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**WARRANTY**


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S HELPER SERVICE, Inc. will replace or repair (at it's discretion) any part which it finds fault in workmanship or material provided these instructions are followed:

1. Call 1-732-441-0555 for return authorization. SHS cannot be responsible for products returned without prior authorization.
2. Include a note indicating nature of problem with your name and address.
3. Returned items must be shipped to S HELPER SERVICE shipping fully pre-paid along with \$20.00 for return shipping and handling. If the part is returned within 90 DAYS of purchase, return postage and handling fee need not be included. NOTE: Proof of purchase with date must accompany returns.
4. Send locomotive in original foam tray and giftbox plus shipping and handling to: S HELPER SERVICE Inc., 77 Cliffwood Ave., Unit 7C, Cliffwood, NJ 07721
5. Pack properly to protect loco against added damage. You must use original polyfoam tray and gift box or risk voiding the warranty.
6. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

This Showcase Line product is warranted against defects in workmanship and materials for one year in the possession of the original purchaser or owner.

This warranty does not include the cost of any inconvenience nor does it cover the cost of transportation damage, misuse, abuse, accident, normal wear or any item which has been tampered. The warranty does not cover sound units, LEDs, smoke units, dirty wheels, electrical wiper replacement or speakers.

### ACKNOWLEDGEMENT

We would like to thank all of our friends who helped us bring this project to fruition: Jeff Freeman, Dallas Gutacker, John Prior, Will Holt, Ron Sebastian, V.S. Roseman, Bill Clark, Hiram Graves, Bob Werre, N.L. Wedekind, Michael Greene, Edwin Kirstatter, Michael Lytle, Dick Karnes, Nancy Workman and Steve Domingues.

We appreciate Ernest Wong who's gentle patience as our project manager guided this loco to completion, Gary Law, Clement Nip and Jonathan Chung who aided Ernest, Karen Kwok for her superb artwork, Mr. Wai Shing Ting who was always there for us and especially our customers. Without this support, there would never have been our steam engine.

Thank you all.

# E-27ca

## 2-8-0 Consolidation



## The Engineer & Fireman's Operating Manual

Dedicated to Howie Waelder 1925 - 2004, L.I.R.R. Engineer (ret.)

***THE SHOWCASE LINE®***  
*Quality S-scale model trains  
 from S-Helper Service, Inc.*

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 77 Cliffwood Ave, Unit 7C, Cliffwood, NJ 07721

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WARRANTY

4-5 Storage

Whenever your 2-8-0 is not being operated for extended periods, we suggest you store it in the original packaging with the 2-8-0 sitting upright. This will help prevent fluids entering unwanted areas of the locomotive.

Ordering Information

All Showcase Line products are available from Hobby Shops. If your local Hobby Shop is unwilling to stock our products, you can order directly from S Helper Service, Inc. US orders under \$100 include \$7 S/H, plus \$1 for each extra \$100. Master Card/Visa/AMEX/Discover cards are accepted. Fax orders can be received 24 hours a day at 732-441-0751. Phone orders can be placed at 1-800-465-0303. Our newsletter, *The SHS Update* is available upon request. Catalogs and other AHA items can be ordered online at:

[www.showcaseline.com](http://www.showcaseline.com)

SECTION 5 - PARTS LIST

Part#	description	price
00552	10 Button LocoMatic™ Controller	\$69.95
01633	LocoMatic™ AC/DC sound, 2-8-0	159.95
01295	Coupler, KD style (2 pair)	5.95
01208	Andrews tender truck, code 110 (pr)	9.95
01209	Andrews tender truck, AF comp. (pr)	9.95
01661	Smoke unit funnels (3/pkg)	2.95
01669	2-man 2-8-0 crew	4.95
01670	Coupler, for tender, AF comp (pr.)	2.95
01671	Speaker, 36mm dia. 8 ohm, 1 watt	8.95
01673	Smoke unit assy.	TBA
01674	Infra-red sensor	TBA
01675	Wrench, 1.6mm for ecc. crank	TBA
01682	Class lights, R&L, brass painted	6.95
-	DCC sound decoder, 2-8-0	TBA
-	Super Smoke™ Fluid, 2 oz.	6.95
-	Aero-loco lubrication set(Train Pak)	15.00
-	Smoke fluid pipette (4)	1.00
-	Jak's Bearing Blocks (pr)	44.00

directions at mid voltage (about 9 volts). This can be done with JAKS Bearing Blocks as well as a layout. When completed, lubricate per the instructions in Section 4-2, and then it's ready.

#### 4-2 Lubrication

After break-in and at regular intervals, we recommend inspection and careful lubrication of the wheel bearings, coupling rods and valve gear, without taking any of these apart. Carefully, place the model upside down on a soft foam or padded surface to prevent damage to the details. Then place one very small drop of Aero Lube 'Conducta Lube' on each axle, between the bronze bearings in the frame and the back of the wheels, using the long feed tube provided. Over lubricating can damage the body as well as void the warranty. Aerolube Train Pak Maintenance and Lube Kits are available from SHS (see page 18).

#### 4-3 Golden White LEDs

The LED's used for lighting your 2-8-0 should yield many flawless years of operation. If they do fail, contact SHS for servicing.

#### 4-4 Cleaning

Body - Remove dust with a small soft brush (make-up brush or similar). We DO NOT recommend removing the body from the chassis for cleaning.

Wheels -Dirt will build up on the wheel treads over time. To remove this dirt and improve traction and electrical pick-up, we recommend using 91% isopropal alcohol and a Q-tip. Rub each wheel tread with the alcohol-moistened Q-tip, applying slight pressure to remove the dirt build-up. Once the wheels' treads are clean, check the electrical pick-ups on drivers 1 and 4 for cleanliness and contact against the inside surfaces of the drivers wheels. Another method used to clean the tread of drivers 1 & 2 wheels is with JAKS Bearing Blocks with felt pads (see page 18)

## THANK YOU

Thank you for purchasing our 2-8-0 Consolidation. Your new S scale steam engine comes Ready-to-Run, with either American Flyer compatible wheelsets, or code 110 NMRA RP25 scale wheelsets. The power and sound options will also vary. You are strongly advised to break in your engine before placing it in normal operation. See Section 4.1 for further details.

We have included additional parts for easy adaptation to different operating conditions. With proper care and maintenance, your locomotive should give you many years of operating pleasure.

## SECTION 1 - Prototype Data

Driver Diameter	62"
Cylinder	24"x30"
Locomotive Wheelbase	25'-6"
Length with Tender	68'-6"
Height	14'-8"
Weight (loco)	224,900 lbs.
Weight (tender)	148,000 lbs.
Tractive Power	50,900 lbs.
Boiler Pressure	215 psi.
Coal	18 tons
Water	7000 gals.

The Baltimore and Ohio Railroad began to receive the first of 414 E-27 2-8-0's in 1905 from the Richmond Locomotive Works, (later a part of Alco). From 1923, the B&O started upgrading many of these to E-27ca, by increasing the cylinder size to 24"x 30", increasing weight on drivers to 244,900 lbs and tractive effort to 50,900 lbs. By 1948, 165 engines had been modified. Starting in 1925, over 100 E-27s were converted to L-2 0-8-0 switchers. By 1953, 69 E-27ca were still on the B&O, with the last ones retired in 1957.

Hundreds of railroads and industries in America owned over 33,000 consolidations, many similar to the B&O engine, making it the most popular type of steam engine.

## SECTION 2 - Features

Engines are factory equipped with either American Flyer compatible wheels and couplers to operate on AF track or code 110 wheels and KD style couplers for operation on track built to the NASG standards.

**Warning - Use of AC voltages higher than 18 volts may damage the electronics and will void the warranty.**

Your locomotive comes with several optional features listed below:

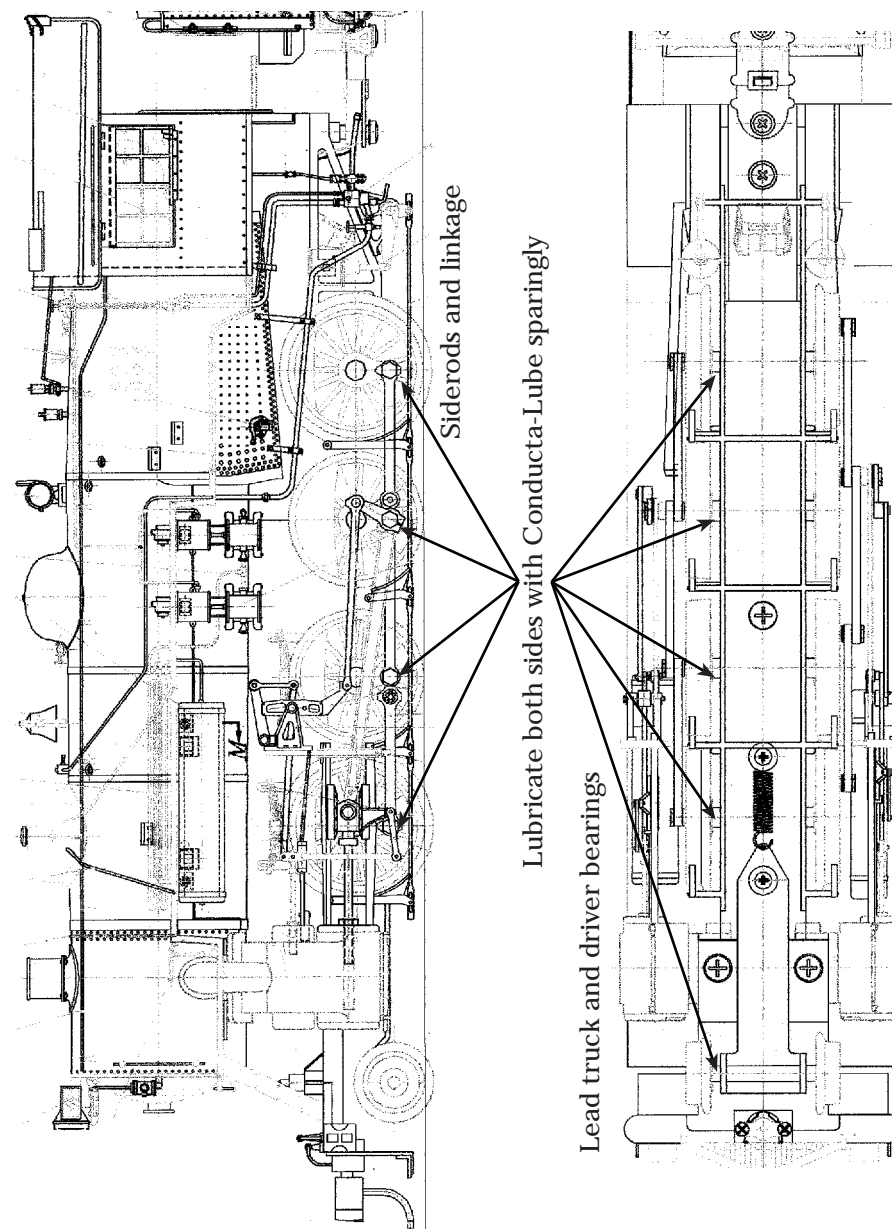
- Accepts two types of couplers.
  - a. American Flyer compatible automatic couplers.
  - b. SHS #01295 KD style couplers.
- Two types of wheels.
  - a. American Flyer compatible wheelsets.
  - b. Code 110 NMRA RP-25 contour wheelsets.
- Electronic options.
  - a. DC no sound.
  - b. LocoMatic™ AC/DC sound.
  - c. Reversing headlights.
  - d. Soundtraxx DCC/DC sound decoder.
  - e. DC shorting plug.

Also included - Smoke unit supplies

- a. Vial of "All Aboard" Super Smoke™
- b. Smoke fluid funnel
- c. Smoke fluid pipette

Replacements and additional 'All Aboard' Super smoke fluid is available from SHS.

The following paragraphs tell you how to set up your 2-8-0 to use any combination of these features.



6-8 Lubrication Points on Locomotive



speed will gradually decrease through neutral to forward depending on how long the button is pressed.

ALT+REVERSE - turns OFF main sounds leaving only the Whistle and Bell if selected (nothing if dip switch 3 set on - double head operation). The same command will restore the main sounds (chuffs and air pump). This also turns off the exhaust chuff sound and smoke unit.

SLOW - neutral position overriding sequencing to a momentum stop - in standard mode. Slow down a step per push of button in command mode.

ALT+SLOW - neutral position or emergency stop.

ALT - alternate button for second functions of the other 9 buttons. Must be held down, in conjunction with one other button. It may be depressed first and held, then another button is pressed.

Notice: Pressing more than one button, other than the ALT, produces no signal. It is an invalid operation.

The LocoMatic™ 10 Button Control Box (#00552), was designed for SHS Inc. by Dalle Electronics, Inc (available from SHS, see page 18)

### 3-11 DCC (Digital Command Control)

A Digital Command Control (DCC) sound decoder is an option available for your 2-8-0. An additional instruction booklet on the operation of the DCC sound decoder is included with 2-8-0s purchased with the DCC sound option.

## SECTION 4 - MAINTENANCE

### 4-1 Break in Period

Your new 2-8-0 comes factory lubricated and ready for the break-in period. Simply operate it for 20 minutes in both

## SECTION 3 - Getting Started

You can perform any or all of the following modifications before or after you begin to operate your 2-8-0. If you have not yet broken in the model, see Section 4-1, and be sure to do so before placing your 2-8-0 into normal operation. The Engine and Tender are designed to remain permanently coupled using a drawbar. We advise against disconnecting the drawbar. Doing so may void the Warranty.

### 3-1 Wheelsets

Your 2-8-0 is fitted with either American Flyer compatible wheelsets or scale wheelsets to the Code 110 NMRA RP25 standard. Because of the complex operation involved in changing wheelsets for this engine, alternate wheelsets are not included, nor are readily available. Due to the considerable differences in the wheelset standards, it is not recommended to operate AF wheelsets on layouts built to the NMRA/NASG scale standards and vice versa.

### 3-2 LED Lighting

The Engine headlight and Tender light are Golden White LEDs. They will light up dependant on the direction of travel. These should have a long operational life and should not need to be replaced.

### 3-3 Couplers

The 2-8-0 comes fitted with the SHS KD style coupler at the front of the locomotive and the American Flyer compatible coupler to the rear of the tender. If you wish to replace the AF tender coupler with the body mounted SHS KD style coupler (provided), place your 2-8-0 upside down on a soft foam protected surface. Carefully remove the screw that holds the rear tender truck to the bolster. The tender truck is then lifted up and the AF coupler bar lifted out. Caution is needed not to pull at the pickup wires on this truck. Place the replacement black square spacer (provided) on the bolster and screw the truck back on. The coupler pad at the rear

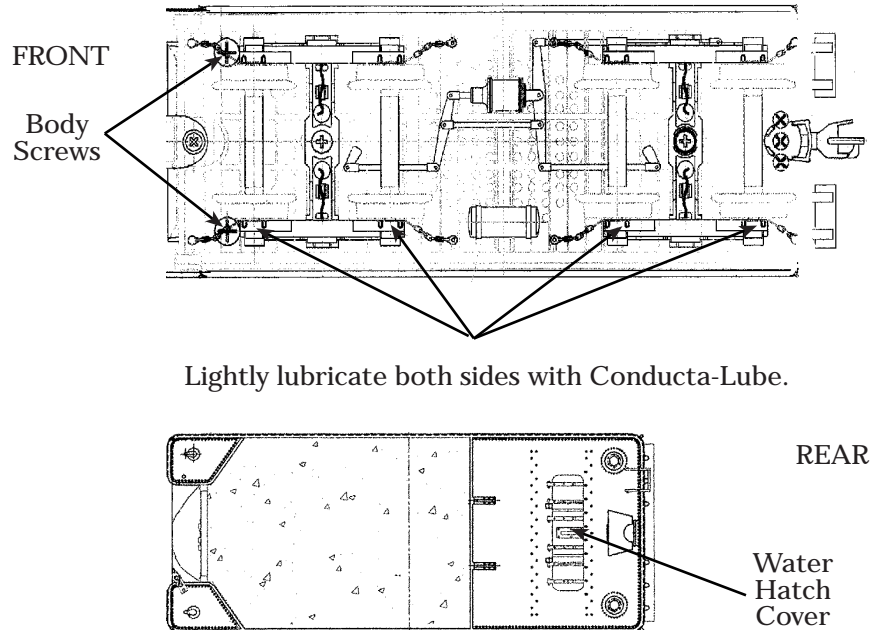
of the tender has three holes cored for mounting the KD style SHS coupler. Use the three threaded metric machine screws provided to secure the coupler.

- Do not overtighten the screws or they will break.

### 3-4 DC Polarity Reversing Options

**WARNING:** Do not use this feature with AC current.

To convert your 2-8-0 to normal DC operation (if not already sold as such), turn over the engine and tender placing on a soft cloth to protect the fine details. Remove the 2 body screws (see fig 6-1), turn over again and remove the tender body. Extract the factory installed circuit board from the 16 pin socket and replace with the DC shorting plug (provided as a separate part with the 2-8-0). Set the engine & tender on the track and test with DC power. Re-assemble the tender & body to the chassis (Do not over tighten screws).



Lightly lubricate both sides with Conducta-Lube.

6-1 Views of Tender - lubrication points & screws

MARKERS - no function on this locomotive.

ALT+MARKERS - no function on this locomotive.

NUMBERBOARD- no function on this locomotive.

ALT+NUMBERBOARD- no function on this locomotive.

MARSLIGHT/STROBE - no function on this locomotive

ALT+STROBE - - no function on this locomotive.

HORN - activates the whistle.

ALT+HORN - turns the smoke unit off or on.

FORWARD - forward motion overriding sequencing from neutral in standard mode. Increases speed in command mode if already running in forward. This is only true in Mode 3. If in Mode 2 then the Neutral button needs to be pressed to stop the engine followed by a direction button. If operating in LocoMatic Mode 3 and running in reverse, speed will gradually decrease through neutral to forward depending on how long the button is pressed

ALT+FORWARD - Cylinder blowdown (turns on the sound of steam forcing condensed water out of the cylinders). Remember, the locomotive has to be in the Neutral position for at least 5 seconds before the Cylinder blowdown can be activated again (this way it simulates the real locomotive having to obtain condensate before requiring the opening of the cylinder cocks).

REVERSE - reverse motion overriding sequencing from neutral in standard mode. Increases speed in command mode if already running in reverse. If running in forward, speed will decrease through neutral to reverse depending on how long the button is pressed. If operating in LocoMatic Mode 3 and running in reverse,

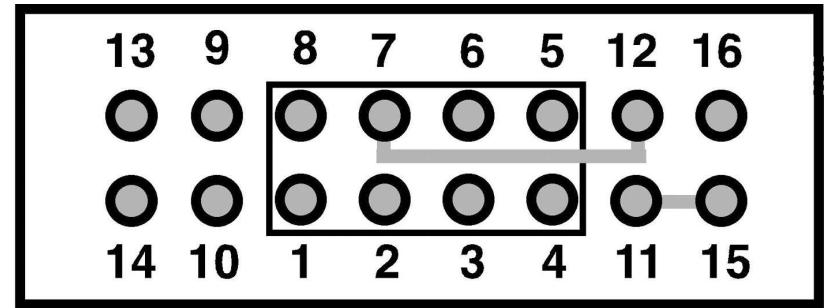
The wire from 'B' terminal is connected to the inside rails of your track and the wire from the '15' is connected to the outer rail. This installs the Controller as a pass through between your transformer and the track. We recommend using #20 stranded wire (available at Radio Shack or other electronics store), as a minimum for these connections. Connect the 9 volt DC power supply to the input jack on the Controller and plug it in. Turn power 'On' to transformer, the Controller is now 'on' and is ready to operate with your transformer. The LocoMatic controller will not interfere with operation of locomotives that do not have the LocoMatic sound system. Use your transformer as usual.

**OPERATING BUTTONS**

The LocoMatic Controller™ has ten operating buttons and is used in conjunction with your regular transformer, or as an independent control with a fixed voltage applied to the track. Some of the buttons cause activation as long as they are held 'on', while others work in a push-on, push-off mode. The lower right hand button, labeled 'ALT', is the alternate button, which provides a second function to each of the other nine buttons. For example; pressing the HORN button will operate the Whistle, while ALT+ Horn operates the smoke unit. Not all of the buttons have alternate functions on this locomotive. The ten Controller buttons perform the following:

- BELL - turns bell "on" or "off", push on and push off.
- ALT+BELL - restores automatic directional lighting and smoke unit operation. Note - lighting on this locomotive is directional until a request is made via the Controller for a manual activation. Lighting functions will then remain manual via the Controller. Pressing ALT+BELL will allow all lighting functions to return to directional operation at the next direction request.

- HEADLIGHT - turns front headlight 'on' or 'off'.
- ALT+HEADLIGHT - turns tender light 'on' or 'off'.



6-2 Socket diagrams

Socket	function	color	ga.	Socket	function	color	ga.
1	motor (+R)	orange	28	9	speaker (+)	violet	28
2	light (tender)	yellow	30	10	speaker(-)	violet	28
3	open	-	-	11	ground	green	30
4	pick-up (L fireman)	black	28	12	+ 5 volt	blue	30
5	motor (-L)	gray	28	13	smoke motor	gray	30
6	light (front)	white	30	14	smoke element	brown	28
7	light (common)	blue	30	15	ground	green	30
8	pick-up (R engineer)	red	28	16	chuff input(sync)	purple	30

6-3 16 Pin Socket Key

**6-4 10 conductors from tender to loco**

- motor (-L)
- motor (+R)
- pick-up (R engineer)
- pick-up (L fireman)
- light (front)
- + 5 volt & light (common)
- smoke motor
- smoke element
- ground & ground
- chuff input (sync)

**3-5 AC/DC LocoMatic™ Sound Units**

Your loco may be equipped with a unique LocoMatic™ Sound and Control system. The recorded sounds of the 2-8-0 are from an actual locomotive and thus prototypically correct for utmost realism. The Sounds are exhaust (chuff), whistle, bell, brake release, air pumps, safety valve, blowers and

cylinder blow down operations. This sound system is polyphonic when playing, i.e. more than one sound is played at the same time. This system controls all operations of the locomotive in all LocoMatic™ Command modes:

- mode 1 - standard AC
- mode 2 - standard AC (controller for extra features)
- mode 3 - command mode (controller for all functions)

The engine exhaust is equipped with Select-a-Chuff™ which can be user set to a prototypical 4 chuffs per revolution and non-prototypical 2 or 1 chuffs per revolution, (1 chuff per revolution matches older AF steam locomotives which performed only 1 chuff per revolution). See 3.7 Dip Switch Options to change the setting.

**Whistle.** The Whistle is user playable by either the standard DC offset whistle button or LocoMatic™ controller. As long as the Whistle button is held down, the Whistle will play.

**Bell.** The Bell is a push on, push off operation, via either the DC offset bell button or the LocoMatic™ Controller's Bell button.

**Air Pumps & Safety Valve.** Both will operate randomly while running or at rest.

**Cylinder Blow Down.** To operate the Cylinder Blow Down sequence requires the use of a LocoMatic™ Controller. To activate the opening of the cylinder cocks, the engine must be at rest for over 3 seconds. At that time, simply press the Alt+Forward, (Sound Function 3) buttons together. When activated, you will hear a longer steam sound. When the engine starts, the sound of the cylinders blowing steam for each exhaust chuff will be heard. After so many exhausts or a faster speed is reached, then the sound will cease. If desired, you can also turn off the sound by pressing the Alt+Fwd buttons on the controller again at any time, at idle or running.



6-7 LocoMatic Controller wiring

the locomotive will gradually increase its speed rather than jump directly to the high speed. This type of operation not only looks better but also results in less strain on the entire motor/gear drive system and is less likely to cause derailments of the locomotive or its train. This also assists in the amount of storage power the system has, allowing for smoother sequence operation.

### 3-10. SHS LocoMatic™ Controller

The SHS LocoMatic™ Controller allows fingertip operation of a unique sound system with the additional features of realistic, prototypical speed and direction control. Right out of the box, your 2-8-0 will always start in the forward direction when power is first applied. If it has been standing without track power for more than 30 seconds. However, if you wish to designate the rear end as 'front', the default starting direction can be changed, (see Dip Switch Options – DIP 4).

Your SHS 2-8-0 will operate correctly with your transformer in the same manner as traditional locomotives, but with the simple installation of the optional SHS LocoMatic™ Control Box operation will be greatly enhanced.

### Connecting the LocoMatic™ Controller

Connect two wires from your transformer to the terminals on the Controller labeled 'Trans, IN'. The 'B' terminal is the base and the '15' terminal is the 'hot'. Then connect two wires from the terminals labeled "Track OUT" to the track.





6-6 LocoMatic 10 Button Control Box

### 3-9. Operation Using an AC Transformer

With the LocoMatic™ sound/control system installed, your locomotive will operate in the same manner as other locomotives when using a transformer to vary speed. When power is applied, the locomotive will come 'on' in either the forward or neutral position as you have selected. Momentary interruptions of power will allow the locomotive to sequence through the usual direction positions. Sequencing can be achieved either by a direction switch/button or by turning the speed control to 'off' and then back 'on'.

If your transformer includes whistle or bell controls, or if you have provided sound activation buttons, you will be able to sound the whistle or the bell with these controls whenever there is power to the track. The whistle will sound as long as you hold the control 'on'. The bell control is a push 'on', push 'off' operation.

An added feature of this sound/control system involves the way the motor is driven, particularly at slow speeds. When track power is at lower voltages, the system further reduces the power to the motor to provide extremely smooth slow speeds for starting and stopping your train. If the track power fluctuates at these lower voltages, you may notice a slight surging in the speed of the locomotive. If track power is set high while in neutral and you sequence to a direction,

### 3-6 Smoke Unit

The smoke unit operates automatically when the engine is running and is set to smoke as soon as track power is on, although some time is needed for the wick to heat up enough to generate smoke. Before operating, and with the locomotive on the track, fill the smoke unit, via the engine smoke stack, with 3 drops of the smoke fluid provided. During running only 1 or 2 drops need be added. Do Not Overfill. While running, the smoke will puff in time to the drivers. When the engine stops running (is in neutral/idle with track power), the smoke will begin to gently rise from the stack. After 5 minutes idle time the smoke unit will turn off. As soon as the engine is sequenced into forward or reverse, the smoke unit will again turn back on.

Another feature is controlling the smoke unit via the LocoMatic™ Controller. The smoke unit can be forced on by using the Alt+Horn combination. If the smoke unit is off, this will force the smoke unit back on and vice versa. If the smoke unit is forced on, via the LocoMatic™ Controller, it will not time out. To reset this to automatic operation press Alt+Bell and release, or turn off the track power to the locomotive for a period of time to allow for the entire sound system to "die" yielding a total system reset.

### 3-7. Lights

Your 2-8-0 is equipped with lighting that is directional. The headlight will illuminate when the locomotive is in forward motion. When the locomotive is in reverse motion, the headlight will turn off and the tender light will turn on. For manual control of the lights using the LocoMatic™ controller, press the headlight button for the headlight and Alt+Headlight button for the tender light. To restore automatic operation, press Alt+Bell, or cut track power to the track for a period of time.

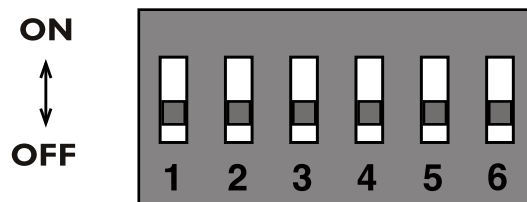
### 3-8. DIP Switch Options

The dip switches are located in the tender and can be accessed through the hinged water hatch cover

(see dwg. 6-1). With all dip switches in the off position a start in forward with standard AC operation will occur. With dip switches in the off position when power is interrupted, a second will pass before sequencing into neutral (especially with low voltage). If a sequence is selected too soon, the engine will start in the reset mode of forward. A slight hum will also be heard through the speaker indicating insufficient track power to maintain proper operation. If this occurs, raise the voltage applied to the track. Quickly turn power off and then back on to allow for sequencing. This of course assumes that sufficient time has passed to allow for the on board storage of energy to be expended. While in neutral, it is advisable to increase the track power from a low setting to allow for a sufficient charge to occur to enable easier sequence operation. Of course, as in all LocoMatic™ systems, sequence direction can also be controlled by the LocoMatic™ 10 Button Controller's Forward, Reverse, Slowdown/Stop buttons with constant power applied to the tracks. While in mode 2, you can use the controller to override any sequence position without changing track voltage.

**Manual Adjustments**

This system, as with other LocoMatic™ systems, has dip switches to select certain features. The dip switches are located in the tender and can be accessed through the water hatch cover (see fig 6-1 page 5).



6-5 DIP Switches (enlarged)

Startup is controlled by the first and second switches as follows:

DIP 1	DIP 2	Operation	Mode
off	off	Start in Forward	I or II
on	off	Start in Neutral	I or II
off	on	Lock in Forward	I or II
on	on	Lock in Neutral	III

Lock in Neutral mode allows for only LocoMatic™ controller operation and allows for track voltage to be set to a fixed amount. The track voltage will determine the maximum speed of the loco-motive.

DIP Switch 3 - controls the whistle and bell operation. With this set ON the whistle and bell will no longer operate leaving the engine for helper service only.

DIP Switch 4 - allows the locomotive to be set up to operate normally in the reverse direction. The rear end, (tender end) of the locomotive leads when Forward motion is input and vice versa. This way two locomotives can operate in a push – pull configuration. In addition to the engine motor direction, the Front and Rear lights are also reversed to follow the locomotives direction.

DIP Switch 5 & 6 - These switches control the Select-a-Chuff™ operation.

DIP 5	DIP 6	Operation
off	off	4 chuffs per revolution
on	off	2 chuffs per revolution
off	on	1 chuff per revolution
on	on	no chuffs, only blower sound