Jacobsen Declaration Exhibit AI

Case 3:06-cv-01905-JSW

Document 237-36 Filed 10/03/2008 Page 2 of 28

Decoder Commander® Software

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Decoder Commander[®] software

Configuration and User Manual



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Table of Contents

	5
INSTALLING DECODED COMMANDED SOETWADE	5 6
INSTALLING DECODER COMMANDER SOFT WARE	
DECODER COMMANDER BASIC OPERATIONS	7
Start Train Server [®] Manager	7
Start Decoder Commander [®]	7
CONNECT DECODER COMMANDER TO TRAIN SERVER	8
DECODER COMMANDER CONSOLE	8
USING DECODER COMMANDER THE FIRST TIME	9
Terminology	9
PROGRAMMING A DECODER WITH THE WIZARD	11
CONFIGURATION OPTIONS AND TOOLS	17
	17
Decoder Tools	····· 1/
Address Setting	
Address Setting Driving Attributes	
Address Setting Driving Attributes Analog Functions	
Address Setting Driving Attributes Analog Functions FX Options	
Address Setting Driving Attributes Analog Functions FX Options Speed Curve Function Matrix	19
Address Setting Driving Attributes Analog Functions FX Options Speed Curve Function Matrix	19 20 21 22 23 24 24 25
Address Setting Driving Attributes Analog Functions FX Options Speed Curve Function Matrix Variable Overview Define Single Variable	19 20 21 22 23 24 24 25 26
Address Setting Driving Attributes Analog Functions FX Options Speed Curve Function Matrix Variable Overview Define Single Variable Programming Information Windows	19 20 21 22 23 24 24 25 26 26 26
ADDRESS SETTING DRIVING ATTRIBUTES ANALOG FUNCTIONS FX OPTIONS SPEED CURVE FUNCTION MATRIX VARIABLE OVERVIEW DEFINE SINGLE VARIABLE PROGRAMMING INFORMATION WINDOWS STATUS MENUS	19 20 21 22 23 23 24 25 26 26 26 26 26 26
ADDRESS SETTING DRIVING ATTRIBUTES ANALOG FUNCTIONS FX OPTIONS SPEED CURVE FUNCTION MATRIX VARIABLE OVERVIEW DEFINE SINGLE VARIABLE PROGRAMMING INFORMATION WINDOWS STATUS MENUS PROGRAMMER WINDOW.	17 19 20 21 22 23 24 25 26 26 26 26 26 27 27
ADDRESS SETTING DRIVING ATTRIBUTES ANALOG FUNCTIONS FX OPTIONS SPEED CURVE FUNCTION MATRIX VARIABLE OVERVIEW DEFINE SINGLE VARIABLE PROGRAMMING INFORMATION WINDOWS STATUS MENUS PROGRAMMER WINDOW REPORT VIEW WINDOW	19 19 20 21 22 23 24 25 26 26 26 26 26 26 27 27 27

Introduction

KAM has two different programming philosophies for programming decoders, a simple programmer (Engine Commander[®] software) and a fully function do everything programmer (Decoder Commander[®] Software).

Engine Commander implements a basic programming capability for programming decoders. Engine Commander allows you to read and write CV's, program decoder address and speed curve. Engine commander programming is a simple programmer, allowing you to read and write your decoder

🔎 Decoder Comman	nder Nickle Plate 9	285	
<u>File Trainserver y</u>	jew <u>L</u> anguage <u>H</u> el	þ	
🗅 🚅 🖬 🐰 🖣		?	
Known decoders	Decoder	Commander using programming mode: entry	
⊡ ≪ database) — ≪ Silver Mini Sil	🌋 Programmer win	dow 🛛 🖪 Report view 🛇 XML trace window 🖉 Trainserver message window	
Nickle Plate 9	Speed curve		
	Decoder tools	Used speed curve © speedtable © 3 point curve Speed step: 20, 254 Normalize curve Straight curve Switcher curve Mainline curve Mainline curve Draw roster © Draw curve	
		Operation Requested:	
		Read Write	
CcCommander entries	Decoder reset		

Figure 2. Train Tools installation screen

Decoder Commander is a serious decoder programmer that allows you to do everything that Engine Commander does plus configure advance decoder functions, clone decoders, customize speed curves, configure advance function mapping from the Dcc Commander SQL database. Decoder Commander allows you full access to the manufacture specific decoder information so you may customize the decoder as you see fit.

Installing Decoder Commander Software

To install Decoder Commander software you need to complete these three steps

- 1. Insert the CDROM in your computer. Select Install Train Tools. Follow the instructions in the installation manual. If you do not have a product key, use the custom option to install Decoder Commander evaluation software.
 - a. The Train tools CD-ROM has numerous examples on how to use KAM's software. These examples are in a short 3 -5 minute video tutorials that explain the operation of KAM's software



Figure 2. Train Tools installation screen

- Follow the information in your installation instructions for the easy to use setup. You will need to have your serial number handy during the installation process. Your serial number is available on the "your Information" page on the KAM website and will be emailed to you on all product downloads.
- 3. Please refer to the "Getting Started with Train Server" guide for configuration of Train Server.
- 4. You are now ready to run Decoder Commander software.

Decoder Commander Basic Operations

Start Train Server[®] Manager

If Train Server Manager is not yet running on the PC running Train Server, you must start Train Server Manager in order to start Train Server. If you have not yet configured any command stations, please read the previous section and complete this step first.

 Start Train Server Manger. It is located in your start menu in the "Train Tools" program group.

Train Server will remember the last command station configured, so you only need to enter the command station information one time.

TIP: Train Server must be running before you continue. If you have not selected a command station in Train Server, Layout commander will not control the layout.

Start Decoder Commander[®]

 Start Decoder Commander. It is located in your start menu in the "Train Tools" program group.

When Decoder Commander starts, there will be a delay while Decoder Commander attempts a database connection to the Microsoft SQL Server Express database. The Microsoft SQL server desktop. The connection is automatic.

TIP: If you see an error that Decoder Commander cannot find the database, then run the Dcc Commander manager to configure the SQL database.

 After Decoder Commander attaches to the database, there is a delay while the software loads the manufactures decoder models from the Microsoft SQL database for the program to use. This may take a few minutes depending on the size of your disk.

Select trainserver	
Select server Trainserver: 127.0.01 Network port 1069	Connect
Cancel OK	

Figure 1: Decoder Commander main window

Connect Decoder Commander to Train Server

• Enter the TCP/IP address or the computer's network name that is running Train Server.

TCP/IP is the networking protocol used for Microsoft networks and the TCP/IP address is how each computer on the network is uniquely identified.

If your are running Decoder Commander on a different computer than the PC running Train Server you must enter the TCP/IP address or computer name of the PC running Train Server. See the Troubleshooting section of this manual for help in obtaining the TCP/IP address of another computer.

The first time Decoder Commander is run, it will use the TCP/IP address of the computer it is running on as the default value for the server address.

After Decoder Commander is run the first time, the default server address displayed will be the last address entered. Some networks use dynamically assigned TCP/IP addresses (DHCP) which can cause the address of a PC to change when rebooted which will cause the previously used address to be incorrect. See the Train Server Administrators manual for more information.

• Enter the TCP/IP port number that Train Server is using.

This will always be port 1069 unless Train Server was intentionally reconfigured.

• Click the "Connect" button.

Decoder Commander Console



Figure 2: Decoder Commander startup screen

After you have selected the connect button, Decoder Commander, connects to Train Server and loads any know decoder that you have programmed, and sets up the programming mode form your last session.

Decoder Commander uses decoder models form the SQL database, that conform to the manufactures decoders specification. These decoder models are used as to create a new decoder that has the properties of the locomotives on your layout.

Using Decoder Commander the first time

Terminology

Decoder Commander is a decoder programmer tool designed for programming model railroad decoders. Before you begin to program your model railroad decoders, there are a few terms that describe the operation of Decoder Commander and the capabilities of the software.

- **Decoder** A hardware component in your model train that controls the operation of the model train. Decoders have a control variable specification that defines the operations characteristic of the decoder and how the model train will operate.
- **Control Variable** Control Variables or CV's contain configuration information on the operation of the decoder. The CV's are defined by the National Model Railroad Organization (NMRA), and conform to a standard that all model train manufactures support.
- **NMRA Standard** The NMRA Digital Computer Control(DCC) standard is located at <u>www.nmra.org</u>.
- **Programmer** A software tool design to program the configuration variables on a mobile decoder. KAM's Decoder Commander and Engine Commander is a software programming tool.
- **SQL Database** All decoders have unique characteristics. KAM has created a SQL database that contains the manufacturers decoder specifications. Users may extend the supported decoders by adding decoders locally, or through our web site and downloading a new database image.
- CommandA hardware component used to control your model railroadStationlayout. Command Stations support two different programming
capabilities, Operation mode and service mode. Service mode
requires a programming track for operation.

Case 3:06-cv-01905-JSW	Document 237-36	Filed 10/03/2008	Page 11 of 28
	Decoder Commande	r [®] Software	
Programming	A command to change the CV in the decoder. Programming is either a "read" (service mode) or "write" (operations and service mode) for the desired CV.		
Read	A decoder may only be read in service mode. This requires that the decoder is placed on the programming track.		
Write	A decoder may be written in operations mode (on the mainline) or in service mode (on the programming track).		
Operations mode	Operations mode is a the model train is ope	programming mode t rating on the layout.	hat is used when
	A decoder address car mode.	not be programmed	in operations
	Operations Mode only to the decoder. This is operations track.	supports an unverifie s because the decode	ed write operation er is on the mainline
Decoder Address	A decoder address is a recognize the locomot	in address that the co ive on the model rail	omputer uses to road layout.
	Decoder addresses do locomotives have he s the both locomotives w	not need to be uniqu ame address and are will respond to any co	ue. If two on the layout, then omputer command.
Programming Track	A set of track attached program the decoder i	l to a command stati n service mode.	on where you can
Service Mode	Service mode is a prog programming track on there are three differe the command station.	gramming mode that a command station. nt programming ope These are page, dire	uses the In service mode, rations support by ect and register.
	Service mode is used addresses. Service m formats to program a	to program the decoo ode uses different ty decoder.	der CV values and pes programming
	Service Mode supports the decoder. This is b programming track.	both "read" and "wr ecause the decoder i	ite" operations to s on the
Programming formats	There are three differe to program a decoder formats are page, dire	ent types of programi in service mode. The ct and register.	ming formats used ese programming

Programming a Decoder with the wizard

🔎 Decoder Comm	ander			
<u>File</u> Trainserver	<u>V</u> iew <u>L</u> anguage (<u>H</u> elp		
] 🗅 🚅 🔚 🐰	🖻 💼 🚳 🗛	?		
Known decoders	Decoder	Comr	mander using programming	mode: entry
	🌋 Programmer wir	idow i	🍕 Report view 🛛 🔾 XML trace window 🛛	O Trainserver message wi
	KAM Initialisation	l		
	Decoder tools		Read from programmer track New from DccCommander Search DccCommander decoder en	wies

Figure 3: Programming your first decoder

• Decoder Commander uses programming wizard when you program a decoder for the first time.

TIP: Before you start the decoder wizard, create a directory called "My Decoders". Locate this directory in the "My Documents" directory. This will allow you to save your decoders to disk.

Decoder Commander uses both the NMRA service mode programming and the operations mode programming.

When you program a locomotive decoder for the first time, you will need to place the locomotive decoder on the service mode programming track to program the decoder CV's. After the decoder is programmed, you can program the decoder on the mainline.

• Select either the "new" file or "new from Dcc Commander" decoder database to begin the programming process for your locomotive decoder.

Create decoder project	
	Create decoder entry This wizzard creates the database values for the selected DccCommander entry Lenz Elektronik GmbH Silver Mini Silent-Back EMF DCC Decoder QSI Decoder Unknown NMRA Extended NMRA Compatbile
	Unknown DccCommander entries DccCommander entry:
	< back next > cancel finish

Figure 4: Running Decoder Commander Programming wizard

• After starting the wizard, select the decoder model that matches your decoder as close as possible. In our example, we have selected an All Mobile CV for the Nickel Plate 941

All of the information collected from the decoder will be stored in a readable data file. You can use the Decoder Commander to print out the decoder information for your records.

• Select next and enter information about the decoder project

Create decoder project 🛛 🗙		
	New from DccCommander Define the loco parameters	
	DccCommander: Silver Mini Silent-Back EMF DCC Projectname Silver Mini Silent-Back EMF DCC Decoder(1)	
	Addressing Short adddress 3 C Long address 0	
	Programming mode Programming Direct programming	
	<back cancel="" finish<="" th=""></back>	

Figure 5: Entering project information for your decoder

TIP: When you name a decoder project, name it with a value that is descriptive of the locomotive. This will make it easier to maintain the decoder over time.

- Select next after you have entered the decoder address and project name
- Select a directory where you would like to save the decoder information that you have created. You can save this information anywhere on your disk.

Create decoder project	X
	Create Decoder Entry This step prepares the database entry DocCommander: Silver Mini Silent-Back EMF DCC Decoder Decoder name: Silver Mini Silent-Back EMF DCC Addressing: 3 / 0 Select folder database
L L	< back next > cancel finish

Figure 6: Entering project information for your decoder

• The Programming wizard allows you to specify the programming operation that you want to perform on the decoder.

There are three programming modes that you can perform. If you do not plan to program your decoder, just select "finish", and a new decoder state table will be created. You can always program your existing decoders at any time. The programming options are described in the table below.

Clone decoder	(optional) Select the decoder that you wish to copy. This will read one of your existing decoders, and either program the decoder, or create a new model for use with the wizard
Read a decoder	Read a decoder's CV's form the programming track and save the information to your decoder database for this locomotive
Write a decoder	Write a decoders CV's to the programming track from the data file or a clone decoder (if selected).
	It is best to clone a decoder on write operations, unless your club layout has a decoder standard.

TIP: When programming a new locomotive, place the locomotive on the programming track, before you decoder commander wizard. If you have purchased a sound decoder, check the manufactures instructions on programming. You may need to purchase a programming booster to program this decoder.

Figure 7: Entering project information for your decoder

Figure 14, shows that have decided to "read the decoder", and store the information into our decoder file, under the name of "Silver Mini Silent-Back". To start the operation, we select program.

TIP: reading and writing a decoder takes time.. The read/write time may be upwards of 30 seconds per CV. Advance decoders typically have 50 CV's, so it is not uncommon to wait 10 minuets to read or write a mobile decoder.

• To begin the programming operation, select "Program". If you wish to abort the programming cycle, select "Abort". Stopping a command station programming sequence may take 30 seconds or more to stop the programming cycle.

Create decoder project				
	Create decoder entry			
	Define the loco parameters DocComman Silver Mini Silent-Back EME DCC Decoder			
EFF ALL	Decoder name: Silver Mini Silent-Back EMF DCC Decoder			
Room 11 (9	Clone decoder:			
	Select Operation:			
	C CreateDccComander entry			
	 Treagnet coder and save values Write decoder values from DccCommander database 			
	16 of 38 processed, result cv=75, val=0			
	Program Abort operation			
ļ	< back next > cancel finish			

Figure 8: Programming operation status update

• At the end of the programming cycle, you select finish. This will update the Decoder in your known decoder list.

Figure 15, shows the status update of the programming operation. This display will show you the number of CV's that are processed, and the value of each CV.

Decoder Commander Silver Mini Silent-Back EMF DCC Decoder(1)				
File Trainserver View Language Help				
] 🗅 😅 🖬 🐰 🎙	3 C <i>6</i> A	ę		
Known decoders	စ္စြို့ Decoder	Commander using programming mode: entry		
	🌋 Programmer wir	ndow 🛛 🖲 Report view 🗍 오 XML trace window 🗍 🖉 Trainserver messag		
Gatabase)	Address settings			
	Decoder tools	DCC Primary Address		
		Short address		
	Address settinge	C Long address		
		Requested Operation:		
	Speed curve	Bead		

Figure 9: Status area updated with new Decoder information

After you have completed the programming operation, the Decoder Commander console is updated with the decoder information that we just read earlier.

Decoder Commander will scan your hard drive when Decoder Commander is started. The decoder information is stored in a XML data file in the directory that you specified.

Configuration Options and Tools

Decoder Tools

-	Property of the	ter a Report view @ 196, here strategy of Traingener manage ofto	Det .
7	6		
1	Contract of the local division of the local	OOI Parase walkers	(manual data)
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	*	Contraction and Contraction of Contr	
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	and the second	instata 🔳 👘	Nacialize Stat
	*	Constant Parents	
		Rissian	
	74	untur 🔳	(resistor intel)
	14	Pitosan Astron Active To Ta Responden	
1	and the second	Simerate	
× .	196	Constato 📕	Manufacture Solida
N	1		
1			
		()	
	Decision in the		

Figure 10: Programming with Decoder Commander Tools

You can use "Decoder Tools" to program your decoder. Decoder Tools allows you to program individual CV's, as groups of CV's. To use the Decoder Tools, select one of the known decoders. Known decoders are decoder's whose data files are located on your disk. Known decoders are created using Decoder Commander programming wizard.

The Decoder Tools menu expands with the decoder tool options. In our example, we have started a programming operation (read was selected). The values that will be read, are changed to -1, and are colored red. Once the decoder values are returned from the command station these values are updated to returned values, and the background changes to white.

CV19: Consist Address
🗹 Consist activ
Current value: 12
Consist Direction Reversed
CV21: Consist Address Active For F1
Consis activ
Current value: 2710
Consist Address Active For F8 Respond to
CV22: Consist Address Active For FL in Forward
✓ Consist activ
Current value: 3

Figure 11: Information display on programming CV's

Decoder Commander allows you to program individual CV's in a group, and displays the status information about the programming operation. Decoder Commander uses KAM's Smart Decoder Technology to determine which CV needs to be written and updated to the decoder.

Yellow Shows a changed value for write operations. This value will be written to the decoder when the user depress the write operation.

Values that are in white are ignore on decoder write operation.

Red If the number displayed is in red and is not a -1, then this value is an error value. The value entered is out of range for the CV.

A -1 value in red, means that this information is being read from the decoder. The return value will be updated as clear text

TIP: If you wish to abort a programming operation, just select a different "decoder Tool". This action will abort the programming operation.

Address Setting

Decoder tools	OLong address	Manufacturer default
Analog function	CV19: Consist Address Current value: Current value: Consist Direction Reversed	Manufacturer default
FX Options	CV21: Consist Address Active For F1 Current value: 12 Consist Address Active For F8 Respond to	Manufacturer default
「伊尊 Variable overview 前日 Define single variable	CV22: Consist Address Active For FL in Forward Consist activ Current value:	Manufacturer default
	Requested Operation: Read Write	
Decoder test		

Figure 12: Address setting CV's

Decoder addresses can only be program in service mode, and not in operations mode, with the exception of consist packet information (CV21 and CV22). All other CV's can be programmed on the main.

Driving Attributes

Decoder tools		
Address settings	O 14 Speed Steps	
Priving attributes	28 / 128 Speed Steps	
	CV29: Reverse driving	
ann.	Locomotive Direction reversed	
Analog function	CV29: Decoder configuration	
and the second second	Speed Table Definition Use QSI table or User table in CVs 67 through 94	
FX Options	CV29: Decoder configuration	
	Address Format Two byte (extended) address	
Function matrix	Requested Operation:	
Variable overview	Read Write	
് പ		
Define single variable		
Decoder test		



Driving attributes are those CV's that effect the operation characteristics of the locomotive decoder. Driving characteristics include speed step (14/28 mode), enabling a decoder speed table by use of the decoder, and to set the locomotives direction of operation (used for double headers)

Analog Functions

Decoder tools	
	CV29: Activate analog function
and the second se	Power Source Conversion DC conversion enabled
Address settings	
	Dorwooted Operation:
and the second sec	requested operation.
Driving attributes	Read Write
nalog function	
EX Options	
@ @ 	
Function matrix	
<u></u> @ <u>@</u>	
Variable overview	
<u></u> @04	
Define single variable	
Denne bingie Vanable	
Decoder test	
]	J

Figure 14: Analog Functions

Analog function support allows the locomotive to operate in analog mode, on a model railroad layout where a Digital Command and Control systems is not available. This capability is unique to each decoder, and is not universal across all decoders that are produced. If you wich to run your locomotive on a layout that does not support DCC, you will need to have CV29 analog mode enabled.

TIP: Analog mode does not always work with all Locomotives motors. You will need to check with the locomotive manufacturer to verify if the locomotive motor supports analog operation.

Likewise, all locomotive motors do not support DCC. Iron core motor typically will heat up and burn out on DCC layouts unless there is some electrical modifications made to the motor circuit.

FX Options

Decoder tools	CV25: Quantum Speed Table	
Address settings	Current value: 0 User Defined Speed Table	Manufacturer default
Driving attributes	CV53: Outout 10 - Forward/Reverse Only	
	Current value: 0 Dynamic Brakes Dynamic Brakes	Manufacturer default
Analog turcuon	CV53: - Neutral Only Mute Doppler Shift	
FX Options	Current value: 0 Displet Shift Headlight Dim Headlight Reverse Light	Manufacturer default
Speed curve	CV53: - Neutral Only Directional Mars Light Mars Light	
Function matrix	Current value: 0 Strobe Mars Light Number Board Lights Directional Headlight + Directional Mars Light	Manufacturer default
Variable overview	CV53: - Neutral Only Directional Ditch Lights Directional Ditch Lights Ditch Lights Ditch Lights	
â Uê	Current value: 0 Cruise Control Scale mph Report and Status Report Course Effect	Manufacturer default
Define single variable	CV53: - Neutral Only Squealing Brakes Squealing Brakes + Air Brakes	
	Current value: 0 Dynamic Brakes	Manufacturer default

Figure 15: FX Function support

FX function support allows you to define the function bit modes of the decoder. These modes allow you different operating characteristics of the locomotive on the layout. Check with your decoder manufacturer to verify that bit mode is supported

Speed Curve



Figure 16: Speed Curve support

Decoder Commander supports speed, if the locomotive decoder supports speed curve. The decoder tools allows you to define any type of speed curve that makes sense for you locomotive. The tools support some preprogrammed speed curves, that would represent a switcher and mainline (freight/passenger).

On any speed curve, you need to be able to modify the speed curve. The decoder Tools, allow you to modify individual elements and normalized the curve.

If you choose a "read" operation, the decoder will be read, and the speed curve will updated based on the information from the locomotive.

TIP: Before you modify a speed curve, always read the speed curve from the locomotive. This will give you a base line to make your speed curve modifications.

Function Matrix

Decoder tools		Ewdlight	Pouliaht	E1	E2	E2	EA	FE	EG	E7	E9	EQ	E10	E11	E12		_
Decoder tools	Fwd light Rev light F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12	Fwd light										F9		F11	F12		
Function matrix Wariable overview	- Manufactur Value: Operation R	er Konfigurat Requested:	on		Ма	nufact	urer d	efault Read			~	/rite					

Figure 17: Function Matrix mapping

Some decoders allow you to cross map the decoder functions, this is useful if you want to have a different operation sequence. For example, if you may desire to configure ditch lights of the locomotive when the head light is turned on. Another example, would be the operation of an uncoupler in a switcher. In running a switcher, you may desire to map the uncoupler to the rev light, so when a switch changes direction you can dropt he cars behind it.

In both of theses cases, you would map the decoder functions in the function matrix as shown above.

Variable Overview

Decoder tools	CV1: Primary Address	
Address settings	Current value: 27	Manufacturer default
Driving attributes	CV2: Vstart	
Analog function	Current value: 32	Manufacturer default
দি Coptions টি Col	CV3: Acceleration Rate	
୮୯୮୦ Speed curve ସାହ	Current value: 3	Manufacturer default
でい Function matrix	Current value: 3	Manufacturer default
eriable overview	CV5: Max Volts	
Define single variable	Current value:	Manufacturer default

Figure 18: Decoder CV Overview

Variable Overview allows you to read and write a single CV variable or multiple CV variables to the decoder. The CV values and descriptions are from the decoder database. The CV's are programmed based on the decoder model that is used, or Decoder Commander programming override.

To program a CV, find the correct CV that you wish to program, and move the slider till the appropriate value. Change one or all values. When it is time to program, Decoder Commander will program the CV's to the desired state.

Select the desired programming operation, either read or write. You can view the programming status in the status bar or the message window.

Decoder tools	Quantum Speed Table Method
and the second sec	25 Value: 0 ORegister
Address settings	Bit 1 O Paging
1. A.	Bit 2 Direct
Driving attributes	Bit 4
	Bit 5
Analog function	Bit 7
	Bit 8
SY Options	
FX Options	
	Bead
Speed curve	
ติญ	
Function matrix	
്പ	
Variable overview	
(that)	
Define single variable	

Define Single Variable

Figure 19: Single CV variable programming

Define single variable allows you to read and write a single CV variable to the decoder. The decoder database contains the necessary information about the decoder's CV, and displays that information. The programming operations displayed are derived from the decoder database.

Programming Information Windows

Status Menus

Decoder Commander maintains a runtime control of the decoder operations. There are four different status menus, Programmer window (default), report view, XML trace window and Train server message window.

Programmer window

The programmer window is the default view that allows the user to control the programming operations in decoder commander.

Report view window

The report view window is a print view of the decoder characteristics. This view is updated real time when the changes are reported by train server. If you desired to print a decoder summary, display the report view first, then select he print operation from the file menu.

🌋 Programmer w	indow 🏾 🍯 Report vi	ew 🛇 XML trace window 🖉 Trainserver message window
<< <	> >>	
Summary	for decoder: Penns	y GG 27
Manufacturer:	QS Industries (QSI)	
cv	Value	Name
1	27	Primary Address
2	32	Vstart
3	3	Acceleration Rate
4	3	Deceleration Rate
5	1	Max Volts
7	5	Manufacturer Version No
8	113	Manufacturer ID

Figure 20: Report View print window

Train Server Message Window

🚿 Pr	grammer window 🔹 Report view 오 XML trace window 🥝 Trainserver message window
Port	Message
1	Program: Direct mode
1	Program: Writing cv 29
1	Program: Complete
1	Program: Direct mode
1	Program: Writing cv 29
1	Program: Complete
1	Program: Direct mode
1	Program: Writing cv 29
1	Program: Complete

Figure 21: Train Server status window

Train Server message window displays the message feedback information from the command station.