can choose whether or not you hear the Sarco Valve, and you can choose how fast you want it to spit.

If you press F20, the Sarco Valve will be heard intermittently. If you press F21, it will be heard less intermittently. Make sure you turn off F20 first.

If you have a silent F40PH and you want to recreate the Sarco Valve effect with your mouth, you may want to purchase a cuspidor. Yes, we know what a cuspidor is, and if you didn't have to look it up we are mightily impressed with your knowledge of obsolete English and we've decided you can join our club.

Please note your F40PH warranty does not cover malfunction due to excess saliva.

F22 Sarco After Shutdown

On real engines you can hear the Sarco Valve after the engine shuts down. Some people like to hear this on the model, but Jason finds it annoying. So the default for this is "off." If you want to hear the Sarco Valve spit for a minute after shutdown, make sure F22 is pressed.

F23 Brake Set/Release

This function turns off the brake release and brake set sounds when you start or stop moving, respectively. It has no effect on the function of the engine — it just affects the sounds.

SOUND VOLUME SETTINGS

The sound volumes on your decoder have been pre-set at the factory to levels that we found comfortable on our test tracks. This is considerably quieter than what you are

probably used to when first turning on a sound-equipped locomotive, because we feel that most locomotive models are set to **ABSURDLY LOUD** out of the box.

Sound levels are very much a matter of personal taste (especially if you are going deaf like we are), and what sounds great in one layout environment may sound too loud or too soft in another. Fortunately all sound levels can be easily adjusted to best suit your own requirements and we recommend that you experiment with different settings if you don't care for the default levels.

To set the volume levels go into the program mode on your DCC system (refer to your system's manual for instructions on how to do this as each system is slightly different); enter the desired CV number; then enter the desired levels. Note that this can be done either on a programming track or on the main (ops mode) if your DCC system supports programming on the main.

We strongly recommend that you keep notes on which settings you have changed and which values were used. If you ever need to do a reset on the decoder (see "Factory Reset" below) then having good notes will allow you to easily re-enter any changes that you might want to keep.

VERY IMPORTANT: Before you change any of the volume control CVs, please make sure that CV 32 is set to 1. CV 32 is used as an index selection register and if you don't set it first then we are not responsible for your resulting rage and the fact that you will probably throw the locomotive against the wall in frustration.

F40PH SOUND VOLUME SETTINGS				
FUNCTION	CV	DEFAULT	RANGE	YOUR VALUE
MASTER VOLUME	63	50	0-192	
DIESEL VOLUME	259	80	0-128	
HORN VOLUME	275	128	0-128	
BELL VOLUME	283	64	0-128	
DYNAMIC BRAKE FAN	299	100	0-128	
DOPPLER HORN	339	128	0-128	
BRAKE SET/RELEASE	347	40	0-128	
FAST SARCO VALVE VOLUME	371	64	0-128	
SLOW SARCO VALVE VOLUME	387	64	0-128	
SARCO VALVE AT SHUTDOWN VOLUME	395	64	0-128	
BRAKE SQUEAL VOLUME	459	128	0-128	

FACTORY RESET

On your F40PH, you perform a factory reset by entering a value of "8" into CV 8. Note that this will cause all of your new volume and motor settings to be lost, so you will need to reprogram any settings that you want to keep. You did keep notes like we suggested earlier, didn't you?

You can NOT lose all of the pre-recorded sounds on your F40PH decoder by doing a factory reset. This is a myth about ESU decoders that was related to function mapping settings using an early version of JMRI. Even then the sounds were still there; they were just not mapped to the proper function buttons. ESU has changed their software so that this cannot happen again. If you manage to lose all of the sounds on your F40PH then you have probably set fire to your decoder – you really shouldn't have used the controller from the Marx tinplate set you got for Christmas in 1951. Open up your F40PH and pour out the ashes.

AWESOME SLOW SPEED THINGY

There is an awesome trick that you can use to get even better slow speed running and smoother operation. It's called the Automatic Motor Tuning Feature. This feature will automatically adjust the Back-EMF in most cases and give you phenomenal slow-speed performance.

In order to use this automatic adjustment you need to use Ops mode programming, i.e. programming on the main. Make sure your locomotive is in "forward" and that you have lots of room in front of it on your mainline. Set CV 54 to a value of 0. Then get out of programming mode and turn on the bell (press F1). We'll say this again: Make sure you have plenty of room in front of your locomotive and it is not headed for the layout edge and the basement floor!!!

Your F40PH will quickly take off at full speed and then screech to a stop while the decoder reads the motor responses. You'll have fabulous motor control after you do this. If you ever have to reset your locomotive, you can do the automatic adjustment again – it just takes a few seconds.

If you had less room than you thought and your F40PH is now in 47 pieces on the floor, have fun putting it back together. Good luck!

LIMITED LIFETIME WARRANTY

We will do our best to solve any problems or issues that you may have with your F40PH locomotive. If your locomotive has any defects that originate from the factory, we will repair your locomotive using new components or replace it outright should a repair not be possible. However, we can only replace your locomotive while we have additional ones in stock. We normally keep spares for up to six months after a model is released. If

you purchased this locomotive or first opened it after that time, it is possible that we no longer have any replacements and that a repair is the only option. Please give us a call or write us an email, and we will see what we can do to help you out.

There are a number of things that this warranty can not cover. If your F40PH arrives with a couple of loose grab irons or underbody bits, there is a very good chance that you can effect a repair in less time and effort than it would take to contact us. Don't be afraid to do some model railroading! White glue works wonders for securing all sorts of parts and will not mar or damage your paint. However, if parts are missing that is another story – call us or send us an email and we'll send you some replacements.

Of course, damage caused by trips to the basement floor, running your locomotive at 300 MPH up the wall on a TYCO Super Turbo Train track, using it as a hockey puck because Joey left his bag at home, filling it with real diesel fuel, or any other damage caused by you that we haven't been able to cover here is not covered by the warranty. However, if catastrophe does strike and your locomotive gets damaged, please give us a shout and we'll do our best to help you out. **Yes, even if it was your fault we will try our best to fix your locomotive for you. Don't be shy!**

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If you like your Rapido F40PH, please tell your friends about Rapido. And please encourage them to sign up for our newsletter and to pre-order the models they want. Most people tend to hear of our models after they come out and they get upset because they missed the models and we get upset because we made less money. We're hoping that our next American model will sell more than 17 pieces.

Packaging cover photo courtesy Alex Stroshane collection.