FOX VALLEY MODELS
SCALE TRAINS

NORFOLK & WESTERN
CLASS J
PRODUCT MANUAL

SCALE TRAINS™

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HO 1:87 SCALE

AGES 14+

LokSound

INTRODUCTION

Thank you for your purchase of our **Fox Valley™** N&W Class J locomotive. In this booklet you will find information in regards to maintenance, lubrication, body removal, storage and basic DCC instructions. For additional information, part numbers, and exploded drawings, please see our website: *www.scaletrains.com*.

If you have purchased a DCC and Sound Equipped model, then you will have access to all the features of this outstanding locomotive. For those that have purchased the DCC and Sound Ready version, the DCC information contained in this manual will not be applicable to your model. All of our models are equipped with a 21 pin MTC receptacle should you decide to install DCC at a later date. Our N&W Class J should accept any 21 pin DCC decoder.

Visit *www.LokSound.com* for more information.

Our DCC and Sound Equipped N&W Class J locomotive model is fitted with the **ESU LokSound™ V5** (ESU #58429) full-function DCC decoder. For more information and to download the decoder technical manual, visit the ESU website listed above. The manual document number is 51989.

For those purchasing a DCC and Sound Ready locomotive who want to install sound at a later time, the same decoder may be used. If you wish to install a non-sound decoder, **ScaleTrains™** recommends the **ESU LokPilot™** # 59629. When choosing a decoder for a DCC and Sound Ready unit it is important to remember that ONLY ESU decoders will have access to the advanced lighting features of our Fox Valley locomotives and the **Power Pack™** circuit. Please contact our sales department for assistance in selecting the proper decoder and programming for your operation. The manual for the non-sound decoder is document number 51986. Either choice will allow you to get the most out of the sound or lighting functions designed for your locomotive. Please see the section "Something New" for more information on installing decoders.

Your state-of-the-art locomotive model utilizes two 25mm round speakers in the tender and one 11mm x 15mm sugar cube speaker in the boiler that are wired to the main board.

NOTE: Other brand 21-pin decoders may fit, however, they will not have access to certain electronic components on the main board that control some lighting functions and the Power Pack circuit.

THE PROTOTYPE

Between 1941 and 1950, 14 Norfolk & Western Railway J Class 4-8-4 streamlined steam locomotives were built at the N&W's Roanoke East End Shops. As the most powerful of their kind, they were an integral member of the N&W's "Big Three" steam roster, representing the technology's peak. Initially pulling prestigious passenger trains, they later transitioned to freight and were retired by October 1959, and scrapped, except for No. 611, which now resides at the Virginia Museum of Transportation (VMT). Restored twice, it was featured in Norfolk Southern Railway's steam program from 1982 to 1994 and later in the 21st Century Steam Program. It now operates as a traveling exhibit, occasionally pulling excursions on host railroads.

THE MODEL

Your Fox Valley N&W Class J model is a meticulously designed and crafted model to match the prototype. DCC and Sound equipped N&W Class J models include an on-board sound system, featuring speakers designed to replicate the distinctive sound of the prototype. Also included are sounds for the whistle, bell, and various other appliances found on a steam locomotive.

HANDLING

Due to the delicate nature of the model, it is advised that care should be taken when removing the model from its packaging and when placing it on the track to operate or test.

REMOVAL FROM PACKAGING

To remove the locomotive, carefully slide off the outer sleeve from the "clamshell"plastic holder cradling the model and set it aside.

Next, unsnap the plastic clamshell holder; note that one end is hinged and designed to snap into the top half of the holder. Do this on a flat surface to reduce the risk of the clamshell, or the model, from slipping from your grip and falling to the floor. Once the clamshell is fully open, carefullly remove the model. Reverse the procedure for storing the locomotive.

STORING YOUR MODEL

If you choose to store your model in its box, pay close attention to the model's orientation as you place it in the clamshell container. The model will only fit correctly one way (the nose toward the clamshell hinge). Improper placement may result in damage to small detail parts or railings on the model. Damage due to improper storage is not covered under the manufacturer's warranty. When handling the model, it is recommended to grip the model firmly at its mid-section and around the boiler while avoiding the fine details on the model that may be present.

DISASSEMBLY

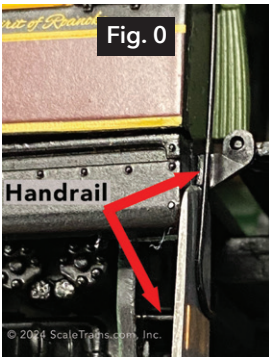


Fig. 0

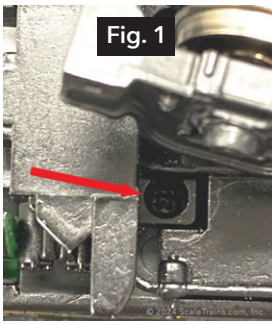


Fig. 1

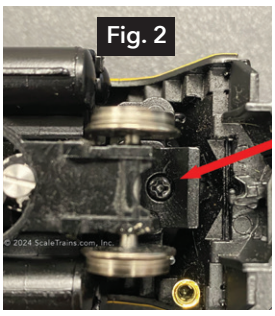


Fig. 2

To disassemble the locomotive and gain access to the main board, decoder, motor, etc., rotate the model upside down and rest it in a foam cradle or other device to protect it from damage while preparing to open it up.

First, release the handrails at the rear of the cab from the chassis at the bottom. To do this is to use the blade of a hobby knife, or other flat tool, and place it between the cab and the bend at the bottom of the railing and rotate until the railing pops loose (see Fig. 0).

Next, locate the two recessed screws in the bottom of the firebox above the trailing truck. You will need to move the truck to one side and then the other to gain access. Remove the screws and set them aside (see Fig.1). The image shows only one of the screws. Deflect the truck to the opposite side to see the second.

Once the cab end screws are removed, there is one additional screw at the front of the model just ahead of the lead truck that must be removed (see Fig.2).

With the last screw removed, the boiler and cab will be free to lift off the chassis (bottom) of the locomotive. CAUTION! There are wires between the upper and lower halves of the locomotive. Use care as to not damage the wiring harness when lifting off the top of the boiler.

To gain access to the inside of the tender, locate the screws at the four corners of the underside of the tender and remove them. Carefully separate the floor and trucks from the body of the tender. There are no wires between the body and floor assembly.

CLEANING

If kept out of its protective packaging for extended periods, it is likely your locomotive may accumulate dust or other debris. While unsightly, it can also potentially damage the finish of the model if allowed to accumulate. To remove light dust, it is recommended that a fine paint brush be used to gently knock off dust particles. For heavier accumulations, canned air dusters (commonly used for cleaning electronics), or air from an airbrush, can be used. Use care with compressed air so as to not dislodge small detail parts.

LUBRICATION

Your Fox Valley locomotive represents hours of careful research and design work, and we are proud to present it to you. With the right care, it should provide years and years of model railroading enjoyment. Out of the box, the model should be ready for service and no lubrication should be necessary, as it has been carefully lubricated at the factory for optimum performance. If the need to lubricate should arise, please follow these guidelines:

- **Be sure to use a plastic-compatible lubricant!** Most household lubricants, such as "3-in-1" type oils, may damage the slippery engineering plastic found in the driveline of the model. Wherever possible, use lubricants designed specifically for model railroad or similar hobby uses, and if in doubt, check the label for any compatibility warnings.
- **Use the right type of lubricant in the right location!** For metal-to-metal bearing surfaces, the use of light or medium oils is recommended. For plastic-to-plastic applications, such as gears, light greases are recommended.
- **Always use lubricant sparingly!** As the saying goes, a little goes a long way. When applying lubricant to bearing surfaces, a tiny drop or dab applied with a fine point, such as a tooth pick, should be more than sufficient. Any excess lubricant oozing from a bearing surface should be carefully wiped away with a paper towel. Excess lubricant that migrates onto electrical pickups can impede power and DCC signal pickup, leading to erratic operation.

Lubrication points will be the same as would be expected on most steam locomotives. In other words, if it moves, it will need periodic lubrication to aid in smooth operation and reduce wear. Remember, a little goes a long way. On the drive wheels, the bearing behind the wheel will need periodic lubrication with a lightweight, plastic compatible, oil. Use care to not get oil on the drive wheel tread as this can cause slipping during operation. The same light oil can be used on moving connection points in the rods, the top (rear) bearing of the gearbox, and the bearings on both ends of the motor. Use care when lubrication is applied not to introduce lubricant into the smoke unit inside the boiler. Smoke fluid oil is a special formula that is not used for lubricant.

The interior of the model is filled with circuit boards and wiring for the many features of your locomotive. Because of this, great care must be taken when applying lubrication to areas that may require it inside the locomotive. Refer to the disassembly instructions and exploded diagrams to understand how to remove the body to access the inner workings of the locomotive. As additional information becomes available, it will be added to the manual and posted to our website.

Whenever possible, avoid contact of the lubricant to the model's exterior finish. Oils and greases can harm the factory paint and lettering. Any excess that may make contact should be gently wiped away with a paper towel or other fine cloth.

Due to the delicate nature of the interior components inside the locomotives, if there is any concern, it may be best to contact your local dealer or contact us directly to help guide you through the lubrication process. Our support team is available by email at: *Support@ScaleTrains.com*.

OPERATING ON DC

DCC & SOUND READY MODELS

DCC & Sound Ready models are equipped with a blind plug (dummy plug) that allows the model to operate on a DC powered track right out of the box. No modification is necessary.

When operating a DCC & Sound Ready model, you will have directional headlights, white only classification lights (if equipped) and number board lights. DCC ready models should not be operated on DCC layouts without a DCC decoder being installed.

DCC & SOUND EQUIPPED MODELS

DCC & Sound Equipped models are equipped with an ESU LokSound V5 DCC decoder that will allow operation on a DC powered track once sufficient electrical power is supplied. The ***Start Up Cycle*** will begin with a low volume simmering sound of a steam locomotive.

DC OPERATION NOTE: Small train set power packs and some low output DC power packs may be able to supply enough voltage/current to activate the start up sound but lack the output capacity to cause the model to move. If this occurs, there is no cause for alarm. However, a higher output power supply should be used that does not exceed the input capacity of the decoder. See ESU decoder manual for details on power requirements.

Sound equipped models operating on DC will only have the ***steam chuff sound*** that will increase as power is applied with the DC supply. DCC functions that are autonomically controlled on DC and that will be on are the front and rear headlights (directional), number boards, walkway lights (if equipped). Sounds like the horn, bell, air compressor, etc. will not be controllable on DC. These sounds may only be user controlled when operating on DCC.

OPERATING ON DCC

DCC & SOUND READY MODELS

DCC & Sound Ready models (without a decoder) contain sensitive electronics and should not be operated on a DCC controlled track even if the DCC system is capable of doing so. DCC isn't A/C or DC, it is both! Confusing, to some degree, but it is a bi-polar, square wave, DC signal or alternating DC. Operating a DCC Ready model without a decoder installed on DCC causes the motor to buzz because it is alternating direction at the frequency of the DCC signal. This isn't good for the motor as it will heat up rapidly and could cause damage over time.

DCC & SOUND EQUIPPED MODELS

Operating your new model on DCC is the best way to get the most enjoyment out of all the state-of-the-art features that are built into the model whether yours is factory sound equipped or you have chosen to install a non-sound decoder. The first question in either case is:"How do I get started?" Below, we will be providing DCC instructions for factory sound equipped models.

GETTING STARTED

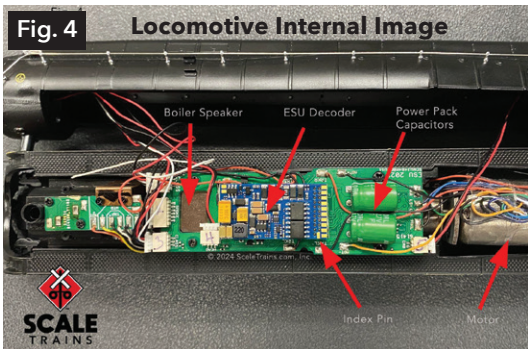
Our models begin with the sound off when you first put the locomotive on the track and may be addressed initially using DCC address: 3.

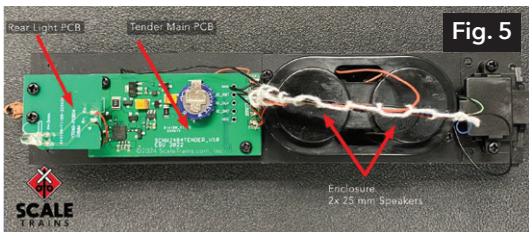
On DCC, pressing F8 will initiate the Start Up cycle. The Start Up cycle for your new locomotive is one of the most realistic in the hobby to date! During Start Up, the locomotive may not be moved until the cycle completes and the locomotive settles down to the simmering state where only a low boiler hiss is heard. This can take from 40 seconds to one minute depending on the length of the recorded start cycle. Start Delay can be disabled by setting CV124 = 16 (default = 20). If you wish for the Start-Up cycle to begin when track power is applied, change the following CV settings in order:

CV31 = 16, CV32 = 3	CV31 = 16, CV32 = 4
CV419 = 32	CV307 = 32
CV435 = 32	CV339 = 16
CV451 = 32	
CV467 = 32	

ADDING A DECODER

There is no better way to get the most from your model than to operate using DCC. An ESU DCC Decoder allows you to access all of the lighting features that are built into your model. If you are installing a sound decoder, you will have the most realistic model available today! If you have installed a decoder in a ScaleTrains.com diesel locomotive before, you may remember that there are DIP switches on the main board that must be adjusted depending on what decoder you install. This is not necessary in our Class J locomotive. It is important to note that when installing the decoder, it is mounted upside down on the main board (see Fig. 4). In Fig.4 it is noted where the index pin is located for the decoder. Also note that the black 21-pin interface bar is pointing downward instead toward the main PCB.





Non-sound Lokpilot decoders are installed in the same manner if no sound is desired. The data portion of the sound file may be loaded onto the Lokpilot decoder so that all functions on the function chart in this manual will work. The tender lighting is controlled by a connection from the locomotive to the main PCB in the locomotive. Fig.5 shows an internal image of the tender and the boards within. It is important to note that the forward enclosure contains two round 25mm speakers connected to the decoder output in the locomotive.

SOUND VOLUME ADJUSTMENTS
MASTER VOLUME CONTROL CV63

When operating your model, it may be desirable to adjust the sound volume differently than programmed at the factory. Only one CV is necessary to adjust the Master Volume Control. CV63 moves all sound up or down depending on the setting. The ESU V5 DCC decoder will allow adjustments from 0 to 150%. The factory setting will vary depending on the model. You can read CV63 with your DCC system's program track to learn the default value for your model before making any adjustments. Volume settings from 0 to 128 are 0 to 100%. Settings from 129 to 192 are 101 to 150%.

Important Note: Settings between 129 and 160 (125%) are generally safe. Settings above 160 should be used with caution, especially with single or small speaker installations to keep from over driving and damaging your speakers.

INDIVIDUAL SOUNDS / VOLUME CONTROL

In addition to the master volume, the advanced functions of the ESU Loksound V5 decoder allows you to control the volume on each sound loaded in the decoder separately. Confusing? Not really. Think of your decoder like the mixing board of an event hall or concert venue. In these setups, you can control the input of each microphone, instrument, etc. to mix them and come up with the compostion you want. Your ESU decoder does the same with the individual input volumes for each sound and then the master volume to move all sound up or down at the same percentage, while keeping the sound mix the same.

To control so many sounds on a single decoder, ESU has utilized CVs above the normal cap of 255 by indexing the CV. Indexing can be a complicated subject but to simplify it, you must use three CVs to set the volume of an individual sound CV. We will use CV31, CV32 and the CV for the sound slot's volume (see Sound CV chart).

Important Note: The following CVs MUST be set first before adjusting the sound slot volume: CV31 =16 and CV32 = 1.

SOUND SLOT VOLUME CHART

Below are the individual sounds for your locomotive and the CVs that control the volumes. Remember, before adjusting these CVs, you MUST set CV31 = 16 and CV32 = 1. Failure to set these first will result in the decoder ignoring your command or you will program something unintentionally.

MUST first set CV31 = 16 and CV32 = 1 to adjust slot volumes 1 to 32

Sound Slot	Sound	Volume CV	Default Setting	
1	N&W J 4-8-4 *	259	180	
2	N&W J 4-8-4 *	267	180	
3	Whistle (SV9)	275	200	
4	Bell (SV10)	283	85	
5	Coal Shoveling	291	90	
6	Slow Air Pump (SV13)	299	25	
7	Oil Burner Blower	307	75	
8	Coupler Clank	315	70	
9	Open Cylinders + Smoke	323	85	
10	Power Reverse/ Johnson Bar (SV14)	331	33	
11	Sanding Valve	339	50	
12	Safety Valve	347	128	
13	Set/Release Brake automatic	355	15	
14	Ash Dump	363	64	
15	Curve Squeal	371	55	
16	Dynamo	379	50	
17	Rail Clank	387	45	
18	Water Refill	395	70	
19	Dumping	403	70	
20	Injector	411	20	
21	Empty	-	-	
22	Independent Brake	427	20	
23	Grade Crossing Sequencer	435	124	
24	Blowdown	443	100	
25	Brake Valve Sound	451	50	
26	Stoker	459	40	
27	Fast Air Pump (SV13)	467	25	
28	Coast	475	32	
29	Rods	483	32	
30	Cylinder Cock #1	491	255	
31	Cylinder Cock #2	499	255	
32	Boiler Hiss	507	3	
	Brake Sound - Squeal	259	40	**MUST set CV32 = 2**
	Brake Sound	259	40	

FUNCTION CHART

Function	Description	Notes:
F0	Directional Headlights	
F1	Bell	
F2	Whistle	
F3	Smoke Generator	
F4	Coast Mode	
F5	Class Lights	White/Green only w/Dynamo
F6	Cab Light (AUX2)	w/Dynamo
F7	Water Refill	
F8	Start/Idle Sounds	
F9	Heavy Load Mode	
F10	Independent Brake	
F11	Grade Crossing	
F12	Disable Brake Squeal Sound	
F13	Coupler Crank	
F14	Air Pump Variable Speed	
F15	Air Pump slow	Random Sound*
F16	Injector	Random Sound
F17	Automatic Brake Set/Release Off	
F18	Ash Dump	Random Sound
F19	Blowdown	Random Sound
F20	Safety Valve	Random Sound
F21	Curve Squeal	
F22	Rod Clank Off	
F23	Oil Headlight (no dynamo/generator)	
F24	Stoker	Random Sound
F25	Sanding Valve	
F26	Empty	
F27	Empty	
F28	Empty	
F29	Sound Fader	

*Random Sounds: These sounds are in the randomly played sound schedule on the decoder with the decoder determining the frequency and duration of play within user definable parameters. The user may also play these sounds independently by pressing the corresponding function button on their DCC throttle to toggle the sound on and again to toggle it off. For more information see the ESU decoder manual.

BASIC DCC FUNCTIONS

F0 HEADLIGHT (directional)
Toggles the headlights ON/OFF, both locomotive and tender.

F1 BELL
Toggles bell ON/OFF. Choose bell by setting options in CV164

F2 WHISTLE
This is a playable whistle sound. The whistle choice is set with options in CV163

F3 SMOKE GENRATOR
Your HO steam locomotive is equipped with a fan-driven smoke system design. The performance and realism of this system is unparalleled in model railroading. Your smoke unit comes primed from the factory however, it is recommended that prior to operating it for an extended period of time that you fill the reservoir with 10-15 drops of smoke fluid such as JT"s Mega Steam™ or others. Do not overfill the smoke generator in order to avoid it overflowing into the boiler area. CAUTION: Follow as safety guidelines for the smoke fluid. Failure to follow the guidelines may cause damage to your model or personal harm.

SAFETY NOTE: DO NOT activate the smoke unit without smoke fluid. Doing so can cause overheating and reduce the performance and/or the life of the unit. If you choose not to add smoke fluid (or have added it and choose to run it smoke free) turn off the smoke unit by deactivating F3.

F4 COAST MODE
The opposite of "Heavy Load." Coast allows for a drifting sound from the rods and snifter valves at any speed. Even allowing for an increase of speed with no chuffs as if drifting downhill. You again have the option to hold the speed to adjust the speed with the offset active.

F5 CLASS LIGHTS
Some locomotives are equipped with changeable Bi-color classification lights. The colors signified train status on the railroad:

Green: A timetable scheduled train with one or more sections to follow.
White: Extra train, not shown on the timetable.

On your Fox Valley model J-Class locomotive, pressing F5 will illuminate the class lights and each additional press of F5 will cycle the lights through the two available colors (Green and White). In DC operation, only white class lights will be available whether the model is equipped with a DCC decoder or a dummy plug.

F6 CAB LIGHT
Our N&W J Class model features a user controllable cab light that may be toggled ON/OFF by pressing F6.

F7 WATER REFILL
Activating F7 will enable the water refill sound as if the locomotive has stopped at a water tower. You will hear the tank lid open and then the water begin to flow. The water flow will continue until F7 is deactivated when you will hear the tank lid being closed.

F8 START / BOILER HISS/SIMMERING
Pressing F8 will activate the sounds on the model and unlike a diesel where you will hear the startup sequence of the diesel prime mover, this is a fairly quiet process whereby you will hear only the sounds of the locomotive as it sits idle, hissing and ready for your command. The random sounds will play from time to time and when you open the throttle, the exhaust chuff will be heard as the model begins to move.

F9 HEAVY LOAD MODE
Activating F9 enables the heavy load sounds of the locomotive to simulate starting out with a heavy train or climbing a grade. Toggle F9 off to disable this feature.

F10 INDEPENDENT BRAKE
Activating F10 will initiate the brake function and cause the locomotive to come to a stop in accordance with the settings entered in Brake 1 (CV179). Once the locomotive is stopped, the locomotive will not move until F10 is deactivated, releasing the brake. If the throttle is left at its previous speed setting when F10 is activated, when the brake is deactivated, the locomotive will automatically ramp up to the previous speed setting.

F11 GRADE CROSSING SEQUENCER
When F11 is activated it begins an automated playing of the chosen whistle as 2 long blasts followed by 1 short blast and an additional single long blast for use when approaching a rail-highway crossing.

F12 DISABLE BRAKE SQUEAL
Toggling F12 will disable the brake squeal sound as the model stops. Toggling it back on will enable the sound.

F13 COUPLER CLANK
Toggling F13 once will trigger the sound of the locomotive bunching the coupler slack in preparation to uncouple from the train. A second press of F13 will place the subsequent sound of the locomotive pulling away and the air line separating from the train. Additional presses will repeat the two sound sequence.

F14 AIR PUMP - VARIABLE SPEED
Activating F14 will enable to air pump on the locomotive to operate at various speeds until the function is disabled.

F15 AIR PUMP - SLOW
Activating F15 will play the air pump sound in a slow mode as if it were maintaining the air reservoir when standing.

F16 INJECTOR
Activating F16 plays the sound of the water injector beginning and flowing water through the check valve and into the boiler.

F17 AUTOMATIC BRAKE SET/RELEASE
The automatic brake is similar in function to the engine brake on F10. This feature has not been set up for use in the decoder so as to not accidentally end up with both brakes on at the same time and the model not moving. The user may study the setting up and use of this function by downloading the ESU Decoder Technical Manual from their website for the Loksound V5 decoder.

F18 ASH DUMP
Activating F18 will play the sound sequence of the fireman dumping ashes from the firebox by shaking the grates.

F19 BLOWDOWN
F19 toggles the sound of the blowdown valve being opened so eject scale and debris from the boiler that has settled to the bottom. This sound will appear as a very loud white noise.

F20 SAFETY VALVE
F20 will manually toggle the safety valves on the boiler to play. The sound is similar in sound to the blowdown. The safety valves are also one of the random sounds that plays automatically as the model is operated.

F21 CURVE SQUEAL
F21 activates the curve squeal sound as a loop that repeats until deactivated.

F22 ROD CLANK - OFF
Disable the rod clanking sound heard during coasting.

F23 OIL HEADLIGHT
This feature is reserved for future use.

F24 STOKER SOUND
Activating F24 plays the sound of the stoker feeding coal through an auger from the tender into the firebox of the locomotive. This sound is also one of the random sounds that plays as a maintenance sound as the model is operated.

F25 SANDING VALVE
This function plays the sound of the sanding valve being opened and feeding sand down to the drivers for improved traction on wet or slippery rails.

F29 SOUND FADER
Activating F29 fades the sound to zero until deactivated.

F26 to F28 and F30-F31 Unused

ESU POWER PACK

Fox Valley models come equipped with an ESU "Power Pack" energy storage device built into the locomotive. These Power Pack devices will work as a backup if the model looses power for a short period of time. If your model is factory equipped with a Loksound decoder, if one is installed later, or if you install a Lokpilot decoder, you will be able to utilize the Power Pack circuit in your Fox Valley HO model. Non-ESU decoders cannot control the Power Pack and it does not function on DC power, nor in DCC & Sound Ready models without an ESU decoder installed and properly configured. Please remember, a Power Pack is a backup, not a battery. This is not an excuse to never clean your track again! They must be charged using track power to function and need track power to stay charged.

The time in which the caps bridge a power loss is adjusted by using CV113. The default setting on most models is 32. This can be adjusted up or down.

BASIC PROGRAMMING NOTES

DCC & SOUND EQUIPPED MODELS

Customizing the programming in your DCC & Sound Equipped model is yet another way to get more enjoyment from your investment. With a few basic guidelines, customizing can be easily done. You may also wish to have the manual for your DCC system handy as well in case a refresher is necessary.

It is recommended that you use ***Paged Mode*** programming to adjust CV settings on your DCC system's programming track. While this is the recommended mode, ***Direct Mode*** may also be used and in many cases, except a decoder reset, some adjustments can be made with ***Programming on the Main*** (i.e. address programming, master volume change, horn or bell choice, etc). An auxilliary programming track booster is not necessary to program an ESU decoder and can interfere with programming in some instances. CVs cannot be adjusted if you are operating your DCC & Sound Equipped model on a DC powered track.

If you will operate your Fox Valley HO locomotive on DCC, it is recommended that you download, read and understand the appropriate Loksound decoder manual for the decoder in use in your model. The V5 manual is document # 51989 on the ESU download webpage at www.LokSound.com and is correct for all DCC & Sound Equipped models produced after January 2019.

DIGITRAX CV PROGRAMMING FOR CVs OVER 255

Some older Digitrax DCC systems do not allow programming of CVs above 255. In order to make full programming possible, we have implemented an assistance tool. This helps to write the number of the CVs desired temporarily into two assisting CVs (so-called address registers), since the usual CVs cannot be reached. Afterwards, the value of the CV desired will be programmed into another assisting CV (value register). When the value register is written, the content will be copied to the actual desired position and the assisting CV will be set back. Consequently, 3 CVs have to be programmed to write one CV. These three CVs are described in the following text:

CV96 - Name Offset CV - Saves the CV number that should be actually programmed in hundreds. Value Range: 0 to 9.

CV97 - Address CV - Saves the CV number that should be actually programmed in units of tens. Value Range: 0 to 99.

CV99 - Value CV - Saves the value of the CV that should be actually programmed. Value Range: 0 to 255.

Example: Need to program CV317 to value of 120.

Program the value of the CV number in hundreds into CV96.
In this example: CV96 = 3

Program the value of the CV number in tens and ones into CV97.
In this example: CV97 = 17

Program the desired value of the target CV into CV99.
In this example: CV99 = 120

BASIC PROGRAMMING NOTES (continued)

As soon as you have programmed CV99, the value of CV99 will be transferred into CV317. When the programming is finished, CVs 96, 97, and 99 will be set back automatically.

This procedure is ONLY needed when programming CVs above 255 on some older Digitrax DCC systems.

NOTE: Please make sure that index CV32 is set to 1 and Index CV31 is set to 16 before you change any of the individual sound volume CVs. Please refer to the decoder manual as necessary for additional CV information. CVs 31 & 32 are not required to adjust the Master Volume, CV63.

Below are some of the basic information points about the V5 decoder and its capabilities:

From the factory, the model is set to default DCC address 03.

- The decoder can be set to a 2 or 4 digit address with normal addressing on all DCC systems.
- Supports **CV1 Short Address** 1-127
- Supports **CV17/18 Long Address** 128-9999. Please add 32 to the default value in **CV29 Configuration** for the decoder to recognize a four-digit address and other config settings.
- Supports **NMRA Consisting using CVs 19 (consist address), CV21 (consist function control F1 to F8), CV22 (FL and F9 to F12 (FL is F/R directional headlight).**
- The decoder may be reset on the program track by setting CV8 = 8. ***NOTE:*** See important information on decoder resets in the **CV8 Resetting the Decoder** section.
- Manufacturer's ID: CV8 = 151
- ESU has added additional function button capabilities (see Function Chart) that may be controlled in a consist using **CV109 (F15 to F22) and 110 (F23 to F30)**. CV109 programs the same as CV21, CV110 (the same as CV22 in regards to bit values).

CV2 Start Voltage (Vmin or Vstart)

Sets the minimum speed or voltage applied to the motor on throttle speed step 1. This can be customized to preference but is generally set where the locomotive will either almost move consistently at SS1 or will crawl on SS1. A setting between 1 to 3 is common.

CV3 Acceleration Rate

Sets the amount of time it will take for the decoder to apply the max voltage set by CV5 to the motor speeding up. The setting in CV3 is multiplied by 0.896 seconds to calculate the time. The CV range is 0 to 255.

CV4 Deceleration Rate

Sets the amount of time it will take for the decoder to reduce the max voltage set by CV5 to zero when stopping. The setting in CV4 is multiplied by 0.896 seconds to calculate the time. The CV range is 0 to 255.

CV5 Maximum Voltage (Vmax, Vfull)

Sets the maximum speed that the locomotive will move. If one model runs faster than another at full throttle, reducing CV5 on the faster locomotive so that they are closer in speed will allow you to run differing locomotives together. The CV range is 0-255 with 255 applying the maximum voltage the decoder can supply to the motor. CV5 must always be greater than CV6 to prevent erratic operation.

CV6 Midrange Voltage (Vmid, Vhalf)

Sets the midpoint of the speed range. A lower setting in CV6 will have smaller increases in speed (voltage to motor) from Vstart to Vmid with throttle speed step advances. Once you reach the Vmid set voltage, larger increases will occur from Vmid to Vmax as you advance the throttle.

CV8 RESETTING THE DECODER

Should it become necessary to reset the decoder to factory specs, place the unit on the programming track of your DCC system and:

1. Enter Paged Mode programming,
2. Enter/read CV8,
3. Set/Program the value 8 into CV8.

That's it! You have just reset the decoder to factory CV settings. This does not affect the sounds on your decoder other than any volume settings that you may have changed. They will be returned to factory settings.

NOTES:

- After a reset, CV8 will again read 151.
- CV1 Short Address will be active again and set to 03
- CV17/18 and CV29 will return to factory defaults

DO NOT reset the decoder using POM (Programming on the Main) as the decoder requires a power cycle OFF to ON to complete the reset cycle. Failure to do so may result in the decoder not properly resetting.

CV17 Long Address (Ad4) - High Byte

The value entered in CV17 determines the higher value (first two digits) of a long address entered into the decoder. See chart on pg. 114 of ESU V5 decoder manual #51989.

CV18 Low Address (Ad4) - Low Byte

The value entered in CV18 determines the lower value (second two digits) of a long address entered into the decoder. See chart on pg. 49 of ESU V5 decoder manual #51989.

Manually Programming a Long (Ad4) Address:

The following information is the same as that found in the decoder manual for determining and programming a long address manually. Some DCC systems have automated methods for entering a long address that you may prefer to use.

To programm a long address, you need to calculate the values for **CV17** and **CV18** and enter them into the decoder. Please note that it is not possible to program addresses via the programming mode "POM" Programming on Main.

To program the long address proceed as follows:

- First you determine the desired address, for instance 4007.
- Then you look for the appropriate address range in **Fig. 2**.

The value to be entered into **CV17** can be found in the column on the right. In our example, it is 207.

The value for **CV18** is established as follows:

desired address 4007
minus first address in the address range - 3840
==============================
equals value for CV18 167

- Program CV17 = 207
- Program CV18 = 167

Your decoder is now programmed to address 4007.*

* You must still program Bit 5 of CV29 to recognize the long address.

Address Range			Address Range			Address Range		
From	To	CV17	From	To	CV17	From	To	CV17
0	255	192	3584	3839	206	7168	7423	220
256	511	193	3840	4095	207	7424	7679	221
512	767	194	4096	4351	208	7680	7935	222
768	1023	195	4352	4607	209	7936	8191	223
1024	1279	196	4608	4863	210	8192	8447	224
1280	1535	197	4864	5119	211	8448	8703	225
1536	1791	198	5120	5375	212	8704	8959	226
1792	2047	199	5376	5631	213	8960	9215	227
2048	2303	200	5632	5887	214	9216	9471	228
2304	2559	201	5888	6143	215	9472	9727	229
2560	2815	202	6144	6399	216	9728	9983	230
2816	3071	203	6400	6655	217	9984	10239	231
3072	3327	204	6656	6911	218			
3228	3583	205	6912	7167	219			

Fig. 2 CV17 Table

CV29 Configuration Register

The Configuration Register, CV29, tells the decoder how to behave in a number of ways from speed steps, to speed curves, and whether to recognize a short or long address. See figure 3 to learn how the default value was reached on the locomotive.

CV	Name	Description			Range	Default
29	Configuration Register	This CV configures the decoder for regular operation				Value
		Bit	Function	Value		14
		0	Normal direction of travel	0	0	
			Reversed direction of travel	1		
		1	14 Speed steps DCC	0		
			28/128 speed steps DCC	2	2	
		2	Disable analog operation	0		
			Enable analog operation	4	4	
		3	Disable RailCom®	0		
			Enable RailCom®	8	8	
		4	Speed curve (CV2, 5 & 6 LS5 DCC On	0	0	
			Speed curve CV67-94	16		
		5	Short address (CV1) active in DCC	0	0	
	Fig. 3 CV29		Long address (CV17 + 18) active in D	32		

Alternate Sounds

Your new Fox Valley locomotive will come to you with the correct horn and bell right out of the box per the specific prototype. In case you would like to use different horn or bell sounds, we have provided an assortment for you:

Whistles (Sound SV9)

CV163=0 BSVY #8419 Hancock Long Bell 3 Chime

CV163=1 Hancock Long Bell 3 Chime

CV163=2 N&W Hooter

CV163=3 Hooter Whistle 1

CV163=4 N&W Y6B

CV163=5 SP&S Whistle

Bells (Sound SV10)

CV164=0 611 N&W J class Bell 1

CV164=1 Pneumatic Bell 2

CV164=2 #425 RBMN Bell

CV164=3 SOO #1003 Bell

CV164=4 DRGW K-27 Bell

Miscellaneous Sounds

Brake Squeal (Sound SV11)

CV165=0	Brake Squeal 02 - Long
CV165=1	Brake Squeal 02 - Short
CV165=2	Brake Squeal 03 -Long
CV165=3	Brake Squeal 03 - Short
CV165=4	Brake Squeal 07 - Long
CV165=5	Brake Squeal 07 - Short

Dynamos (Sound SV12)

CV166=0	Soo Line 1003
CV166=1	DRGW K-27
CV166=2	T16.1

Air Pumps (Sound SV13)

CV167=0	Cross Compound (Soo #1003)
CV167=1	Cross Compound (DRGW K-27 #463)
CV167=2	Cross Compound (SP 4449)
CV167=3	RBMN #425
CV167=4	Westinghouse Single Stage 9" (HVSR #3)

Reversers (Sound SV14)

CV168=0	Johnson Bar (manual)
CV168=1	Power Reverse

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Ship item(s) for repair to our Service Center at...

ScaleTrains Service Center
4901 Old Tasso Road NE
Cleveland, TN 37312

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If ScaleTrains.com deems the product to be defective, we will either (1) repair (2) replace the item, or (3) offer a store credit redeemable at ScaleTrains.com toward a future purchase. This determination is at the sole discretion of ScaleTrains.

ScaleTrains has the final decision on all warranty matters. The warranty policy is subject to change without notice.

SXT82273 • Rev 9-24 • ESU V5 Decoder

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