

TurboTrain

OPERATING INSTRUCTIONS

Written by Frank Verrico and Jason Shron

READ ME FIRST!

Do not even place your TurboTrain on the track without reading the **Quick Start Guide** beginning on page 4. Your Turbo is a unique train and is guaranteed not to work properly if you don't read the **Quick Start Guide**.

TO AVOID FRUSTRATION:

Before operating your TurboTrain, please read the **Operating Guide** beginning on page 9 (DCC) or page 15 (DC).



Quality. Style. Spirit.™ Qualité. Style. Éléance.™

RAPIDO

Thank you for purchasing the Rapido Trains Inc. TurboTrain. 10 years of research and development have gone into the making of this model, and we at Rapido are glad that it is finally in your hands. Just as the TurboTrain was unique, this model is unique. It has a unique electrical configuration that requires special handling. Please read the **Quick Start Guide** beginning on page 4 before setting up your Turbo. Before running your Turbo, we recommend you read the **Operating Guide** beginning on page 9.

If you have any problems with your TurboTrain, read the instructions completely, including the **Troubleshooting/FAQs** section on page 19. If your problem persists, you can give us a call at 1 (877) 738-6445 (or +1 905 738 6445 from overseas), or send us an email at TurboTrain@rapidotrains.com Ask for Dan, our Turbo repair guru. He will either fix your problem or refer you to the people who can.

This box contains:

Product #200001-200004

1x PDC-28 (FRONT)

1x PDC-29 (REAR)

1x IC-29

2x Single-Axle Trucks

2x Left Side Bell Crank Sideframes

2x Right Side Bell Crank Sideframes

2x 5/8" Diaphragms

2x Traction Tire-Equipped Wheelsets

8x Extra Traction Tires

1x DC Sound Transmitter

1x *TurboTrain: A Journey*

1x Decal Sheet

Product#200005-200006

1x PDC-26 - TurboClub (FRONT)

1x PDC-27 - TurboCoach (REAR)

1x IC-30

2x Single-Axle Trucks

2x Left Side Bell Crank Sideframes

2x Right Side Bell Crank Sideframes

2x 15mm Diaphragms

2x Traction Tire-Equipped Wheelsets

8x Extra Traction Tires

1x DC Sound Transmitter

1x *TurboTrain: A Journey*

1x Decal Sheet

Rapido Trains Inc.

140 Applewood Crescent, Unit A

Concord, Ontario

L4K 4E2

Canada

Tel. (905) 738-6445 - Toll Free 1-877-738-6445

Fax. (905) 738-6265

<http://www.rapidotrains.com>

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**Short (prototypical) diaphragms
are available separately for
your Turbos on display.
See pages 26 and 27 for details.**

Glossary

PDC Power Dome Car; the locomotive

PDC-28 Front PDC on American TurboTrains (ARROW is pointing to the nose)

PDC-29 Rear PDC on American TurboTrains (ARROW is pointing away from the nose)

PDC-26 Front PDC on Canadian Turbos (ARROW is pointing to the nose)

PDC-27 Rear PDC on Canadian Turbos (ARROW is pointing away from the nose)

IC Intermediate Car

IC-29 American TurboCoach (with take-out counter)

IC-30 Canadian TurboCoach (CN name in service: TurboLuxe)

IC-31 Canadian TurboCafe (CN name in service: Turbo Buffeteria)

IC-33 Canadian TurboClub

IC-36 American TurboCoach

Dual-Axle Truck Power truck on the PDC

Single-Axle Truck Truck between cars

Guidance Arms the long poles sticking out from the Single-Axle Truck

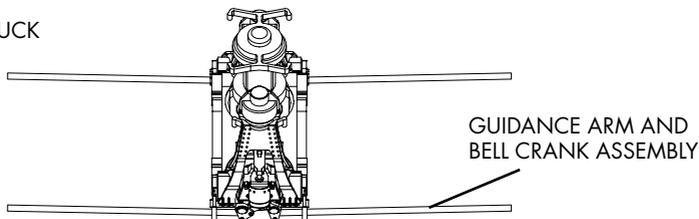
Diaphragm Flexible rubber passageway between cars

Gyalite Oscillating white headlight on the front of each PDC

Quick Start Guide

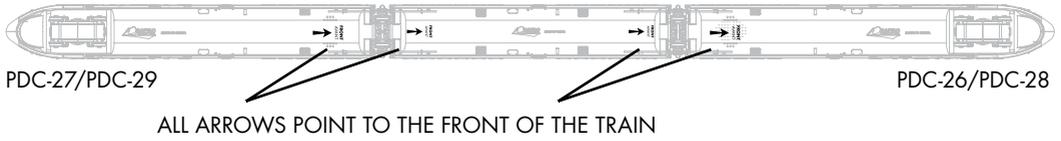
Check the arrows underneath each PDC and IC. All of the Intermediate Cars on the TurboTrain must face the same way for proper operation. Please follow these instructions carefully.

SINGLE-AXLE TRUCK

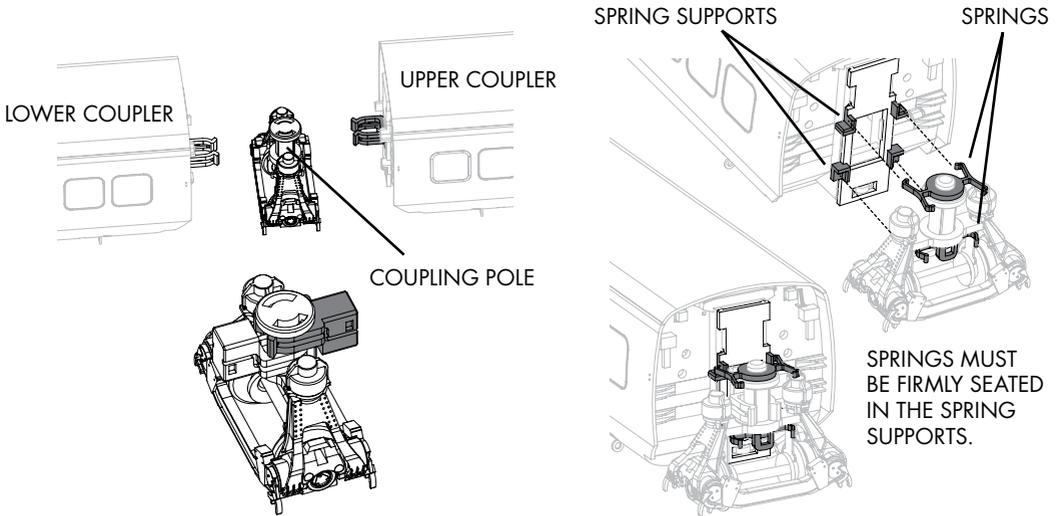


1. Remove all of the Single-Axle Trucks from the PDCs and ICs.
2. If your layout has curves below 24" Radius, you will need to remove the Guidance Arms. If your layout has broad curves or you plan to display your TurboTrain, skip to step 3. The easy way to do this is to cut off the Guidance Arms on either side of the Single-Axle Truck. The better way to do this is to carefully remove the Guidance Arm and Bell Crank assembly from the side of each Single-Axle Truck and replace it with the matching Bell Crank Sideframe included in the box. Keep the Guidance Arm and Bell Crank assemblies in case you rebuild your layout with wider curves and you want

to re-install them. If you lose them, new Guidance Arm and Bell Crank assemblies are available for purchase from Rapido Trains Inc. See page 26.

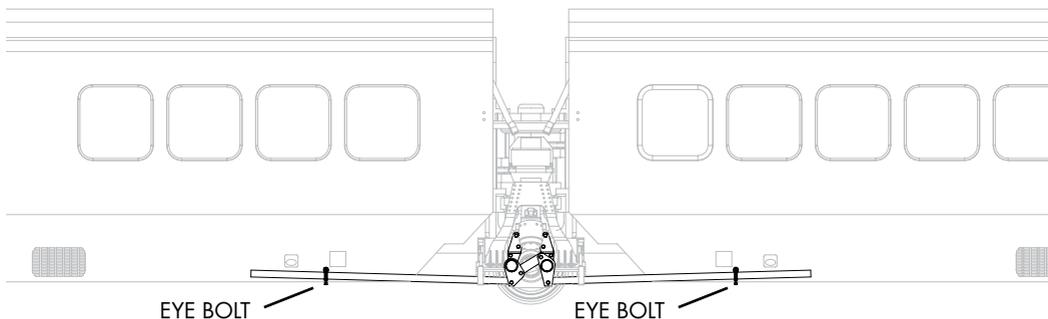


3. Check the bottom of each PDC and IC before putting it on the track. The arrows must all face the same way. You will also notice that every **front** coupler is a **Lower Coupler** and every **rear** coupler is an **Upper Coupler**. Even though the TurboTrain has two PDCs, PDC-28 (American Turbos) or PDC-26 (Canadian Turbos) is always the front PDC and PDC-29 (American Turbos) or PDC-27 (Canadian Turbos) is always the rear PDC.



4. Install a Single-Axle Truck on the **rear** end of every IC and of PDC-28 (American Turbos) or PDC-26 (Canadian Turbos). Do this by clipping the coupler on the car end around the Coupling Pole (vertical rod) in the center of the Single-Axle Truck. Be sure not to snag the pickup wire in the coupler on the Coupling Pole. Make sure that the plastic springs on the Single-Axle Trucks are properly seated in the Spring Supports on the end of the car. Carefully thread the Guidance Arms through the Eyebolts on the car bottom as you are pushing on the Single-Axle Truck. There is no front or back to the Single-Axle Trucks. They can be installed either way.
5. Place the Rear PDC — PDC-29 (American Turbos) or PDC-27 (Canadian Turbos) — on the track. Next place the IC, with Single-Axle Truck attached and to the rear, on

THREAD GUIDANCE ARMS THROUGH EYE BOLTS



the track. Move the IC toward the PDC, and thread the Guidance Arms through the Eyebolts on the PDC. Then couple the PDC onto the Single-Axle Truck. Again, make sure that the plastic springs on the Single-Axle Trucks are properly seated in the Spring Supports on the end of the PDC.

NOTE: The coupler on the rear of PDC-28 and PDC-26 is an **Upper Coupler**. It attaches to the Coupling Pole **above** the **Lower Coupler** on the front end of the IC.

6. If you have more ICs, install them to the rear of the first IC using the same method as step 5. Refer to the Appendix on pages 132 and 133 of *TurboTrain: A Journey* for the correct order of ICs on long TurboTrains. If you are freelancing, the ICs can be installed in any order you wish, as long as they are facing the right direction.
7. **BEFORE INSTALLING THE REAR PDC:** Look at all of your Single-Axle Trucks. If any IC roof is higher or lower than the adjoining car, **YOU HAVE INSTALLED A CAR BACKWARDS** or you have placed an Upper Coupler below a Lower Coupler. Separate the cars and fix the problem.
8. Now that the front PDC and all of the ICs are at the same level, you are ready to attach the rear PDC, PDC-29 (American Turbos) or PDC-27 (Canadian Turbos). Check that all wheels are properly on the track. Your Turbo is now ready to run.
9. **VERY IMPORTANT: Do not park your TurboTrain on a curve.** The plastic springs which keep the Single-Axle Trucks centered will develop memory and stop functioning if the train is parked on a curve after an operating session. The Guidance Arms will also develop memory and may cause derailments. Between operating sessions, the TurboTrain must always be parked on straight track.

10. If you wish to install the Diaphragms, gently compress each diaphragm and drop it between cars. The Diaphragm will uncompress and fill the space between cars. If the folds of the Diaphragm stick up or out, gently push them in. If you are displaying your TurboTrain or you have very wide radius curves, you can order shorter diaphragms from Rapido Trains Inc. which will have prototypical-sized folds. Information and an order form is located on pages 26 and 27.
11. If you have grades over 2% or you wish to run long Turbos, you may need to add the traction tires for reliable operation. To do this, turn one PDC over and rest it on a soft surface, preferably some soft foam. Unclip the cover of the Dual-Axle Truck. Remove the wheelset furthest from the nose of the PDC, and replace it with a wheelset equipped with traction tires, included in the box. Close the cover. Repeat the process with the other PDC. Using traction tires will not affect the electrical pickup of the train, but may require you to clean your track more frequently.
12. **Note to members of clubs and modular layout groups:** Disassembling and reassembling the TurboTrain is a time-consuming job. If you keep the Guidance Arms attached, you will become frustrated and you will operate your Turbo less and less frequently. We don't want that, so we recommend that you remove the Guidance Arms (see step 2 above). However, if you are really creative, you can build a travel case with tracks along the bottom into which you can run your TurboTrain between operating sessions. That way you never have to disassemble the train. It's a thought...

Quick Start Operation — DCC

1. Select address 3 on your DCC controller. Both PDCs are set to address 3 by default. **NEVER, EVER PROGRAM THE PDCs SEPARATELY!**
2. Press any function button twice to start up.
3. Once the Turbo is idling, press F4. If you hear "All Aboard!" you are in **American announcement mode**. If you hear "En Voiture, All Aboard!" you are in **Canadian announcement mode**. To switch between modes, press F12. You will hear a toot from the horn when the announcement mode has been switched.
4. F0 turns on the headlights. F3 turns on the Gyalrite.
5. Give it some juice and away you go.
6. The remaining functions are explained on page 10.

If your DCC system has fewer than 12 functions, you will need to change the announcement mode using DC programming. Refer to page 17.

Quick Start Operation — DC

1. Turn the throttle up to half power (until you hear the engines)
2. Wait three seconds.
3. Turn on the Gyalite by pressing button 3 on your DC Sound Transmitter.
4. Give it some more juice and away you go.

Note: To switch between American and Canadian announcement modes you need to press button 5A on the DC Sound Transmitter.

Operating Guide

Introduction

The TurboTrain comes factory equipped with two state-of-the-art Dual-Function decoders. These enable your train to operate with any NMRA-compatible DCC system, as well as with any regular DC Train Control (HO power pack). It will automatically sense the type of control you are using.

Some of the accessory sounds are directional from either the lead PDC or the trailing PDC, depending on the direction of travel. This is normal and not considered to be a factory defect. The Turbo roar will play simultaneously from both PDCs, while the Horn and Bell will only emanate from the lead PDC. Other sounds will vary from either the lead or trailing PDC.

The TurboTrain itself, and the electronics installed inside, are very delicate. Care should be taken in the handling of the entire TurboTrain.

DO NOT TRY AND PICK UP OR CARRY THE TURBOTRAIN WHILE COUPLED.

It will collapse and the couplers and/or trucks will break. Your warranty does not cover such silliness. If you didn't read this until **after** you broke the couplers and/or trucks, you can order new couplers and trucks on page 27.

Because the couplers carry electrical power between the ICs and the two PDCs, it is very important to follow the steps in the **Quick Start Guide** (page 4) when setting up your Turbo. The train has an independent sound decoder in each PDC; these must be linked together electrically for proper operation.

Operating Guide — DCC

Your TurboTrain will operate on any NMRA compatible Digital Command Control (DCC) system. The highly advanced dual-function decoders have the following features:

- Synchronized Turbo engine sound with associated random sounds
- 1.5 amp capacity
- Programmable for either 2 digit (1-127) or 4 digit (1-9999) addresses
- Programmable start voltage
- Programmable acceleration and deceleration rates
- Supports full readback of CVs
- Programmable top voltage
- Programmable 14/28/128 speed steps
- Directional lighting (F0)
- 28 accessory functions
- Advanced consisting (CV 19)
- OPS Mode programming (programming on the main line)
- Compatible with NMRA DCC standards
- Complies with Part 15 of FCC regulations
- Programmable individual sound volumes

A Note About Volume

Because the TurboTrain will likely never be consisted with other locomotives, we've made some interesting changes to the decoders' programming which may be a bit different from what you are used to. One of these is F8. F8 changes the volume of the engine roar on the Turbo. While the train is idling, pressing F8 will scroll through different volumes, including mute.

The tricky part is this: when your Turbo was tested at the factory, the volumes of the two PDCs may have become out of sync. So when one PDC is on volume 1, the other is on 2 (or 3 or 4), resulting in an inability to mute the entire train. If this happens, scroll through F8 until one of the PDCs is silent. Then remove that PDC from the train and the track and scroll through F8 until the remaining PDC is silent. Your PDCs are now in sync.

TurboTrain: A Journey is also available separately. It would make a great gift!

DCC Function Chart – American Announcement Mode

Some function buttons have different effects when the Turbo is idle and when it is running. Press F12 to change between American and Canadian announcement modes.

FUNCTION	EFFECT-IDLE	EFFECT-RUN
F0	HEADLIGHT/TAIL LIGHT	SAME
F1	BELL	SAME
F2	HORN	SAME
F3	GYRALITE	SAME
F4	ALL ABOARD	BRAKE SQUEAL
F5	NEW YORK DEPARTURE ANNOUNCEMENT	NEW HAVEN STATION ANNOUNCEMENT
F6	BOSTON DEPARTURE ANNOUNCEMENT	PROVIDENCE STATION ANNOUNCEMENT
F7	DOORS OPEN	AIR RELEASE
F8	CHANGE ENGINE VOLUME	SAME
F9	DOORS CLOSE	BRAKE SQUEAL
F10	ENGINE SHUT DOWN	AIR RELEASE
F11	BELL RING RATE	SAME
F12	CANADA/USA TOGGLE	SAME
F13	BELL VOLUME	SAME
F14	HORN VOLUME	SAME
F15	ANNOUNCEMENT VOLUME	SAME

Additional Sound Functions – Canada and USA

(same for Moving and Idle, included for 28-function DCC systems)

F16 All Aboard USA	F21 All Aboard Canada	F26 Dorval
F17 New York	F22 Toronto	F27 Toronto Onboard
F18 Boston	F23 Montreal	F28 Air Release
F19 New Haven	F24 Guildwood	
F20 Providence	F25 Kingston	

Note for American and Canadian Turbos: If you manually use F10 to shut down the decoder, you need to press any function button two times to restart the Turbo.

The decoders support the new NMRA protocols that use up to 28 functions (F28). Some of the older DCC systems on the market do not use functions past F12. We've purposefully tried to keep all of the important functions in the "Top 12."

DCC Function Chart – Canadian Announcement Mode

Some function buttons have different effects when the Turbo is idle and when it is running. Press F12 to change between Canadian and American announcement modes.

FUNCTION	EFFECT-IDLE	EFFECT-RUN
F0	HEADLIGHT/TAIL LIGHT	SAME
F1	BELL	SAME
F2	HORN	SAME
F3	GYRALITE	SAME
F4	EN VOITURE, ALL ABOARD	TORONTO ARRIVAL ANNOUNCEMENT
F5	TORONTO DEPARTURE ANNOUNCEMENT	GUILDWOOD STATION ANNOUNCEMENT
F6	MONTREAL DEPARTURE ANNOUNCEMENT	KINGSTON STATION ANNOUNCEMENT
F7	DOORS OPEN	DORVAL STATION ANNOUNCEMENT
F8	CHANGE ENGINE VOLUME	SAME
F9	DOORS CLOSE	BRAKE SQUEAL
F10	ENGINE SHUT DOWN	AIR RELEASE
F11	BELL RING RATE	SAME
F12	CANADA/USA TOGGLE	SAME
F13	BELL VOLUME	SAME
F14	HORN VOLUME	SAME
F15	ANNOUNCEMENT VOLUME	SAME

DCC First Run

For prototypical operation, refer to TurboTrain Prototypical Operation on page 23.

The first time you run your new Turbo there are a few steps you should take to make sure the train operates properly:

1. Test the TurboTrain on a DC-powered track first if possible. If it runs properly (lights, sound, forward and reverse) on DC, it will run trouble free on DCC. The train has already been tested at the factory on DCC, but it doesn't hurt to be sure.
2. Each PDC comes with a factory default DCC address of 3. Before programming a new address into the TurboTrain, test run it on your DCC system on address 3. This will also ensure there are no problems with the train.
3. Test all functions (lights and sound) on the default address of 3. Use the Function Charts on these pages.

4. To avoid a current overload on your DCC system when starting it up with a lot of sound-equipped locomotives on your layout, your new TurboTrain does not automatically start up in DCC. To start the train in Run Mode, enter the address you have assigned for the locomotive, and then press any function button (F1-F9) two times. You will then hear the turbines go through their startup procedure. There will be no movement or operating functions for a few seconds until the Turbo's idle steadies out. Once the PDCs finish their startup, the train is ready to run on your layout.
5. When you are finished running the Turbo, pressing function button 10 (F10) will shut the Turbo down. When the Turbo is shut down this way, it will not automatically start up next time you need it. You will have to press any function button 2 times to restart. If you shut down power to your DCC system without using F10 to shut down the Turbo, the train will automatically start up again when you restart your DCC system. This is helpful if the TurboTrain hits a stretch of filthy track and loses power for a brief time. With all the electrical pickups on this thing, the track probably has to be buried in a swamp for the train to lose power.
6. The Turbo comes with its factory default start voltage (CV 2) set to move at a low throttle setting, but the Turbo can be run with anywhere from one to seven ICs. This could mean that with your chosen number of ICs, the train starts too fast. Experiment with different higher or lower values in CV 2 until the Turbo starts to move at your desired speed with minimum throttle movement. Fiddling with CV 2 is an important part of breaking in your train. See DCC Programming below.

Once these steps have been completed, follow the included CV chart to add any new programming features you want into the Turbo. When you initially program your new TurboTrain, this should be done on a program track for best results. You must know how to properly use your DCC system's programming mode to program any decoder. If you are unsure of programming a decoder with your system, please consult your DCC system's instruction book regarding programming or contact the manufacturer of your DCC system for proper guidance.

DCC Programming

Be aware that each PDC has a separate sound decoder installed inside of it. The decoder in one PDC has its default direction set to run "forward" in the forward mode of your DCC system. The decoder in the other PDC has its default direction set to run "backward" in the forward mode of your DCC system, and vice versa when you change the direction on your DCC throttle to change the direction of the Turbo.

Do not program the PDCs separately!!!

The TurboTrain must be programmed as an entire unit. If the whole TurboTrain does not fit on your layout's program track, attach both PDCs back to back, making sure they are properly coupled to a Single-Axle Truck, and program them together as one unit.

After initial testing, it is preferable for all programming to be done on your mainline to minimize handling of the TurboTrain.

If you do not remember or for some reason the TurboTrain has lost its address, it must be programmed on a program track.

NOTE: Some DCC systems do not have enough power on the Program Track for programming sound decoders. If your system is one of these, there are Program Track Boosters available from aftermarket DCC suppliers.

NOTE: The decoders in your Turbo support all program methods, including: register mode, paged mode, CV programming mode, direct mode, and programming on the main (OPS mode programming). Program the Turbo the same way you would program any other NMRA-compatible decoder with your DCC system. Although the sound decoders in the Turbo support "read back on a program track," there may be some DCC systems that either do not support reading back decoders, or do not have the capability to read back sound decoders.

The CV Chart is on the next page.

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product announcements and
delivery updates.**

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CV Chart

CV	REGISTER	DESCRIPTION	RANGE	DEFAULT
CV1	R1	Short address	1-127	3
CV2	R2	Start voltage	0-32	0
CV3	R3	Acceleration	0-32	0
CV4	R4	Deceleration	0-32	0
CV5	–	Top voltage	0-32	32
CV6		Speed curve select: 0=linear; 1=slow increase at slow speed; 2=fast increase at slow speed	0-2	0
–	R6	Page number	–	–
CV29	R5	Basic configuration	–	2
CV7	R7	Manufacturer version number	–	32
CV8	R8	Manufacturer ID	–	143
CV17	–	Long address upper byte	192-231	192
CV18	–	Long address lower byte	0-255	3
CV19	–	Advanced consist address	0-127	0
CV21	–	When CV21=0, all accessory functions will follow its own address. When CV21=1, all functions will follow the consist address	–	0
CV50	–	Announcement volume	0-3	3
CV51	–	Horn volume	0-3	3
CV53	–	Bell volume	0-3	3
CV54	–	Bell ring rate	0-1	0
CV55	–	Engine volume (4=engine sound off)	0-4	2
CV56	–	Brake squeal volume	0-3	3
CV57	–	Air release volume	0-3	3
CV58	–	Door open/close volume	0-3	3
CV59	–	American/Canada version	0-1	0-1
CV105	–	User identification number	0-255	0
CV106	–	User identification number	0-255	0
CV125	–	Factory default setting: program it to 1 to restore all the CVs to default setting	–	0

Operating Guide — DC

The TurboTrain will operate with a standard analog DC power pack. Please note that some train set power packs do not generate sufficient voltage to operate sound-equipped trains.

With a standard DC power pack, the sounds will not begin until the throttle is at approximately 50% of the throttle setting. The locomotive will begin moving when the throttle has been turned about 60%. The DC Sound Transmitter features six buttons that control various sounds. Refer to the DC Function Chart on page 16.

Caution: Do not run your TurboTrain with DC power packs intended for "G" scale as you will damage the circuitry: do not exceed 18 volts. Also, never operate your Turbo with a transformer designed for use with AC-powered model trains, such as most European HO scale models or O-27 trains. Some DCC systems also come equipped with a switch for extra voltage for larger scales ("O" or "G"). If you use your TurboTrain on this setting, damage will occur to the on-board electronics due to the higher constant track voltage of 22 volts.

To avoid damaging the decoders in the TurboTrain, remember the following: once bringing the train to the idle setting (approx. 50% throttle), wait at least 3 seconds before running the train at its maximum recommended voltage level. Older power packs can exhibit a "no-load" voltage spike for a few seconds which can damage the circuitry in the decoders.

DC Sound Transmitter

The DC Sound Transmitter (included) is powered by a 12-volt battery (#A23.12). One battery is included; replacement batteries are readily available at electronics or office supply stores.

There are certain conditions that will affect the range of the transmitter, such as atmospheric conditions, metal piping, metal screening used on the layout, etc. For best operation it is advisable to place the transmitter antenna close to the rails as you operate the sounds on the Turbo.

The Shift Key

The shift key is used for accessing additional sounds when operating the Turbo in DC analog mode. Example: Press Button 6 then press Button 1, and you will get Button 1A. However, you must wait 2 seconds after pressing the Shift Key before pressing another button, or the desired effect will not work. Note: Pressing the Shift Key three times shuts down the turbines. Remember to wait two seconds after each press.

A Note About Volume

Button 5 changes the volume of the engine roar on the Turbo. While the train is idling, pressing Button 5 will scroll through different volumes, including mute. Remember to wait two seconds after each time you press Button 5.

The tricky part is this: when your Turbo was tested at the factory, the volumes of the two PDCs may have become out of sync. So when one PDC is on volume 1, the other is on 2 (or 3 or 4), resulting in an inability to mute the entire train. If this happens, scroll through Button 5 until one of the PDCs is silent. Then remove that PDC from the train and the track and scroll through Button 5 until the remaining PDC is silent. Your PDCs are now in sync.

For prototypical operation, refer to TurboTrain Prototypical Operation on page 23.

DC Function Chart – American Announcement Mode

Some buttons have different effects when the Turbo is idle and when it is running.

BUTTON	EFFECT-IDLE	EFFECT-RUN
—	HEADLIGHT/TAIL LIGHT	SAME
1	BELL	SAME
2	HORN	SAME
3	GYRALITE	SAME
4	ALL ABOARD	BRAKE SQUEAL
5	CHANGE ENGINE VOLUME	SAME
6	SHIFT KEY	SAME
1A	NEW YORK DEPARTURE ANNOUNCEMENT	NEW HAVEN STATION ANNOUNCEMENT
2A	BOSTON DEPARTURE ANNOUNCEMENT	PROVIDENCE STATION ANNOUNCEMENT
3A	DOORS OPEN	AIR RELEASE
4A	DOORS CLOSE	BRAKE SQUEAL
5A	CANADA/USA TOGGLE	AIR RELEASE

DC Function Chart – Canadian Announcement Mode

Some buttons have different effects when the Turbo is idle and when it is running.

BUTTON	EFFECT-IDLE	EFFECT-RUN
—	HEADLIGHT/TAIL LIGHT	SAME
1	BELL	SAME
2	HORN	SAME
3	GYRALITE	SAME
4	EN VOITURE, ALL ABOARD	TORONTO ONBOARD ANNOUNCEMENT
5	CHANGE ENGINE VOLUME	SAME
6	SHIFT KEY	SAME
1A	TORONTO DEPARTURE ANNOUNCEMENT	GUILDWOOD STATION ANNOUNCEMENT
2A	MONTREAL DEPARTURE ANNOUNCEMENT	KINGSTON STATION ANNOUNCEMENT
3A	DOORS OPEN	DORVAL STATION ANNOUNCEMENT
4A	DOORS CLOSE	BRAKE SQUEAL
5A	CANADA/USA TOGGLE	AIR RELEASE

DC First Run

Running the TurboTrain for the first time is easy.

1. Turn the throttle up to half power (until you hear the engines)
2. Wait three seconds.
3. Turn on the Gyalite by pressing button 3 on your DC Sound Transmitter.
4. Give it some more juice and away you go.

DC Programming

To program the various items in DC, have your DC Sound Transmitter handy:

1. Turn on the power pack. Move the throttle slowly up until you hear the Turbo sounds start. Make sure the Turbo is in idle.
2. Turn off the power pack (leaving the throttle setting as is) and wait 2 seconds.
3. Press and hold the Shift Key on your DC Sound Transmitter while you turn the power pack on. When you hear the Turbo bell, quickly release the Shift Key. Wait 2 seconds before pressing any other buttons. Note: Program Mode is a slow process.

4. Always wait 2 seconds after pressing a button. Do not press any button within that 2 second lag time. When pressing buttons, hold for 2 seconds. Keep it well pressed or the circuitry may “read” that as the button being pressed twice, causing an error. While in the Program Mode you will only be able to perform approximately 30 program operations.
5. To return to the Run Mode, turn the power pack off, then wait 2 seconds before turning the power pack back on.

DC Programming Chart

BUTTON	DC PROGRAMMING
1	CHANGE BELL VOLUME
2	CHANGE HORN VOLUME
3	CANADA/USA TOGGLE — PRESS TO CHANGE ANNOUNCEMENT MODES
4	CHANGE ANNOUNCEMENT VOLUME (ALL ABOARD PLAYED AS SAMPLE)
5	NOT USED
SHIFT	PRESS SHIFT KEY FIVE TIMES TO RESTORE FACTORY DEFAULT SETTINGS. LIGHTS WILL FLASH WHEN SETTINGS HAVE BEEN RESET.

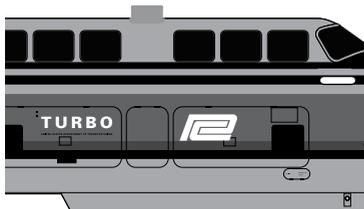
Pressing the Shift Key (Button 6) five times:

To restore the Turbo decoders to factory defaults, press the Shift Key, wait for the Turbo to say “Program,” wait 2 seconds, press the Shift Key again, listen for “Program,” etc. Do this a total of five times. We told you it was a slow process. Once done, the Turbo will go into its start-up mode and be ready to run when the throttle is advanced.

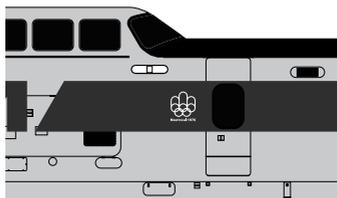
Decals

We have included a sheet of decals with additional car numbers, car line numbers (such as 66 01 for train 66, car 01), destination signs (such as Providence) and logos. Refer to *TurboTrain: A Journey* for decal placement. The Penn Central logo was added to the Penn Central Turbo in 1971, and the Montreal Olympics logo was added to the VIA-CN Turbo in 1976. See drawings below for placement.

Penn Central



VIA-CN



By 1975, CN crews had stopped changing the car line numbers. They left the train number blank and just kept the car numbers constant (01, 02, etc.). See page 71 of *TurboTrain: A Journey*. PDC-26 is car 01.

If you are renumbering your Turbo, you must first remove the old numbers. We recommend putting some **Testors® ELO Easy Lift Off Paint and Decal Remover** (product #F542143) on a small brush. Apply it sparingly to the car number you want to remove and leave it for 10 seconds. Wipe off the ELO with a soft cloth. If the number is still visible, repeat for 5-second intervals until it disappears. Don't overdo it! Your warranty doesn't cover over-zealous lettering removal! Use ELO in a well-ventilated area.

To apply the decals, cut out the decal and place in a bowl of distilled water for about 20 seconds. Remove and place on a paper towel.

We recommend decal setting solution from **Microscale®**, available at all good hobby shops. Place some **Micro-Set** (product #MI-1) on the Turbo where the decal will go. Slide the decal off the backing paper and apply to the model. Position with dull tweezers. Dab it with a paper towel to remove any remaining moisture.

Add a drop of **Micro-Sol** (product #MI-2) to the decal. Touch a paper towel to the model beside the decal (do not touch the decal!) to wick up any extraneous Micro-Sol. Let the decal sit for a minimum of 6 hours to dry. If necessary, add another layer of Micro-Sol and let it dry. If there are any air bubbles in the decal, pop them with a sharp blade and add some more Micro-Sol.

Note that too much Micro-Sol will stain the model, so use it sparingly. After the decal has dried completely and you are happy with it, touch it lightly with a damp paper towel to remove any unwanted residue.

NOTE: Open bottles of Micro-Set and Micro-Sol enjoy being knocked over and having their contents spilled all over your workbench or kitchen table. We suggest putting a few drops at a time into an empty bottle or dish and working from that.

Troubleshooting/FAQs:

It is possible that during normal running of the TurboTrain in DC or DCC, a sound or accessory function might not play simultaneously from each PDC. This could be caused by the Turbo hitting a patch of dirty track, causing it to miss its radio signal or its digital signal. This is not considered to be a defect in the TurboTrain or its electronics, as there are a lot of variables to running a train this complex.

Q. The Turbo does not run out of the box.

A. Check the power source (DC power pack or DCC system) for proper operation. Check wiring from your power source to the layout. Make sure the Turbo is properly placed on the track rails. For DC operation, make sure that the power pack throttle is moved up to approx. 50% to initiate decoder start up. Some train set power packs do not generate sufficient voltage to operate sound-equipped trains.

Q. The Turbo runs jerkily, hesitates, or stalls.

A. Clean track and all the wheels. Make sure all wheels are on the track, and all PDCs and ICs are coupled properly. To clean IC wheels, put some track cleaner or isopropyl alcohol on a paper towel and place it on the rails. Run the Single-Axle Truck back and forth over the wet paper towel. To clean PDC wheels, place the PDC and one IC on the track, coupled to two Single-Axle Trucks. Allow the two Single-Axle trucks to pick up power while you place the Dual-Axle Truck on the wet paper towel. Gently hold the PDC in position as you give the throttle some juice and allow the wheels to spin on the paper towel. Regular running of the TurboTrain over clean track will keep the wheels clean.

Q. The Turbo's wheels are spinning, but the train isn't going anywhere.

A. Check that all the wheels are on the track. The PDCs don't have enough power to pull a derailed car. Check that a wheelset is not caught on a turnout frog or a big gap between rails. Ensure that you are accelerating slowly. Running the throttle to full in half a second will cause wheel slip. If slipping persists, add the Traction Tire-Equipped Wheelsets.

Q. The Turbo derails on all turnouts.

A. The springs on the Single-Axle Trucks are not seated properly or they have developed memory and are stuck in the "open" position. Refer to the **Quick Start Guide** on page 4 for proper installation of the Single-Axle Trucks. If you require more springs, they are available to order from Rapido Trains Inc. Ordering info is on page 26.

A. The Coupler may be broken or may have come out of its support on the end of the car. If it is broken, contact Rapido Trains Inc. for a free replacement. If it has come out of its support, clip it back in. If the coupler will not stay in, it means the support tab is broken. Contact us for help.

Q. The Turbo derails on curves.

A. The Guidance Arms are binding in the Eyebolts on the bottom of each car. This may be caused by flash on the Guidance Arms or on the Eyebolts. Before contacting us for replacements, scrape off any flash on the Guidance Arms and ream out the Eyebolts with a small reamer, a small circular file, or a #60 drill bit in a pin vise. If you damage the Guidance Arms or Eyebolts while doing this, we'll provide free replacements.

A. The springs on the Single-Axle Trucks have developed memory and are stuck in the "open" position. If you require more springs, they are available to order from Rapido Trains Inc. Ordering info is on page 26.

A. You have tight (18" radius) curves or tight S curves. The Turbo must be operated slowly on 18" radius curves. The Turbo will not operate on curves below 18" radius. S curves should have a minimum 9" straight section between the curves. 18"-radius S curves should be avoided if at all possible. If the train still derails on 18" radius curves and everything else checks out, you can try removing the upper spring from each Single-Axle Truck to give the trucks more play. The TurboTrain is not guaranteed to run reliably on 18"-radius curves.

Q. Single-Axle Trucks are not vertical.

A. The springs on the Single-Axle Trucks are not seated properly. Refer to the **Quick Start Guide** on page 4 for proper installation of the Single-Axle Trucks.

Q. The Turbo's belly hits my track at the bottom or the top of my grades/hills.

A. This can't be fixed. Your vertical curves are too steep for the Turbo, which has prototypical clearances between the track and the belly. Your options are to improve your track, accept that the Turbo will bottom out on vertical curves, or refrain from running the Turbo on the hilly parts of your layout.

Q. When using the Turbo on DC, the DC Sound Transmitter does not activate the sound functions.

A. The output of the Transmitter is regulated by FCC regulations. Place the Transmitter antenna wire on the track rails for best performance.

Q. The Turbo will never be used for DCC operation. How can all 28 accessory functions be accessed? The Brand Q sound controller I have does not work with the Turbo.

A. The Brand Q controller can only be used with Brand Q locos and is not compatible with all of the other makes on the market. By using the MRC Blackbox controller, all functions on the TurboTrain, and most other makes of locomotive can be accessed. The MRC Blackbox controller is available to order at all good hobby shops or direct from MRC.

Q. In DC operation can the horn, bell, or other sound/accessory functions be changed?

A. The transmitter supplied with the Turbo allows you to perform limited programming changes for DC use. Refer to page 17 to find out how to do this.

Q. In DCC operation the Turbo initially ran on address 3, but the address can not be changed to a 4 digit address on the program track.

A. Some DCC systems do not have enough power to program sound decoders on the program track. If your DCC system supports programming on the main (ops mode programming), program the 4 digit address on the main line.

Q. After changing the TurboTrain's address to a 4 digit address, the Turbo does not move if the throttle is turned up.

A. It is possible that the Turbo missed its CV 29 packet during programming. Recall back to the train's original 2 digit address, go into CV programming, then set CV 29 to a value of "34." Now recall back to the 4 digit address and run the Turbo.

Q. In DCC operation, when the throttle is advanced, the Turbo does not start to move until a high throttle setting is reached, or its speed is too high at low throttle setting.

A. The Turbo comes factory default with its start voltage (CV 2) set to move at a low throttle setting. Experiment with different values in CV 2 until the train starts to move at your desired speed with minimum throttle movement. As the Turbo can be run with up to seven ICs, changing CV 2 is an important part of breaking in your train.

Q. In DCC operation the top speed of the TurboTrain is too fast.

A. The Turbo comes with its top voltage, CV 5, set to maximum. Adjust CV 5 to lower values until your desired top speed is reached. It's unlikely that the top speed is too fast for the prototype. See TurboTrain Prototypical Operation on the next page.

Q. After programming a value into the Turbo, the PDCs run in opposite directions, effectively fighting each other.

A. The PDCs were improperly programmed or programmed independently of each other. Place both PDC's back to back on a program track, properly coupled together, and reprogram them to either the factory defaults (CV 125), or their original address.

Q. While running on my DCC layout, the Turbo jumped the rails over a turnout frog and caused a short circuit. Now it will not respond to any commands.

A. A short circuit can cause a decoder to lose its address or place a value in a different CV. Use the factory re-set CV (125) to get the train back to running on default address 3. If this does not work, place the values in the following CVs:

CV1=3

CV19=0

CV29=2

Then try running your Turbo on address 3.

Q. The Turbo dome roofs are supposed to be black!

A. Actually, the dome roofs were never painted black. However, the exhaust quickly covered the roofs with a grimy black coating that was fairly uniform. You can simulate this by airbrushing a mix of grimy black, roof brown and oily black on your dome roofs (for CN and VIA) or just roof brown and grimy black (for American TurboTrains). The American roofs were cleaned occasionally; the Canadian roofs were not, and were consequently

much dirtier. When masking around the roof, we recommend you use cardboard and raise it about 1mm to give a slightly feathered edge to the weathering. Be sure not to get any weathering on the windows as they were cleaned regularly. Refer to photos in *TurboTrain: A Journey* for correct application.

Q. The Turbo dome roofs are supposed to have windows!

A. When the CN Turbo first entered service, it had windows on the dome roofs. These became covered with soot and damaged, and were thus were plated over in 1969. The American TurboTrains never received dome roof windows.

NOTE: The TurboTrain has been thoroughly tested with every major NMRA-compatible DCC system available in North America for proper operation. There might be some difficulties experienced with the use of this train with older DCC systems, or digital systems made for the European market that use a different, non-NMRA, digital format.

Operation with European Power Packs

Please be aware that most DC power packs made for the European market do not have a separate direction switch built in. They rely on the throttle knob to control direction. This may make it difficult to perform any of the available programming in DC operation. Running any sound-equipped locomotive with this type of power pack may cause difficulties in reversing locomotive direction without the sound cutting out and the locomotive stopping. If you have a power pack of this type, it is recommended that you hook up a DPDT switch wired for reversing direction to the variable output of this type of power pack. Most books available at your local hobby store that deal with the subject of layout wiring will show how this can be done.

FCC Compliance

This device complies with the part 15 of FCC Rule. Operation is subject to the following two conditions. (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that causes undesired operation.

TurboTrain Prototypical Operation

Engine Startup

The Startup Sequence should be heard in the yard or in the shops. The train was only shut down when stored. The turbines were never shut off during station stops or when idling at the terminal, with the exception of Grand Central Station and Penn Station in New York. Because so few people model Grand Central and Penn Stations, we decided to include the on-board announcements rather than the sounds of the DC traction motors used at those terminals.

Gyalite

The Gyalite was used at all times when running, except when:

- approaching an oncoming train
- approaching a station
- stopped at a station

Horn and Bell

The Horn you hear on the model is sampled from a clear recording of the actual Turbo horn. The discordant sound was intended to be noticeable when the train was approaching at high speed, and it was certainly successful. The horn could wake the dead. It was used throughout the service life of both Canadian and American TurboTrains. As far as we can tell, it was never replaced with a conventional horn.

The Horn and Bell should be activated together when approaching level crossings. The Bell should be activated when approaching and leaving stations, even if the train is not stopping.

Doors

The “Doors Open” and “Doors Close” warning chimes were added in 1973 when the Canadian Turbos were rebuilt, and are thus correct for 9-car Canadian Turbos and potentially the Late Amtrak paint scheme. These chimes were played when the stairs were folding down (Doors Open) or folding up (Doors Close), to ensure that passengers didn’t accidentally get thrown onto the platform. We think they sound cool, so you can use them if you like even if your prototype TurboTrain didn’t use them.

Station Announcements

We had to rerecord the terminal station announcements because the original recordings had too much background noise. With the exception of the Montreal station announcement, they have been condensed considerably to fit onto the sound decoder. The Montreal announcement is short, sweet and complete. The onboard announcements had to be condensed, so your passengers are not thanked for choosing to travel with the railroad, nor are they reminded to take all of their personal belongings with them. We hope your passengers won’t be too upset.

Prototypical Speeds

The real three-car TurboTrain achieved a speed of 170.8 MPH. This is probably a bit too fast for model-sized curves. In service, the US TurboTrain rarely would have exceeded 100 MPH, and was limited to 90 MPH for much of its route. We have designed the five-car TurboTrain model to be able to achieve 100 MPH on straight and level track (DCC).

The Canadian nine-car Turbo had a maximum in-service speed of 95 MPH (though it often traveled faster). Its speed record is 140.6 MPH, another speed that is too fast for your layout. We have designed the nine-car Turbo model to be able to achieve a maximum speed of at least 95 MPH on straight and level track (DCC)

WARNING: operating at top speed around tight model railroad curves could spell disaster. The warranty does not cover such foolishness.

Amtrak IC Marshalling

If you are operating a full-length Amtrak TurboTrain and you want to be really prototypical, you will need to turn around IC-36 #72 (Early Amtrak) or IC-36 #75 (Late Amtrak), as this IC was marshalled backwards in the train. However, turning it around without rewiring is not possible. You will need to do the following steps (only recommended for expert model railroaders), and you must be very careful not to cause a short circuit. NOTE: Doing this will void the warranty for your entire TurboTrain:

- remove the roof by pulling it off carefully
- remove the interior
- unplug the PCB plugs from each end of the car, making sure to note their orientation. If you install one the wrong way, you will fry your entire train next time you couple it together.
- remove the couplers and swap them around
- replace the couplers, PCB plugs, floor and roof

VIA Grab Irons

Grab irons were added to the front and back of each VIA Rail Canada Turbo dome roof in 1979. These can be made using bent .012" brass wire, and should be a scale 18" wide. Refer to photos in *TurboTrain: A Journey* for placement.

American TurboTrain Seats

Due to the plastic injection process, the seats in the US TurboTrains are missing their centre arm rests. With the armrests removed, your passengers now have the option of sleeping sideways over a pair of seats: a welcome improvement over the original.

Send us your weathered Turbo photos!
Take photos of your Turbo "in service" on your model railroad and we'll publish some of them on our web site!
The more creative, the better!

Warranty Information

Rapido Trains Inc. will replace any parts found to be missing or defective in your TurboTrain (including all Intermediate Cars purchased separately) provided they are available. This warranty does not cover the replacement of parts that have become lost or broken during normal operation of the train. Those can be ordered separately from Rapido Trains Inc.

Please write, fax or email us:

Rapido Trains Inc.
140 Applewood Crescent, Unit A
Concord, Ontario
L4K 4E2
Canada

Email: TurboTrain@rapidotrains.com
Fax: 1 (905) 738-6265

You can also call our Turbo repair guru, Dan, at 1 (877) 738-6445 (or +1 905 738 6445 from overseas).

Tampering with the wiring of your TurboTrain will void this warranty. Broken wires or electrical contacts caused by opening the PDC are not covered by this warranty. Lack of reliable operation on grades above 3% or curves tighter than 24" radius is not covered by this warranty. Damage caused by running the TurboTrain at top speed around tight curves, sending it on a one-way trip to the layout room floor, or by any other accidental misuse is not covered by this warranty.

Accessories/Parts Order Information

Part #	Description	Price
102020	Short (Display) Diaphragms (1 pair)	\$12.95
200000A	Long (Operating) Diaphragms (1 pair)	\$14.00
200000B	Guidance Arm and Bell Crank assembly (1 pair)	\$5.00
200000C	Couplers (2 pairs)	\$5.00
200000D	Single-Axle Truck Springs (does 2 trucks)	\$5.00
200000E	Single-Axle Truck complete (1)	\$10.00
200000F	PDC Dome Antenna (1 pair)	\$4.00
200000G	PDC Horns Canada (2 pairs)	\$5.00
200000H	PDC Horns USA (2 pairs)	\$5.00
200000J	PDC-28/29 Grabs and Stirrups (does 2 PDCs)	\$5.00
200000K	Windshield Wipers (does 1 PDC)	\$5.00
200000L	PDC nose (1)	\$5.00

All orders must include \$5.00 flat rate shipping and handling. Canadian orders must include GST/HST. Ontario orders must also include PST.

Please photocopy this page, fill it in and send it with your order.

PART #	DESCRIPTION	QUANTITY	SUBTOTAL

SUBTOTAL	
SHIPPING	\$5.00
GST/HST (CANADA ONLY)	
PST (ONTARIO ONLY)	
TOTAL AMOUNT ENCLOSED	

NAME: _____

ADDRESS: _____

CITY: _____ STATE/PROV.: _____

ZIP/POSTAL CODE: _____ COUNTRY: _____

I enclose a check/money order or I will pay by Visa or MasterCard (circle one).

VISA/MASTERCARD # _____

CVC (LAST THREE DIGITS ON BACK OF CARD): _____

EXPIRY DATE: _____ NAME ON CARD: _____

SIGNATURE _____

If you are paying by Visa or MasterCard, you can email your order to TurboTrain@rapidotrains.com Do not include your credit card information in the email. We will email you an electronic invoice which can be paid securely online. You can also fax your order to 1 (905) 738-6265. US or Canadian funds accepted. All credit card orders will be charged in Canadian funds. Your credit card company will convert to your currency.

TurboTrain

DCC/DC FUNCTION CHART

DCC	EFFECT-IDLE	EFFECT-RUN
F0	HEADLIGHT/TAIL LIGHT	SAME
F1	BELL	SAME
F2	HORN	SAME
F3	GYRALITE	SAME
F4	USA: ALL ABOARD; CANADA: EN VOITURE, ALL ABOARD	USA: BRAKE SQUEAL; CANADA: TORONTO ARRIVAL ANNOUNCEMENT
F5	USA: NEW YORK; CANADA: TORONTO DEPARTURE ANNOUNCEMENTS	USA: NEW HAVEN; CANADA: GUILDWOOD STATION ANNOUNCEMENTS
F6	USA: BOSTON; CANADA: MONTREAL DEPARTURE ANNOUNCEMENTS	USA: PROVIDENCE; CANADA: KINGSTON STATION ANNOUNCEMENTS
F7	DOORS OPEN	USA: AIR RELEASE; CANADA: DORVAL STATION ANNOUNCEMENT
F8	CHANGE ENGINE VOLUME	SAME
F9	DOORS CLOSE	BRAKE SQUEAL
F10	ENGINE SHUT DOWN	AIR RELEASE
F11	BELL RING RATE	SAME
F12	CANADA/USA TOGGLE	SAME
F13	BELL VOLUME	SAME
F14	HORN VOLUME	SAME
F15	ANNOUNCEMENT VOLUME	SAME

DC	EFFECT-IDLE	EFFECT-RUN
—	HEADLIGHT/TAIL LIGHT	SAME
1	BELL	SAME
2	HORN	SAME
3	GYRALITE	SAME
4	USA: ALL ABOARD; CANADA: EN VOITURE, ALL ABOARD	USA: BRAKE SQUEAL; CANADA: TORONTO ARRIVAL ANNOUNCEMENT
5	CHANGE ENGINE VOLUME	SAME
6	SHIFT KEY	SAME
1A	USA: NEW YORK; CANADA: TORONTO DEPARTURE ANNOUNCEMENTS	USA: NEW HAVEN; CANADA: GUILDWOOD STATION ANNOUNCEMENTS
2A	USA: BOSTON; CANADA: MONTREAL DEPARTURE ANNOUNCEMENTS	USA: PROVIDENCE; CANADA: KINGSTON STATION ANNOUNCEMENTS
3A	DOORS OPEN	USA: AIR RELEASE; CANADA: DORVAL STATION ANNOUNCEMENT
4A	DOORS CLOSE	BRAKE SQUEAL
5A	CANADA/USA TOGGLE	AIR RELEASE



Quality. Style. Spirit.™ Qualité. Style. Éléance.™

RAPIDO