User's Manual

VK9000
1394 Data Analyzer

IM 703425-01E

YOKOGAWA
Yokogawa Electric Corporation

IM 703425-01E
1st Edition

Foreword

Thank you for purchasing the YOKOGAWA VK9000 1394 Data Analyzer. This user's manual contains useful information about systems functions, operating procedures, and troubleshooting tips. To ensure correct use, read the manual thoroughly before operation. Keep this manual in a safe place for quick reference in the event of a question or utilize the system's online help.

Notes

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functions.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer as listed on the back cover of this manual.
- Copying or reproducing all or any part of the contents of this manual without YOKOGAWA'S permission is strictly prohibited.
- YOKOGAWA holds the copyrights to the software of this product. Altering, copying, and reverse engineering all or any part of the software is strictly prohibited.

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Revisions

1st Edition: February 2001

Disk No. ????
1st Edition : February 2001 (YK)

Checking the Contents of the Package

Unpack the box and check the contents before operating the instrument. If some of the contents are not correct or missing or if there is physical damage, contact your YOKOGAWA dealer.

VK9000

Check that the model name and suffix code given on the nameplate match those on the order.

MODEL (Type Name) and SUFFIX (Suffix Code)

Type	Suffix Code	Description
703425		VK9000
	/D1 or /F1	SBP-2 Parser
	/D2 or /F2	AV/C Parser
	/D3 or /F3	IPv4 over 1394 Parser
	/D4 or /F4	Scripting Software
	/D5 or /F5	HAVi Software
	/D6 or /F6	Customize Parser

Standard Accessories

Part Name	Quantity
VK9000 unit	1
Cordless keyboard	1
Mouse	1
Batteries	2
Stylus	1
1394 Cable	1
Power cord	1
CD-ROM containing backup software	1
Windows NT software	1
CD-ROM containing backup PC	1
User's guide	1
License sheet	1 (In the case of the option addition)

Safety Precautions

This instrument is an IEC safety class I instrument (provided with terminal for protective grounding).
The following general safety precautions must be observed during all phases of operation. If the instrument is used in a manner not specified in this manual, the protection provided by the instrument may be impaired. YOKOGAWA Electric Corporation assumes no liability for the customer's failure to comply with these requirements.

Make sure to comply with the following safety precautions. Not complying might result in injury or death.

WARNING

Power Supply
Ensure that the source voltage matches the voltage of the power supply before turning ON the power.

Power Cord and Plug
To prevent an electric shock or fire, be sure to use the power cord supplied by YOKOGAWA. The main power plug must be plugged into an outlet with a protective grounding terminal. Do not invalidate this protection by using an extension cord without protective grounding.

Protective Grounding
Make sure to connect the protective grounding to prevent electric shock before turning ON the power.

Necessity of Protective Grounding
Never cut off the internal or external protective grounding wire or disconnect the wiring of the protective grounding terminal. Doing so poses a potential shock hazard.

Defect of Protective Grounding
Do not operate the instrument when the protective grounding or the fuse might be defective. Also, make sure to check them before operation.

Do Not Operate in Explosive Atmosphere
Do not operate the instrument in the presence of flammable liquids or vapors. Operation in such environments is very dangerous.

Do Not Remove Covers
Some areas inside the instrument have high voltage. The cover should be removed by YOKOGAWA'S qualified service personnel only.

External Connection
Connect the protective grounding before connecting to the item under measurement or to an external control unit.

CAUTION

This product is a class B1 product (for the measurement room).
Operation of this product in a residential or commercial area may cause interference to other equipment.
Any unused ISA and PCI slots of the instrument cannot be used.
YOKOGAWA does not guarantee proper operation if the user adds card or modifies the unit.
The instrument may have an adverse effect on a device connected to the same AC power supply due to the power supply's distorted harmonic signals.
The instrument uses a lithium battery. When the battery dies, please contact your nearest YOKOGAWA dealer as listed on the back cover of this manual.

Contents

1.1 Characteristics of VK900

The VK9000 is a 1394 testing solution and provides complete 1394 data analysis and generation. Analyze 1394 serial bus activity using the VK9000, a powerful and flexible way to analyze your 1394 bus. View node configuration information and set flexible triggers to capture and filter data. Generate 1394 traffic and examine CSR data.
The VK9000 provides a complete, cost effective, 1394 testing suite. Use the VK9000 to set triggers, generate and capture data, or analyze packet contents and bus topology. Importantly, snooping and packet generation is supported at speeds of 100, 200, and 400 Mbps. Optional plug-in support includes AV/C, IPv4, SBP-2, HAVi and scripting.
Some of the major features and capabilities are:

- Fully compliant with 1394-1995 and 1394.a
- Topology map for bus topology analysis
- Snooping and packet generation at speeds of 100, 200, and 400 Mbps
- Optional protocol support includes AV/C, IPv4 SBP-2, and HAVi
- Optional scripting engine
- Optional Customize protocol parser function
- Node identification and speed mapping
- View CSR information
- Event Window for display of traffic
- Flexible triggering
- External Trigger In/Out
- 2–six-pin 1394 connectors and 1–four-pin 1394 connector
- Comprehensive filtering
- Event search engine
- 1394 packet generation
- Statistical data analysis

1.2 Structure of the Manual

This manual provides detailed information on functions of the VK9000 via procedural steps and descriptions and definitions of VK9000 functionality. Use the VK9000 Instruction Manual as a reference for specific procedural steps or background information. This manual also provides overview information on major, high-level functions of the VK9000 via user interface information and tutorial information.
The manual is divided into eleven major sections:

Front Matter
The Front Matter includes the VK9000 Model Number and Suffix Codes along with package contents and general safety precautions.

Chapter One: Introduction to VK9000
The Introduction to VK9000 discusses important overview information including a summary of system features and a review of the contents of this manual, a description of labeling conventions and notations used in the manual, and important safety precautions.

Chapter Two: Getting Started
The Getting Started chapter, discusses information needed before first using the VK9000 including setting up the system for the first time and includes information on the VK9000 User Interface including menus, commands, shortcut icons, customization tips, and the soft keyboard for data entry. Also this section contains a Quick Tour, which provides several tutorial steps to increase users' familiarity with the interface and highlights basic functions of the VK9000.

Chapter Three: Topology Window
The Topology Window section examines the major functions related to visualizing the 1394 bus including the Topology Map for viewing 1394 nodes on the bus including performing Read, Write, and Lock commands, the Event List for viewing individual 1394 packets, the Transaction Viewer for tracing 1394 transactions between nodes on the bus, and consumed 1394 bandwidth.

Chapter Four: Capturing Packets
The Capturing Packets section discusses capture buffer organization and triggering and capturing options including setting, saving and reusing triggers and trigger condition options including external in and external out triggering via the BNC connector.

Chapter Five: Examining Node and Packet Contents
The Examining Node and Packet Contents section examines the CSR and Config ROM Explorer, which is used to examin CSR and Config ROM data with packet contents numerical values translated in descriptions in a tabular format, and the Data Explorer, which is used to selectively examine packets from the capture buffer and drill down and examine contents and parse various protocols.

Chapter Six: Generating 1394 Traffic
The fifth section, Generating 1394 Traffic, discusses various packet generation options for asynchronous, isochronous, PHY, and higher level protocol packets including simultaneously generating and triggering on packets. The section also details creating sequences of packets and saving and reusing packets.

Chapter Seven: Additional VK9000 Software Functionality: Custom Protocol Plug-In and Scripting Engine
The Additional VK9000 Software Functionality: Custom Protocol Plug-In and Scripting Engine chapter discusses the Custom Protocol Plug-In, which provides a method to define a custom protocol and then the ability to parse a 1394 packet to reveal the user defined protocol. Also discussed is the Scripting Engine Plug-In, which is an embedded Visual Basic Scripting Engine that uses standard VB commands and VB Language Extensions for VK9000 specific commands for automating much of the development and testing process.

Chapter Eight: Contacting Customer Support, Backup Software Installation, and Troubleshooting Tips
The Contacting Customer Support, Backup Software Installation, and Troubleshooting Tips section contains important information on contacting customer support and the VK9000's operating system and its system software along with common troubleshooting tips for the LCD Monitor, keyboard and touchscreen, and the Topology Map.

Chapter Nine: VK9000 Specification
The VK9000 Specification section contains a detailed specification for the unit.

Appendix
The Appendices section contains information on protocol support detection values and reference information.

Description and Labeling Conventions

The documentation uses common Microsoft labeling conventions for graphical user interface elements such as windows, menus, menu items, icons, task bars, dialog boxes, tabs, etc. Familiarity with the exact conventions is not necessary. The documentation is designed to emphasize Yokogawa interface elements, not labeling terms. To help users focus on these elements, Yokogawa graphical user interface element titles are in bold type in the documentation, for instance, **Data Generator** window. Also when a short-cut button command is available the documentation first outlines using the menu command then provides the short-cut as a Tip after the main procedural step.

The VK9000 is designed for mouse or stylus pen operation. Thus users can either use a mouse or a stylus to interact with the user interface. To avoid confusion the manual uses terms for mouse actions such as click and double-click instead of terms specific to stylus pen/touchscreen operation such as tap and double-tap. In either case the term click and tap are interchangeable; that is click means the same as tap throughout the manual. A user would for instance move the tip of the stylus pen to the object in question and press it once or twice for double click.

Notations Used in this Manual

The following notations are used in this manual:

Hexadecimal notation	(Example) 0123_{16} 0x0123 (Hex): 0123
Decimal notation	(Example) 123
Binary notation	(Example) 11011_2

Precautions

Handling of packets that do not conform to the standard

The capture operation is not guaranteed when packets that do not conform to the standard are received.

Analyzer operation when software or hardware other than the analyzer is installed

YOKOGAWA will not be held responsible for operation problems of the analyzer that may occur if the user installs software or hardware that was not installed at the time of delivery of the product.

The operation of the software and hardware other than the analyzer when it is installed

If the user installs software or hardware that was not installed at the time of delivery of the product, YOKOGAWA will not be held responsible for the operation of the software or the hardware.

2.1 Safety Precautions

If you are using this instrument for the first time, make sure to thoroughly read the Safety Precautions section at the start of this manual.

Do not remove the cover from the instrument

Some sections inside the instrument have high voltages that are extremely dangerous. For internal inspection or adjustment, contact your nearest YOKOGAWA dealer as listed on the back cover of this manual.

Malfunction

Never continue to use the instrument if there are any symptoms of trouble such as strange smells or smoke coming from the instrument. In such cases, immediately turn OFF the power and unplug the power cord. Then, contact your nearest YOKOGAWA dealer as listed on the back cover of this manual.

Power Cord

Nothing should be placed on top of the power cord. The power cord should also be kept away from any heat sources. When unplugging the power cord from the outlet, never pull the cord itself. Always hold the plug and pull it. If the power cord is damaged, contact your dealer for replacement.

2.2 General Handling Precautions

Never place anything on top of the instrument

Never place another instrument or any objects containing water on top of the instrument. This may cause problems.

Do not apply shock to the input section

Applying shock to the input terminal or the connected cable can cause electrical noise to enter the instrument.

Do not damage the LCD

The LCD is very vulnerable to scratches. Therefore, be careful not to damage the surface with sharp objects. Also, do not apply vibration or shock to it.

When not using the instrument for a long time

When the instrument is not being used for an extended period of time, unplug the power cord from the outlet.

When moving the instrument

First, disconnect the power and other cables. Use both hands to carry the instrument.

Cleaning

When cleaning the case or the operation panel, first remove the power cord from the outlet to prevent electrical shock. Then, wipe with a dry, soft cloth. Do not use volatile chemicals since this might cause damage including but not limited to discoloration or deformation.

2.3 Installation Considerations

Installation position

Place the instrument on a flat, even surface making sure that the ventilation holes on the back of the unit are not blocked. To prevent internal overheating, allow enough space around the instrument and do not block the vent holes.

Installation condition

Install the instrument in a place that meets the following conditions.

Do not install the instrument in the following places:

- In direct sunlight or near heat sources
- Near high voltage equipment or power lines
- Where an excessive amount of soot, steam, dust, or corrosive gases are present
- Near magnetic field sources
- Where the level of mechanical vibration is high
- In an unstable place

2.4 Before Connecting the Power Cord

To avoid electrical shock and damage to the instrument:

Connect the power cord only after confirming that the voltage of the power supply matches the rated electric power voltage of the instrument.

Connect the power cord after checking that the power switch of the instrument is turned OFF.

To prevent electrical shock or fire, always use the power cord supplied by YOKOGAWA.

Always use protective grounding to prevent electrical shock. Connect the power cord of the instrument to a three-pole power outlet that has a protective grounding terminal.

Never use an extension cord that does not have protective grounding; otherwise the protection function will be compromised.

2.5 Setting Up

Connect the Power Cable

1. Check that the power switch is OFF.
2. Connect the plug of the accessory power cord to the power connector on the rear panel of the instrument.
3. Plug the other end of the power cord into a power outlet

Install the Batteries in the Keyboard

Make sure that the batteries are installed in the keyboard. If the unit will not be in use for a long period, remove the batteries not avoid battery drain. Also when traveling with the unit consider removing the batteries to also avoid drainage which can occur if the mouse button on the keyboard is depressed. Connect the mouse.

Setting Networking Option

The VK9000 supports networking. This option is not enabled when the unit is shipped since each user's site has different variables and constraints. Consult with your network administrator for configuring networking options.

Connect a 1394 device

To connect a 1394 device, connect a 1394 cable to one of the VK9000's 1394 ports located on the left side of the unit. Connect the 1394 cable to the appropriate device.

Start the VK9000

Press the power switch located to the back of the main unit. The VK9000 starts.

Using the VK9000 with a Stylus or a Mouse

The VK9000 supports mouse or stylus use. The system is designed with a touchscreen and ships with a VK9000 stylus/pen. The stylus is operated by twisting the cap to reveal the plastic tip or use with the interface or a ball-point pen tip for regular writing.

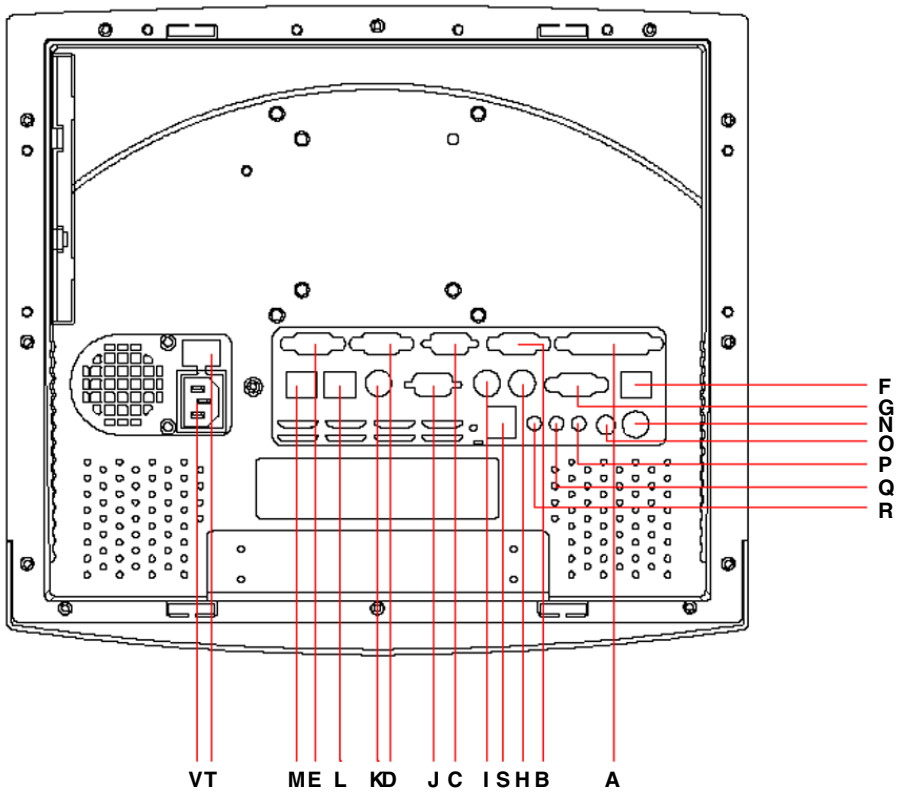
The keyboard mouse, which is the right-hand button on the keyboard, moves the mouse pointer on the screen. The double-button on the left-hand section of the keyboard are used to select objects by single or double click actions.

WARNING

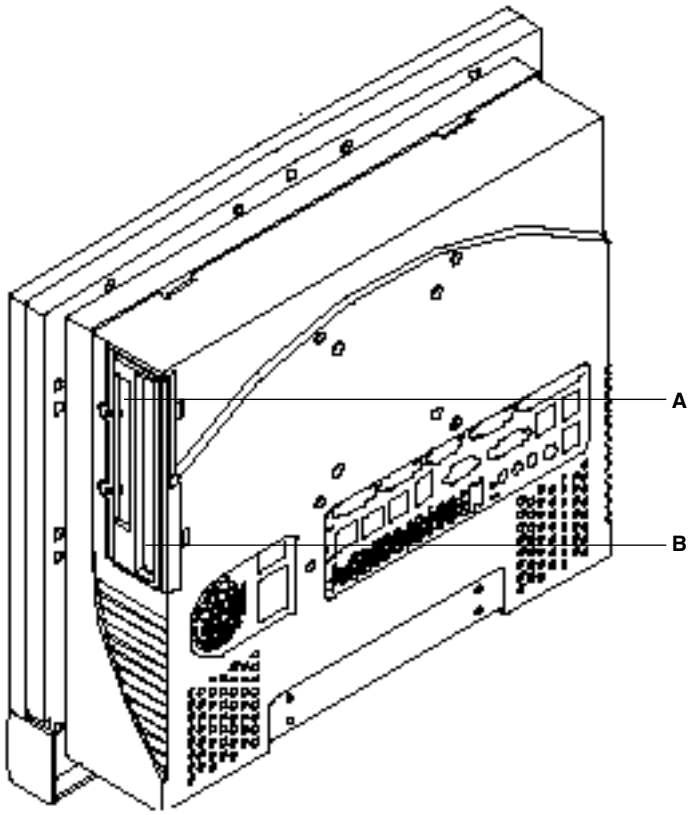
Do not use the pen tip or other types of sharp objects on the touchscreen. Sharp objects can scratch or damage the screen.

The VK9000 also supports a serial or PS/2 mouse usage.

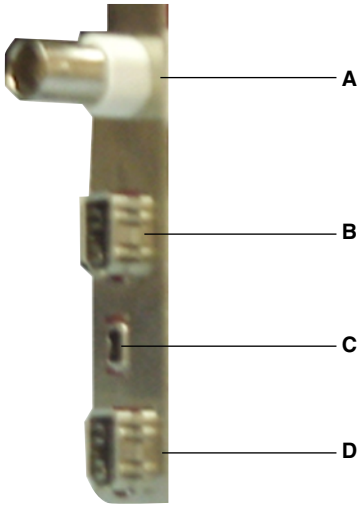
VK9000 Physical Configuration Overview



Item	Description	Item	Description
A	Printer port	J	External FDD
B	COM1	K	+5/12 V DC-out
C	COM2	L	DIO
D	COM3	M	DIO
E	COM4	N	TV-out (S-teminal)
F	Ethernet (RJ45)	O	TV-out (RCA jack)
G	VGA port	P	Line-in
H	PS/2 Keyboard	Q	Speaker out
I	PS/2 Mouse	R	MIC-in



Item	Description
A	Floppy Drive
B	CD-ROM Drive



Item	Description
A	BNC connector
B	1394 6-pin connector
C	1394 4-pin connector
D	1394 6-pin connector

Structure of the VK9000 Default Folder

The various files used by the VK9000 are stored in folders under the directory c:\dpx. The folders titles are:

Folder title	Contents
Bitmaps	Contains bitmap file data.
Data	Contains capture data saved to a file and uses the file extension .fwx.
Firmware	Contains files and information to update the VK9000's firmware.
Framebuilder	Contains data and files used by the Framebuilder Software which is used in conjunction with the Custom Protocol Plug-In to build unique packets.
Icons	Contains images used on the Topology Map to represent 1394 nodes.
Protocols	Contains higher-level protocol information used by the Framebuilder and VK9000.
Packets	Contains packet data saved to a file including Asynchronous packets (.apk) Asynchronous packet streams (.asq); Isochronous packets (.ipk); and PHY packets (.ppk) and PHY packet streams (.psq).
Scripting	Contains data and files used by the Scripting Engine Plug-In.
Settings	Trigger condition files (.trg) and filter configuration files (.eft) are stored in this folder.

The pdf data of this Instruction Manual is also stored in User's Manual folder in backup CD-ROM.

2.6 VK9000 User Interface Tour

Menu Bar

The user interface for the VK9000 consists of four menu/button bars. The top bar is the **Menu** bar and is used to access submenu commands.

Menu Bar

Menu Item	Description
File	Contains commands used to manipulate data in the VK9000 user interface including saving data and opening data along with preferences for node topology display.
View	Contains commands used to determine how data is displayed in the Topology window and Event List/Transaction Viewer.
Filter	Contains commands used to selectively display different types of data from the capture buffer.
Trigger	Opens the Trigger window. Trigger window is used to select data capture options.
Generator	Opens the Data Generator window. Data Generator window is used to select preferences and options for 1394 packet generation
Zoom	Contains commands to increase or decrease the Topology Map.
Tools	Contains a commands for the Real Time Bandwidth Monitor, Soft Keyboard, and Scripting Engine API.
Help	Contains commands for displaying Online Help and displaying software revision number.

Button Bar

Directly under the Menu bar is the Button bar. The Button bar is used to access shortcut commands. These commands are also accessed via submenus from the Menu bar.

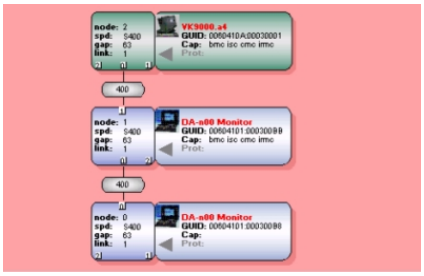
Button Bar

Button Bar Shortcut Icons

Button Name	Button Icon	Button Description
New		Clears current displayed topology.
Open		Used to launch/access a new file.
Save		Used to save to a file packet data.
Print		Prints Topology
Print Preview		Previews Print job.
Refresh Topology		Updates displayed topology.
Update Port Status		Updates node port status information.
Capture		Opens the Trigger window.
Start Generation		Opens the Data Generator window.
Stop Iso Generation		Stops Isochronous packet generation.
Filter		Opens the Filter window.
Live Topology		Displays Live (active) bus topology.
Logged Topology		Display Logged (captured/saved) topology.
Zoom In		Increases Node Size.
Zoom Out		Decreases Node Size.
Search		Opens the Dialog for Searching Event window.
Scripting		Starts the Scripting Engine API, optional feature.
Bandwidth		Starts the Real time Bandwidth Monitor.
Help		Opens the Online User Guide.

Topology Map

The **Topology Map** is located directly under the **Menu** and **Button** bars. The **Topology Map** shows live and logged 1394 bus topology. Devices are represented as nodes on the **Topolgy Map**. The **Topology Map** when showing live or active topology uses red as a background color for the window. When the topology is saved or logged then the background color changes to green.



Topology Map

Node Element	Descripton
node	Node Identification number.
spd	Speed supported by the node.
link	Displays the linkon bit value. A value of 1 shows the link is on.
pwr	Displays a node's power class.
Node icon	Icon displayed to represent the node.
Node name	Name given to the node.
GUID	Globally Unique Identifier number. Unique number assigned to 1394 devices.
Cap	Node capabilities. Abbreviations in Uppercase show that the node is acting in that role, for instance BMC means that a node is acting as Bus Manager.
Prot	Indicates protocols supported.
PHY ports	Indicates the number of PHY ports on the node.

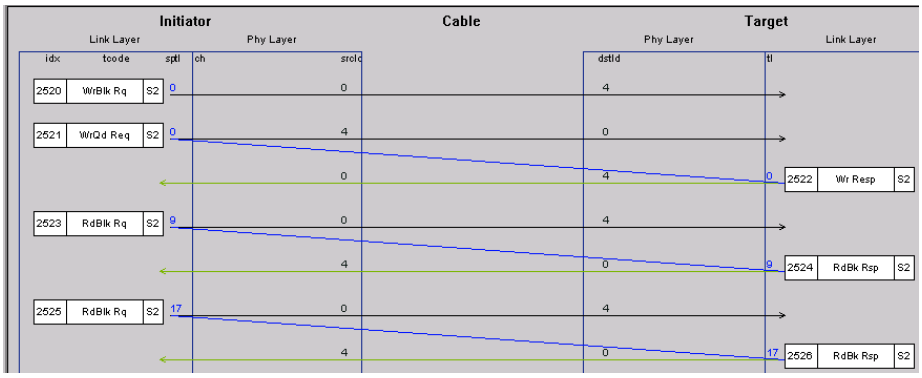
Event List and Transaction Viewer

Users can examine packet traffic in two ways. The first method is the **Event List** in which bus traffic from various nodes is detailed in a tabular format. The **Event List** is located below the **Topology Map**.

Type	Index	Time (sec.cycle.tick)	Ext...	SrcID	DstID	Dst Addr	Tlabel	Retry	Resp	Priority	Speed	Channel	Tag	Sync	Ack
Asy	796	011.6743.1984		4	0	FFFF...	13	RetryX		0	400				
Asy	797	011.6744.1991		0	4		13	RetryX	Complete	0	400				
Asy	798	011.6745.1524		0	4	0000...	9	RetryX		0	400				
Asy	799	011.6745.1935		4	0		9	RetryX	Complete	0	400				
Asy	800	011.6747.2197		0	4	0000...	16	RetryX		0	400				
Asy	801	011.6747.2603		4	0		16	RetryX	Complete	0	400				
Asy	802	011.6750.1445		0	4	0000...	48	RetryX		0	400				
Asy	803	011.6750.2393		0	4	0000...	57	RetryX		0	400				
Asy	804	011.6750.3030		0	4	0000...	50	RetryX		0	400				
Asy	805	011.6751.0754		0	4	0000...	59	RetryX		0	400				
Asy	806	011.6751.1549		0	4	0000...	52	RetryX		0	400				
Asy	807	011.6751.2490		0	4	0000...	61	RetryX		0	400				

Event List

The second method, the **Transaction Viewer**, which represents bus packet details, involves graphically representing packet traffic. The **Transaction Viewer** is located in the same place as the **Event List** on the **Topology** window. Users select which view to use and can toggle between each.



Transaction Viewer

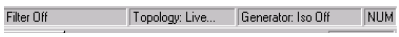
Accessing the **Event List** and **Transaction Viewer** along with several other features is made possible via the **Navigation** bar located below the **Event List/Transaction Viewer**. Users can select view options by clicking on the needed button. Importantly, these features examine packet details and will not display any information unless data has been logged/captured or a saved file is opened.

Navigation Bar and Status Bar

Navigation Bar

Item	Description
Topo/Event List	Displays contents of the capture buffer/logged file in the Event List.
Transaction	Displays the contents of the capture buffer/logged file in the Transaction Viewer.
Bandwidth	Displays the contents of the capture buffer/logged file in the Bandwidth Usage window.
Transmit Time	Displays the contents of the capture buffer/logged file in the Transmit Time window.
Event Time Distribution	Displays the contents of the capture buffer/logged file in the Event Time Distribution window.
Statistics	Displays the contents of the capture buffer/logged file in the Statistics window—not a graphical presentation but a tabular summary.

The **Status** bar located in the lower right hand corner of the screen tracks several key features including if a filter is applied, whether topology is live or logged, the status of the Isochronous Generator, and if the Number key on the keyboard is selected.

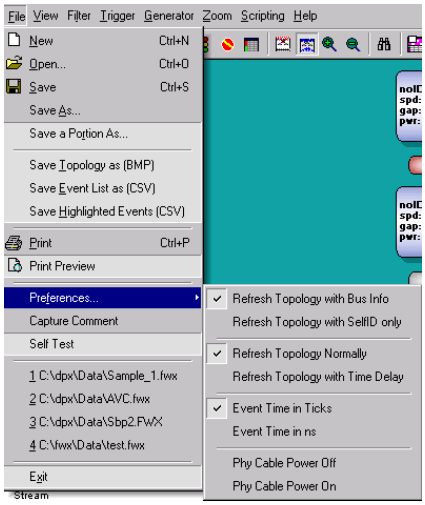


Status Bar

Item	Description
Filter	Indicates whether a Filter is applied to the contents of the capture buffer/ logged file.
Topology	Indicates if the topology is Live (active) or logged (contents of capture buffer/logged file).
Generator	Indicates whether the Isochronous Generator is active.
NUM	Indicates if the Num Lock key on the keyboard is selected.

File Menu

The **File** menu contains commands used to open previously saved files and select preferences, which alter the displayed topology.



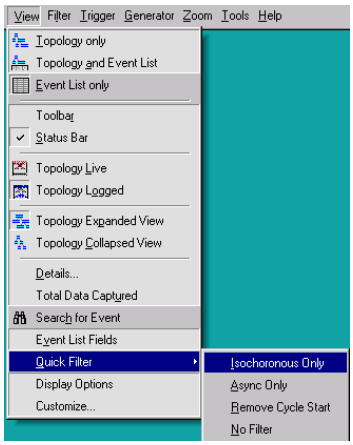
File Menu

Item	Description
New	Clears current topology.
Open	Used to access data saved to a file.
Save	Used to save data to a file.
Save As	Used to save data to a file or change data already saved to a file.
Save a Portion As	Used to select a section of the Event List/Transaction Viewer to save to a file.
Save Topology as (BMP)	Save to a bitmap file node data displayed on the Topology Map.
Save Event List as (CSV)	Save to a CSV file data in the capture buffer/logged topology.
Print	Prints current topology.
Print Preview	Previews current print job.
Prefences	Used to alter the appearance and to select options on the data displayed on a node. Also used to set a time delay so that slower devices can respond to a Read Block Request.
Capture Comment	Add comments to a specific capture saved to a file.
Self Test	Used to test VK9000 internal hardware.
Exit	Closes the application.

Item	Description
Refresh Topology with Bus Info	Displays bus block information on the node on the Topology Map including GUID and node capabilities and protocols supported.
Refresh Topology with Self ID only	Displays Self ID information on the node on the Topology Map only including Node ID and speed.
Refresh Topology Normally	Standard method for refreshing bus topology.
Refresh Topology with Time Delay	Used to set a time delay so that slower devices can respond to a Read Block Request.
Event Time in Ticks	Displays time data in ticks in the Event List/Transaction Viewer.
Event Time in ns	Displays time data in nano seconds in the Event List/Transaction Viewer.
PHY Power Cable Off	Turns off 1394 power provided to the PHY. Makes the VK9000 a power consumer. Can cause topology recognition problems if this mode is selected and a device is connected which does not provide 1394 power to the bus. In this case turn off the unit.
PHY Power Cable On	Turns on 1394 power provided to the 1394 bus, + 15 w.

View Menu

The View menu contains commands which impact the **Topology Map** and the **Event List/Transaction Viewer**. The **View** menu also contains commands for changing display options and customizing interface menus and buttons.

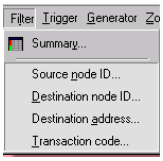


View Menu

Item	Description
Topology only	Displays Topology Map completely in Topology window, Event List/ Transaction Viewer is not displayed.
Topology and Event List	Displays Topology Map and Event List/Transaction Viewer in Topology window.
Event List only	Displays Event List/Transaction Viewer completely in Topology window, Topology Map is not displayed.
Toolbar	Used to select if the Toolbar is displayed.
Status Bar	Used to select if the Status Bar is displayed.
Topology Live	Displays Live (active) bus topology.
Topology Logged	Displays topology saved to a file or contents of the capture buffer.
Topology Expanded View	Displays full node display information including GUID, Node Capabilities and Node ID number and Node Speed.
Topology Collapsed View	Displays shortened node display information including Node ID and Node Speed only.
Details	Opens the Data Explorer window.
Total Data Captured	Displays statistical information from the capture buffer.
Search for Event	Opens the Search for Events window, which is used to search for specific events in the Event List/Transaction Viewer.
Event List Fields	Select fields displayed on the Event List.
Quick Filter	Apply a quick filter to data in the capture buffer.
Display Options	Used to configure how data is displayed and optional display choices. Discussed as a separate topic in this manual.
Customize	Opens the Customize window, which is used to change/select menu commands and buttons that are displayed on the VK9000 interface. Users can quickly customize commands and buttons used most. Separate topic in this manual.
Isochronous Only	Filters out all packets except Isochronous packets.
Async Only	Filters out all packets except Asynchronous packets.
Remove Cycle Start	Filters out of the capture buffer Cycle Start packets.
No Filter	Turns off any applied filter settings.

Filter Menu

The **Filter** menu contains commands used to filter data when displayed in the **Event List/Transaction Viewer**.

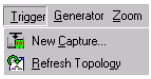


Filter Menu

Item	Description
Summary	Opens the Summary tab on the Filter window, which contains all filter setting from the other three tabs (Source, Destination, and Transaction).
Source node ID	Opens the Source tab on the Filter window, which contains filter settings for Source ID.
Destination node ID	Opens the Destination tab on the Filter window, which contains filter settings for Destination ID.
Destination address	Opens the Destination tab on the Filter window, which contains filter settings for Destination ID.
Transaction code	Opens the Transaction code tab on the Filter window, which contains filter settings for Transaction codes.

Trigger Menu

The **Trigger** menu contains commands to start a new data capture and to display the most current bus topology.

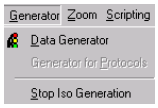


Trigger Menu

Item	Description
New Capture	Opens the Trigger window, which is used for all trigger customization/ settings.
Refresh Topology	Refreshes displayed topology with most current/active bus topology.

Generator Menu

The **Generator** menu provides commands to begin generating 1394 packets and to stop continuous Isochronous packet generation.

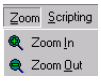


Generator Menu

Item	Description
Data Generator	Opens the Data Generator window, which is used to select packet generation options.
Generator for Protocols	Planned future enhancement.
Stop Iso Generation	Stop Isochronous packet generation.

Zoom Menu

The **Zoom** menu is used to minimize and maximize the appearance of the various 1394 nodes on the **Topology Map**.



Zoom Menu

Item	Description
Zoom In	Increases the size of nodes on the Topology Map.
Zoom Out	Decrease the size of nodes on the Topology Map.

Tools Menu

The **Tools** menu contains a commands to start the **Script Editor**, which is used to set up customized triggering and generation automated responses, the **Soft Keyboard**, and the real-time **Bandwidth Monitor**.

Tools Menu

Item	Description
Script Editor	Open the Scripting Engine API, which is used to customize and automate testing procedures. Optional feature.
Soft Keyboard	Digital keyboard, operated via the touchscreen for data entry. Separate topic in this manual.
Bandwidth Monitor	Real time bandwidth monitoring of the 1394 bus. Separate topic in this manual.

Help Menu

The **Help** menu contain version information for the VK9000 software and access to the VK9000 Online Help.

Item	Description
Help Topics	Opens the Online VK9000 User Guide.
About DPX	Displays current VK9000 software build.

Soft Keyboard Window

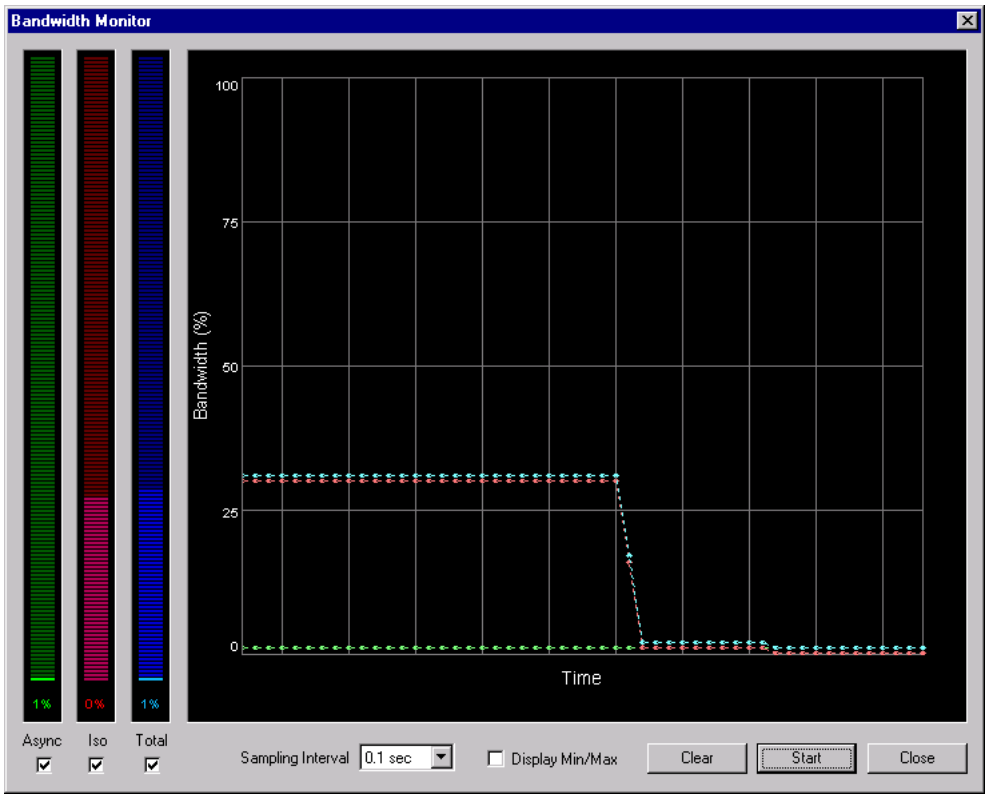
Use the **Soft Keyboard** to enter data with a stylus without using the keyboard. This option is selected from the **Tools** menu. After the Soft Keyboard window opens, press the appropriate buttons. To end the **Soft Keyboard** user session, click the **Soft Keyboard** command on the View menu.

Soft Keyboard

Real Time Bandwidth Monitor

The **Real Time Bandwidth Monitor** displays current bandwidth consumption on the 1394 serial bus. Bandwidth is measured by selecting a Sampling Interval and then selecting whether to measure Asynchronous bandwidth usage by clicking the **Async** button, Isochronous bandwidth by clicking the Iso button, or total bandwidth by clicking the **Total** button. The Async, Iso, and Total vertical columns display in real time the average consumed percentage of bandwidth and also continuously track high and low bandwidth with horizontal marks. These high and low marks carry over from previous sampling cycles until replaced by new higher or lower values.

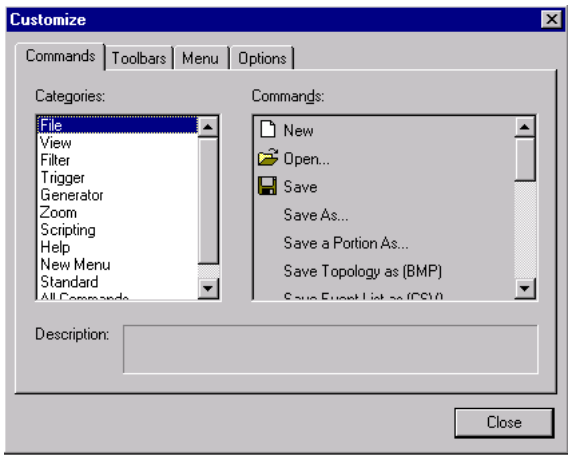
Bandwidth is also tracked via the sampling period in the right hand section of the window. This display also shows the average and high and low, but the high and low numbers do not carry over from previous sampled cycles. Instead each measure of high, low, and average reflect the sample interval only.



Real-Time Bandwidth Monitor

Customize Window

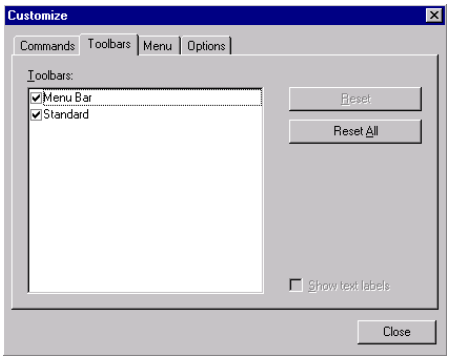
The Customize window selected from the **View** menu via the **Customize** command contains four tabs used to alter the appearance of the interface. The **Commands** tab is used to create shortcut menu buttons. Users select a menu item from the Categories list. Then from the Commands section, select a command desired as a shortcut button and drag it to the button toolbar. The Command will appear as a shortcut button.



Commands Tab

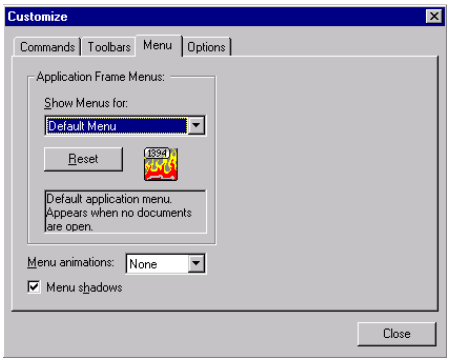
The **Toolbars** tab contains options for selecting if the **Menu** and **Button** bars are displayed.

Select the **Menu Bar** and/or **Sandard** bar and if need click the **Reset All** button.



Toolbars Tab

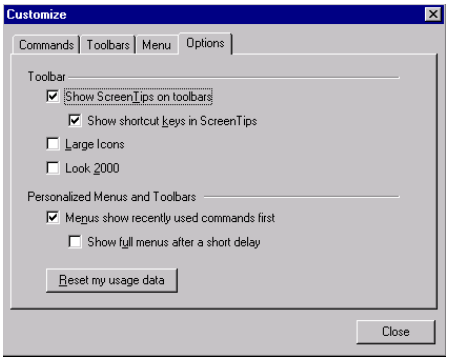
The **Menu** tab contains options to determine which menus are displayed.



Menu Tab

The **Options** tab is used select the size of the **Button** bar icons.

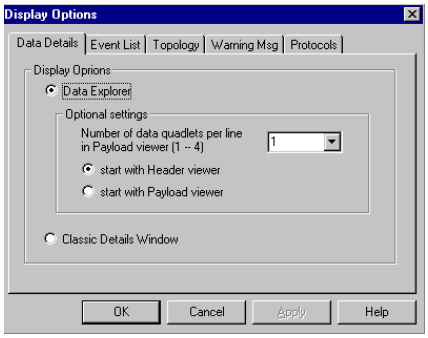
In the **Toolbar** and **Personalized Menus** and Toolbars sections of the Options tab select the desired check boxes and click the **Reset my usage data** button.



Options Tab

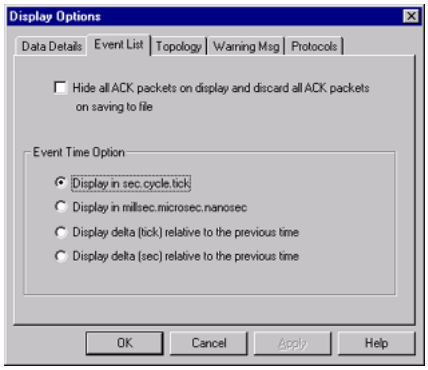
Display Options Window

The **Data Details** tab is used to select if packet details are displayed in the **Data Explorer** or **Classic Details** window and to further select how data appears in sections of the **Data Explorer**.



Data Details Tab

The **Event List** tab contains data display choices that focus on timing details displayed in the **Event List**.



Event List Tab

The **Topology** tab on the **Display Options** window provides settings that affect the **Topology Map**. Use these settings to change the appearance of the **Topology Map** or compensate for the operational idiosyncrasies of some devices.

The contents of the node's bus information block are used to update **Node Identification** boxes with the correct icon, node name, GUID, and node capabilities.Normally, select or use the **Refresh Topology with Bus Info**. In some cases, however, you may wish to suppress the sending of these Read Quadlet Requests. Then, select **Refresh Topology with Self ID Only**. **The Node Identification** boxes then display only the Node ID and speed.

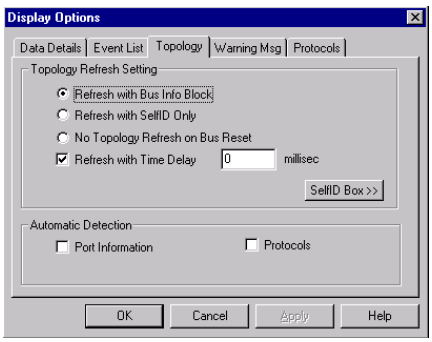
If no updated topology is desired or needed, select **No Topology Refresh on Bus Reset** from the **Topology** tab on the **Display Options** window. This feature is particularly useful if your debugging situation creates bus reset storms or if you do not want to refresh topology.

1394-1995 specifies that when a Read Quadlet Request is received by a device, it must respond with a read quadlet response within a certain amount of time. Otherwise the transaction is considered incomplete.

When **Refresh Topology Normally** is specified, the VK9000 waits for the specified time for each device to respond. If a device does not respond, the requests are retried four times.

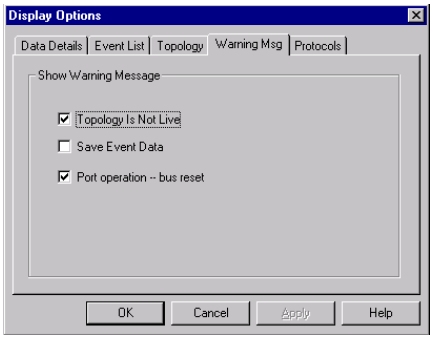
Some devices however, need more time to respond. In this case, select **Refresh Topology with Time delay** and enter in the **Time** field a value in milliseconds.

The **Automatic Detection** box contains update choices for port information and protocols. If these options are selected, after a bus reset the selected information, for instance, port information, is updated. For large captures, however, this option can slow down data display time.



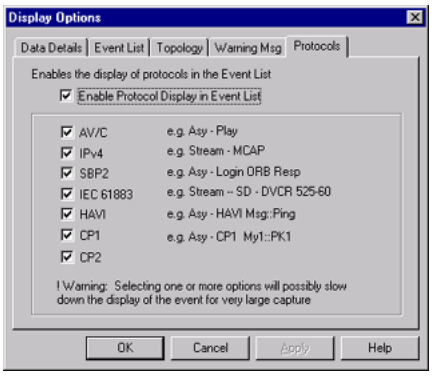
Topology Tab

The **Warning Msg** tab contains choices that impact whether warning messages are displayed before a specific action.



Warning Msg Tab

The **Protocols tab** contains update choices for port information and protocols. If these options are selected, packets are automatically recognized in the **Event List/ Transaction Viewer**, for instance an Asynchronous packet could be recognized in the **Event List** as an AV/C command. For large captures, however, this option can slow down data display time.



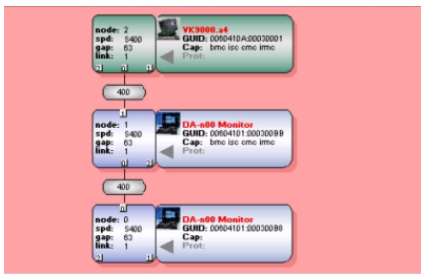
Protocols Tab Quick Tour

2.7 Quick Tour Overview

To start the VK9000, press the power button located to the back of the unit. The VK9000 starts. The VK9000 software uses a specially configured version of Windows NT. After the VK9000 hardware (the computer) is turned on, the VK9000 software automatically starts. If you exit the VK9000 application and want to restart it, double-click the VK9000 icon on the desktop.

Quick Tour: Topology Window

The **Topology Map**, occupying the upper half of the VK9000's screen just below the toolbar, displays a map of the topology of the 1394 bus attached to the VK9000 including the VK9000's node.



Topology Map

- On the **Trigger** menu select the **Refresh Topology** command.

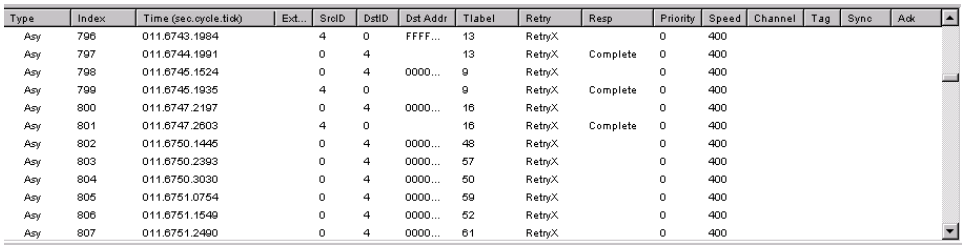
Tip

On the toolbar click the **Refresh Topology** button.

Quick Tour: Event List

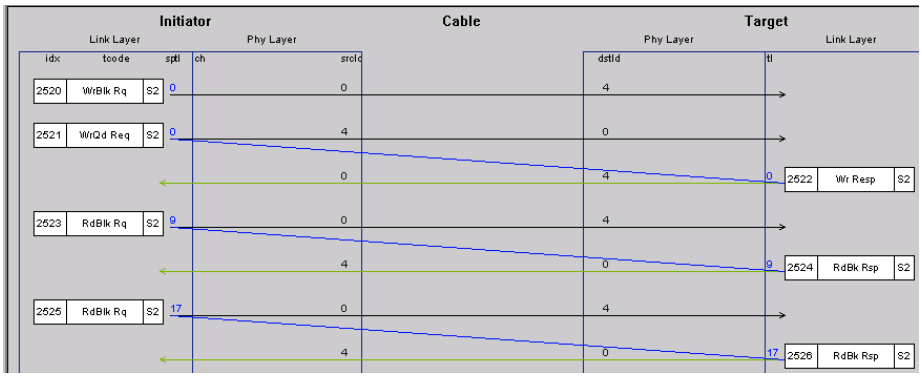
The **Event List** occupies the lower half of the VK9000's main screen. It displays the contents of the capture buffer. User can select to view capture buffer contents in the **Event List** or via the **Transaction Viewer**.

The **Event List** and **Topology** window can also display previously saved data.



Type	Index	Time (sec.cycle.tick)	Ext...	SrcID	DstID	Dst Addr	Tlabel	Retry	Resp	Priority	Speed	Channel	Tag	Sync	Ack
Asy	796	011.6743.1984		4	0	FFFF...	13	RetryX		0	400				
Asy	797	011.6744.1991		0	4		13	RetryX	Complete	0	400				
Asy	798	011.6745.1524		0	4	0000...	9	RetryX		0	400				
Asy	799	011.6745.1935		4	0		9	RetryX	Complete	0	400				
Asy	800	011.6747.2197		0	4	0000...	16	RetryX		0	400				
Asy	801	011.6747.2603		4	0		16	RetryX	Complete	0	400				
Asy	802	011.6750.1445		0	4	0000...	48	RetryX		0	400				
Asy	803	011.6750.2393		0	4	0000...	57	RetryX		0	400				
Asy	804	011.6750.3030		0	4	0000...	50	RetryX		0	400				
Asy	805	011.6751.0754		0	4	0000...	59	RetryX		0	400				
Asy	806	011.6751.1549		0	4	0000...	52	RetryX		0	400				
Asy	807	011.6751.2490		0	4	0000...	61	RetryX		0	400				

Event List



Transaction Viewer

On the **File** menu select **Open**.

Tip

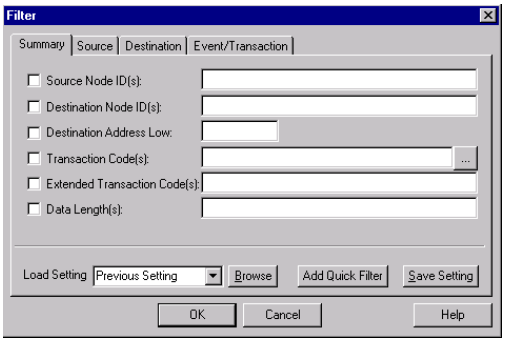
On the toolbar click the **Open** button, it is same as **File**-**Open**.

Navigate to the **Data** folder and double-click the 3iso_1asyn.fwx file.

The **Event List** displays packets from the saved file. The **Topology Map** is updated to reflect the topology of the bus at the time of the data capture. The background color of the **Topology** window changes to reflect a *Logged Topology* instead of a *Live Topology*. The Status bar at the bottom of the screen displays the current topology status: **Topology: Logged**.

Quick Tour: Filtering

Use the **Filter** feature to quickly sift through a large capture buffer and locate events of interest. This section of the Quick Tour uses data from a sample file to demonstrate not only the Filter feature but the **Data Explorer**. For example, the file, 3iso_1asyn.fwx, contains several Write Quadlet Request packets interspersed with numerous Cycle Start and Stream packets. Rather than tediously scroll through the **Event List** searching for Write Quadlet Request packets, use the **Filter** function to sift through the **Event List** and display only the Write Quadlet Request packets.



Filter Window

1. On the **File** menu select **Open**. The **Open** dialog box appears.
2. Select **3iso_1asyn.fwx** and click **OK**. Packet data fills the **Event List**.
3. On the **Filter** menu, select the **Summary** command. The **Filter** window appears.
4. Select **Transaction Code(s)** check box.
5. Click the … button. The **Transaction Code** dialog box appears.
6. Click **Write Quadlet Request**.
7. Click **OK**. The **Event List** now displays only Read Quadlet Request packets.
8. On the **Filter** window, clear the **Transaction Code(s)** check box and click **OK** to disable filtering.

Tip

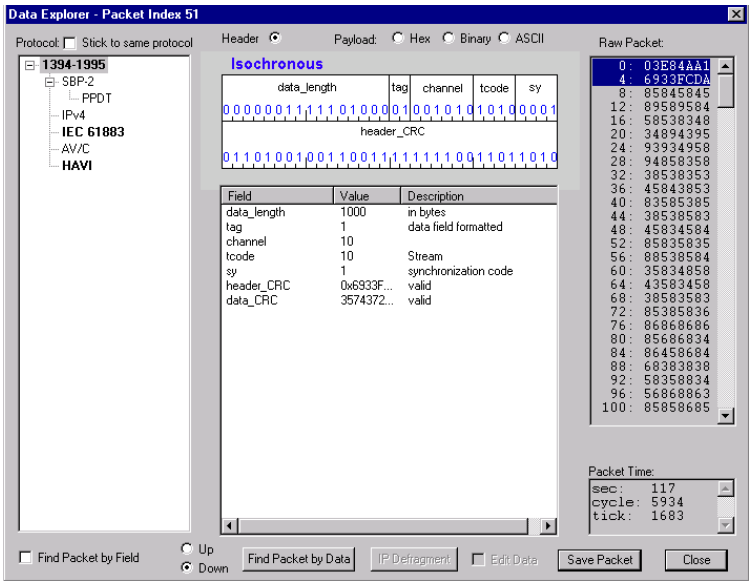
On the toolbar click the **Filter** button, it is same asa **Filter**-**Summary**.

Quick Tour: Data Explorer

The VK9000 contains a very powerful **Data Explorer** used to analyze and decode packets and search for packets based on contents.

From the File menu select Open and select 3iso_1asyn.fwx. Scroll through the **Event List** until packet 51 appears. The second column of the **Event List** displays the event number or *index* of each packet.Double-click **Event 51**. The **Data Explorer** appears, displaying the selected packet.

Once the **Data Explorer** is open, use it to examine any packet in the capture buffer. Scroll through the **Event List** to find the appropriate packet and then click it to display the packet in the **Data Explorer**.



Data Explorer Window

The **Data Explorer** contains several windows:

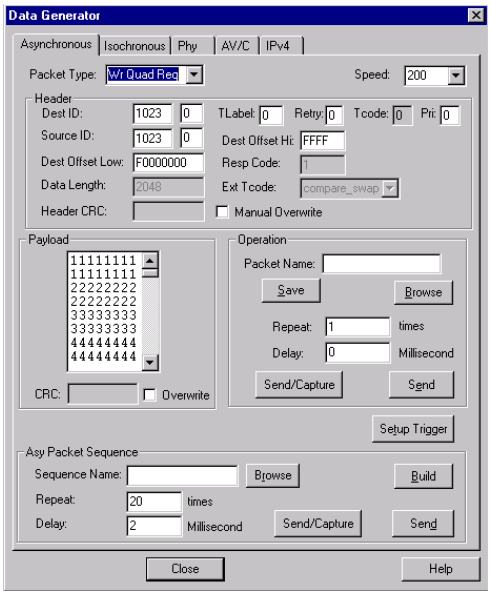
- The **Raw Packet** window appears in the right section of the **Data Explorer**. It displays the 1394 packet in its raw hex form.
- The **Packet Timing** window appears in the lower right corner of the **Data Explorer**. It displays timing information about each packet.
- The **Packet Format** window appears in the center section of the **Data Explorer** display.
- The **Protocol Selection** window appears in the left section of the **Data Explorer** display. This window is used to specify the protocol used to decode the packet shown in the **Packet Format** window. Typically, the 1394-1995 protocol should be highlighted.

You can save the packet appearing in the **Data Explorer** for later use when generating packets. Click **Save Packet** at the bottom of the **Data Explorer**.

The **Data Explorer** contains a very powerful search tool. You can search for other packets in the capture buffer containing the same or similar contents. You can also search for packets containing one or more identical header fields.

Quick Tour: Setting a Trigger and Generating Data

This section of the Quick tour involves using the Data Generator to first generate data and then in the second section, to generate, capture, and display packet data. The **Data Generator** is one of the most powerful features of the VK9000. Simultaneously generate and capture Asynchronous, Isochronous, and PHY packets. While viewing a packet with the **Data Explorer**, you can save it. Subsequently, in the **Data Generator** window you can recall the saved packet, modify it if necessary, and send it. You can build entire sequences of packets for sending and save the sequences for later re-use. The **Data Generator** also provides support for resending sequences of Isochronous packets currently in the capture buffer and sending packets with bad CRC values, invalid fields, etc.



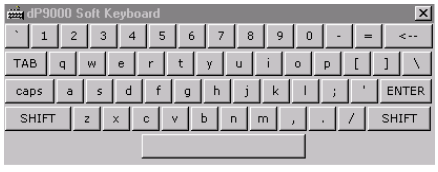
Data Generator Window

The **Data Generator** window provides an easy and flexible environment for building and sending 1394 packets. To display the **Data Generator** window, select **Data Generator** from the **Generator** menu.

Before accessing the **Data Generator** window on the **View** menu select **Soft Keyboard** then on the toolbar menu click the **Data Generator** button. The **Soft Keyboard** appears.

Tip

On the toolbar click the **Start Generation** button, it is same as **Generator**-**Data Generator**.



Soft Keyboard

The tabs on the Data Generator window provide controls to build the various types of packets. For instance, the **Asynchronous** tab provides the controls for building and sending Asynchronous packets. Similarly, the remaining three tabs provide controls for building Isochronous, and PHY packets.

You can also simultaneously send and capture packets with the **Send/Capture** button. This allows you to not only send packets but to view the responses.

To demonstrate this feature, complete the following steps which involve reading a node's **GUID** from its **Bus Info Block**. Each node stores its GUID in a pair of quadlets starting at F0000408. (There are simpler ways to obtain a node's GUID, but this procedure overviews several key processes such as using the **Data Generator** and setting a trigger.)

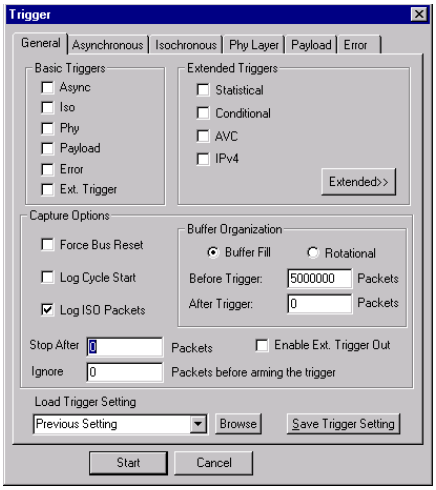
Setting Up the Data Generator

Prerequisite: a 1394 device.

1. Connect the 1394 device to the 1394 port on the VK9000.
2. On the **Topology Map**, locate any node other than the VK9000's node, and note the Node ID.
3. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
4. From the **Packet Type** list select **Rd Blk Req**. From the **Speed** list select **100**. (You may be able to use a higher speed, depending upon the path to the desired node.)
5. On the **Header** box, enter in the second section of the **Dest ID** field the ID of the node from Step 1. In the **Dest Offset Low** field enter F0000408. In the **Data Length** field enter 8.

Setting the Trigger

1. Click the **Setup Trigger** button. The **Trigger** window appears.
2. On the **General** tab, on the **Capture Options** box, clear **Force Bus Reset**, **Log Cycle Start**, and **Log ISO Packets** check boxes. On the **Basic Triggers** box select the **Async** check box. Clear the **Payload** and **Error** check boxes if selected. In the **After Trigger** field enter any number larger than ten like 100.
3. On the **Trigger** window click the **Asynchronous** tab. Check the **Source ID** check box and enter the Node ID of the 1394 device connected to the VK9000. Next to the **Transaction Code** field click the … button. The **Transaction Code** dialog box appears.
4. Select **Read Block Response** and click **OK**. The **Transaction Code** dialog box closes. On the **Trigger** window, click **OK**. The **Trigger** window closes and the **Data Generator** window appears.



Trigger Window

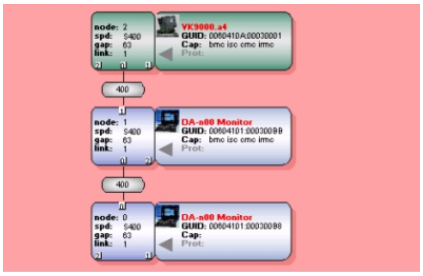
Using the Data Generator

1. On the **Operation** box of the **Data Generator** window, click the **Send/Capture** button. Data generation and data capture begins.
2. Click the **Stop** button. The **Event List** appears and contains at least two packets. The highlighted packet is the response to the Read Block Request.
3. Double-click the packet. The **Data Explorer** appears.
4. On the **Payload** box click the **Hex** radio button. The center window of the **Data Explorer** displays 8 bytes, the node's GUID. Verify the accuracy, by comparing this value to the node's GUID on the **Topology Map**.

3.1 Topology Map Overview

The **Topology Map**, which appears in the **Topology** window, provides a high-level view of the actual network topology. It displays all of the nodes connected to a single 1394 bus up to the maximum of 63 nodes.

Each time a bus reset is detected the **Topology Map** updates automatically (when a live topology is displayed). Topology is also updated when a node is attached or detached from the bus during a capture. See Live vs. Logged Topology section for more information.



To manually refresh the Topology Window

- On the toolbar click the **Refresh Topology** button.

Note

Clicking the **Refresh Topology** button causes a bus reset.

Altering the Appearance of the Topology Map

Topology Map Appearance

Several commands and shortcut buttons are available to adjust the appearance of the **Topology Map** including:

- Adjusting the relative sizes of the **Topology Map** and **Event List**
- Hiding the **Event List/Transaction Viewer** to display an enlarged **Topology Map**
- Restoring the split screen view
- Increasing and decreasing the size of the **Topology Map**
- Increasing and decreasing the size of **Topology** nodes

To adjust the relative sizes of the Topology window and Event List

- Drag the horizontal bar dividing the **Topology Map** and the **Event List/Transaction View** up or down.

To hide the Event List and fill the entire area with the Topology window

- On the **View** menu select the **Topology Only** command.

  Tip

  On the toolbar click the **View Topology** button, it is same as **View**-**Topology Only**.

To restore the Event List/Topology window split screen

- On the **View** menu select the **Topology and Event List** command.

  Tip

  On the toolbar click the **Topology and Event List** button, it is same as **View-Topology and Even List**.

To zoom the Topology Map in or out

- On the **Zoom** menu select the **Zoom In** or **Zoom Out** commands.

  Tip

  On the toolbar click the **Zoom** buttons, they are same as **Zoom In/Out**.

Live vs. Logged Topology

The **Topology Map** displays either live or logged topology. Live topology reflects the topology of the 1394 device(s) and the VK9000 node. Logged topology is captured data.

The status of the topology displayed in the **Topology Map** is indicated by:

- The **Status** bar at the bottom of the screen which always displays either **Topology: Live** or **Topology: Logged**
- The background color of the **Topology** window which is different for live (red) vs. logged (green) topology

In some cases, it is helpful to be able to quickly switch between live and logged topology in order to compare them.

To view topology saved to a file, on the **File** menu select the **Open** command.

Tip

On the toolbar click the **Open** button.

To switch between Live and Logged Topologies

- On the **View** menu select either the **Topology Live** or **Topology Logged** commands.

WARNING

The Network Topology can look different after each bus reset.

Topology Display Options

The **Topology** tab on the **Display Options** window provides settings that affect the **Topology Map**. Use these settings to change the appearance of the **Topology Map** or compensate for the operational idiosyncrasies of some devices.

Settings in the **Topology** tab are saved for the next user session.

Refresh Topology with Bus Info vs. Refresh Topology with SelfID Only
The contents of the node's bus information block are used to update **Node Identification** boxes with the correct icon, node name, GUID, and node capabilities.

Normally, select or use the **Refresh Topology with Bus Info**. In some cases, however, you may wish to suppress the sending of these Read Quadlet Requests. Then, select **Refresh Topology with SelfID Only. The Node Identification** boxes then display only the Node ID and speed.

No Topology on Bus Reset
If no updated topology is desired or needed, select **No Topology Refresh on Bus Reset** from the **Topology** tab on the **Display Options** window. This feature is particularly useful if your debugging situation creates bus reset storms or if you do not want to refresh topology.

Refresh Topology with Time delay
1394-1995 specifies that when a Read Quadlet Request is received by a device, it must respond with a read quadlet response within a certain amount of time. Otherwise the transaction is considered incomplete.

When **Refresh Topology Normally** is specified, the VK9000 waits for the specified time for each device to respond. If a device does not respond, the requests are retried four times.

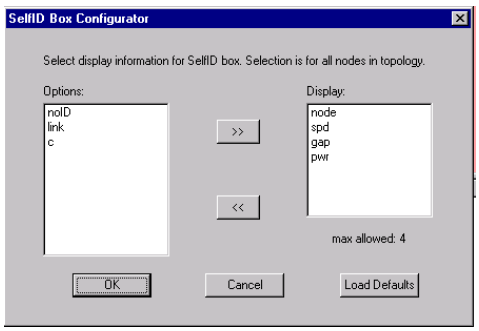
Some devices however, need more time to respond. In this case, select **Refresh Topology with Time delay** and enter in the **Time** field a value in milliseconds.

Automatic Detection Box
The Automatic Detection box provides a way to update node information on the topology map. Use this option selectively with large data captures since this can slow down data display.

Item	Description
Port Information check box	Select to automatically update port status information.
Protocols check box	Select to automatically update protocol detection status for SBP-2 Management Agent, IP NPM, and AV/C. Information is displayed on the device's node on the Topology Map. If this option is selected, after a bus reset, the VK9000 node will send read quadlet requests to read Config ROM data. For full functionality, devices must contain a Unit Spec ID and a Unit Software Version for protocol detection. See the appendix for a full table of protocol combinations and values supported.

Self ID Box

On the **Topology** tab on the **Display Options** window click the **Self ID Box** button to open the **Self ID Box Configurator** window. Use this feature to select the most appropriate information to be displayed on the Self ID section for nodes on the bus. Use the left and right arrows to move options to and from **Display** box. If needed click the **Load Defaults** button to reset the VK9000's factory default settings. When finished click **OK** to make selected changes or click **Cancel** to close the window without making changes.



Self ID Box Configuration Window

PHY Power Cable Off/on

The displayed can also change depending on whether the **PHY Power Cable** Off or **PHY Power Cable On** from the **File** menu is selected.

Item	Description
PHY Power Cable Off	Turns off 1394 power provided to the PHY. Makes the VK9000 a power consumer. Can cause topology recognition problems if this mode is selected and a device is connected which does not provide 1394 power to the bus. In this case turn off the unit.
PHY Power Cable On	Turns on 1394 power provided to the 1394 bus, + 15 w.

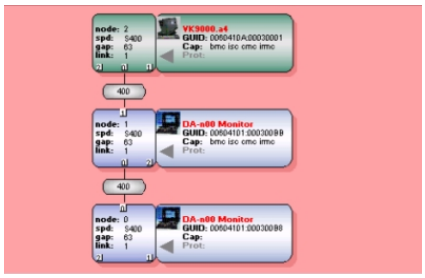
3.2 Understanding Topology Map Nodes

Node Identification

The **Topology Map** displays node information for each node on the 1394 bus in a **Node Identification** box.

A node is divided into two sections. The section to the left contains the Node ID and the Node Speed and also displays PHY port status. The section to the right contains the Node GUID, Node Capabilities, and Protocol capabilities along with a node icon. The VK9000, however, displays a Question Mark or Generic icon for 1394 devices connected for the first time. If desired, you can also add your own icons or change icons.

Node ID boxes either display full Node ID information or abbreviated Node information. Users determine if both sections of the Node box are necessary. If the gray arrow is clicked the right hand section of the node disappears. Click the gray arrow to expand the box.



Topology Map

The node's capabilities are depicted using one or more of the following acronyms:

Item	Description
isc	Isochronous capable.
cmc	Cycle Master capable.
irmc	Isochronous Resource Manager capable.
bmc	Bus Manager capable.

Each acronym may be displayed in upper or lower case. Lower case indicates that the node is capable of serving in the master or manager role but is not currently acting in that role. Upper case indicates that the node is capable of serving in the master or manager role and is currently acting in that role. For example, a node represented by **bmc** is Bus Manager-capable, but is not the current Bus Manager; **BMC** would indicate that node was acting as the current Bus Manager.

When a node is connected to the bus for the very first time and no icon and Node description has been defined, the Generic Node icon will be displayed.

If no information other than the Node ID and PHY Speed is displayed in the right-hand side of the Node Identification Box, no access to the nodes bus_info_block (Link Layer not active, CSR not implemented, etc.) is possible.

Speed Mapping

The transaction speed between two nodes is indicated on the line connecting two N**ode Identification** boxes. The speed is determined by the slower of the two node PHY Speeds.

Using the Node Info Window

Overview of the Node Info Window

Use the **Node Info** window to analyze and change node and PHY properties. The **Node Info** window has four tabs: **Self ID, CSR, Port**, and **Node**. The **Node** tab displays bus information and contains controls for node operations. The **Self ID** tab displays PHY register information. The **CSR** tab is used to send Read, Write, and Lock commands. The **Port** tab displays port status and contains controls to change PHY port operations.

To change node capabilities

1. On the **Topology Map** double-click the left section of the **Node ID** box. The **Node Info** window appears.
2. On the **Node Info** window click the **Node** tab.
3. On the **Operation** box on the **Node** tab select the appropriate property. Choices include: **Cycle Master**, **Iso Resource Mgr**, **Bus Manager**, and **Force Root**.
4. Option: on the **Operation** box clear the appropriate property.
5. Click the **Apply** button.

To view node register data

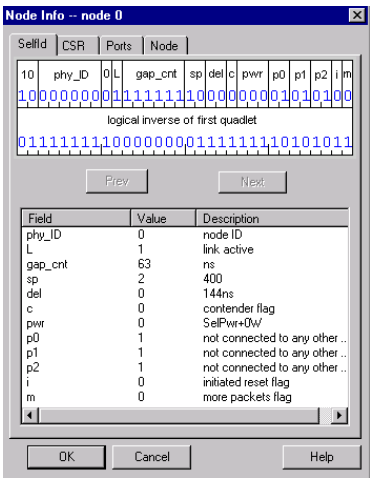
1. On the **Topology Map** double-click the left section of the **Node ID** box. The **Node Info** window appears.
2. On the **Node Info** window click the **Self ID** tab.

To update port status

1. On the **Topology Map** double-click the left section of the **Node ID** box. The **Node Info** window appears.
2. On the **Node Info** window click the **Port** tab.
3. On the **Port Status** box on the **Port** tab click the **Update** button.

Node Info Window: Self ID Tab Controls

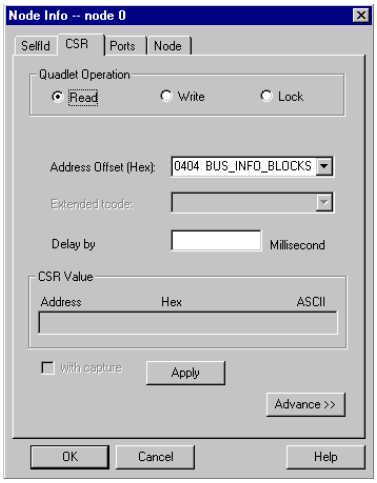
Use **Self ID** tab to view the Self ID packet of a node.



Node Info Window Self ID Tab

Item	Description
Self ID Register Display	Displays register information.
Prev	Click to view a previously viewed section of the register. Note: The Prev button only applies to a node sending more than one Self ID packet, for instance a six-port PHY.
Next	Click to view the next section of the register. Note: The Next button only applies to a node sending more than one Self ID packet, for instance a six-port PHY.

Node Info Window: CSR Tab Controls



Node Info Window CSR Tab

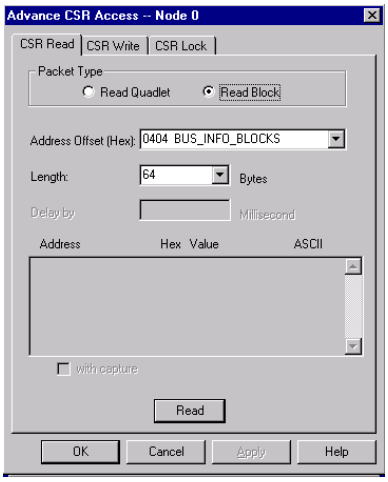
Item	Description
Read	Select to send a Read command.
Write	Select to send a Write command.
Lock	Select to send a Lock command.
Address Offset (Hex)	Select the needed Offset to send the command.
Extended tcode	Select an Extended transaction code.
Delay by	Enter a delay, value in milli seconds.
CSR Value	Displays the CSR value derived from the action.
Apply	Select to complete the CSR command.
Advance	Select the Advance option for more specific individual choices for Read, Write, and Lock commands.

To perform a CSR Read, Write, or Lock Command

1. Double-click the left-hand portion of a **Node ID** box of a node on the **Topology Map**. The **Node Info** window appears.
2. Click the **CSR** tab and select either **Read**, **Write**, or **Lock**. Make other selections as needed.
3. Click **Apply**. CSR data appears in the **CSR Value** box.

CSR Read

Use the **CSR Read** window to access a node's CSR registers.



Node Info Window CSR Read Tab

Item	Description
Packet Type	Select to send a Read Quadlet or a Read Block command.
Address Offset (Hex)	Select the register location to send the CSR Read command. Length Select a data length.
Delay by	Enter a delay.
Address Hex Value and ASCII	Display the CSR value.
Read	Executes the CSR Read command.

To access and read a node's CSRs via the CSR Read window

1. Double-click the left-hand section of a node on the **Topology Map** and select **CSR Read** from the Node Info window. The **CSR Read** window appears.

Note

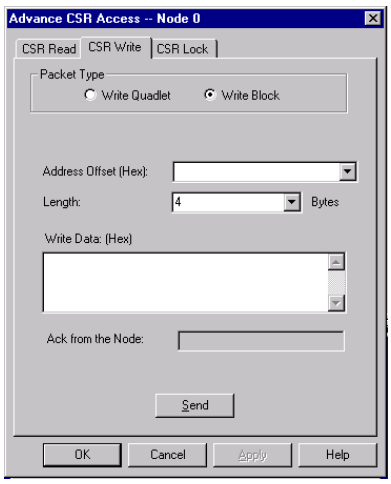
By default, the Data Analyzer uses Read Block Request commands to access a node's CSRs. Some nodes do not support the Read Block Request Command and will result in a CSR Read Error message. In this case, click the **Read Quadlet** radio button to switch to the use of Read Quadlet Request commands to read CSRs.

2. From the **Address Offset (Hex)** list, select an appropriate register to read or enter the address in hexadecimal in the field.
3. Option: if necessary, from the **Length** list select a new value. By default, the value is automatically set to the correct length. If Read Quadlet is selected as the transaction type, the number of Read Quadlet Requests sent is **Length***2)/8.
4. Option: if necessary, enter in the **Delay By** field a value. Some devices cannot respond to multiple Read Quadlet Requests unless there is some idle time between them. If Read Quadlet Requests are used to access CSRs, then this value specifies the time between Read Quadlet Requests. (This field is ignored if Read Block Requests are used.)
5. Click the **Read** button. The results are displayed in the lower window.

Response Codes are displayed separately for any address being read from. Available codes are **Complete**, **Conflict Error**, **Data Error**, **Type Error**, and **Address Error**.

CSR Write

The **CSR Write** function uses Write Quadlet Request commands to modify a node's CSRs.



Node Info Window CSR Write Tab

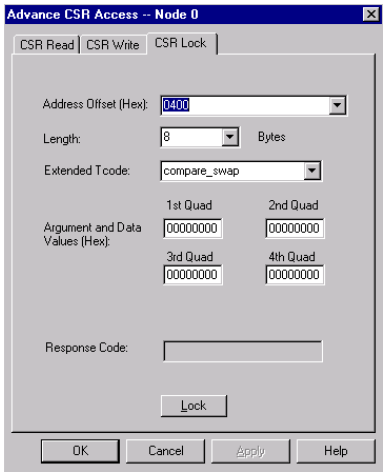
Item	Definition
Packet Type	Select to send a Write Quadlet or a Write Block command.
Address Offset (Hex)	Select the register location to send the CSR Read command.
Length	Select a data length.
Write Data: (Hex)	Enter in hexadecimal the value to write to the register.
Ack from the Node	Displays the acknowledgement response from the node.

To write to a node's CSRs

1. Double-click the left-hand section of a node on the **Topology Map** and select **CSR Read** from the Node Info window. The **CSR Read** window appears.
2. From the **Address Offset (Hex)** list, select the register to write to. You can also enter the address in hexadecimal in the field.
3. Specify the number of bytes to be written in the **Length** field.
4. Specify the CSR's new contents in the **Write Data: (Hex)** field. The contents must be specified in hexadecimal.
5. Click the **Send** button. The **Ack from the Node** field indicates the results of the operation.

CSR Lock

A lock transaction passes an address, subcommand, and data parameter(s) from the requester to the responder and returns a data value from the responder to the requester.



Node Info Window CSR Lock Tab

Item	Definition
Address Offset (Hex)	Select the register location to send the CSR Read command.
Length	Select a data length.
Extended Tcode	Select an extended transaction code.
Argument and Data Values (Hex)	Enter in hexadecimal up to four quadlets to send.
Response Code	Displays the response code from the node.

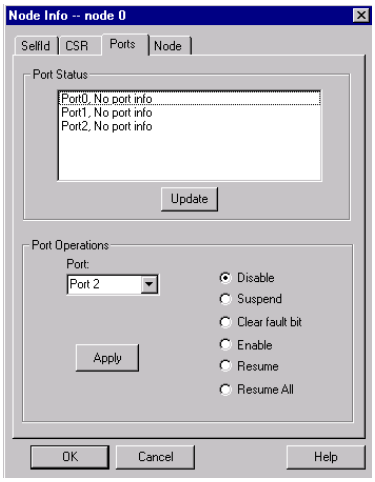
To write to a node's CSRs using Lock commands

1. Double-click the left-hand section of a node on the **Topology Map** and select **CSR Read** from the Node Info window. The **CSR Read** window appears.
2. From the **Address Offset (Hex)** list, select the register to read. You can also enter the address in hexadecimal in the field.
3. Specify the number of bytes to be written in the **Length** field.
4. Specify the extended transaction code in the **Extended Tcode** field.
5. Specify up to four quadlets to be written in the four **Argument and Data Values** fields. The contents must be specified in hexadecimal.
6. Click the **Lock** button.

Response Codes are displayed separately for any address. Available codes are **Complete**, **Conflict Error**, **Data Error**, **Type Error**, and **Address Error**.

Node Info Window: Port Tab Controls

Use the **Port Status** box to change the selected PHY port functions or update port functions.

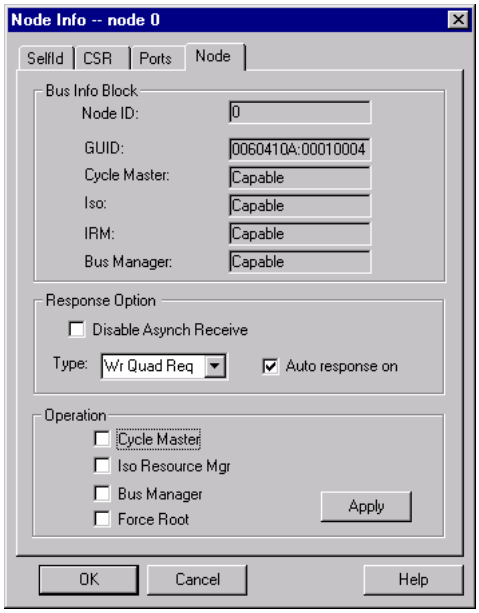


Node Info Window Ports Tab

Item	Definition
Port Status	Displays PHY port status.
Update	Click to update PHY port status. Information is then displayed in the Port Status box.
Port Operation box Port list	Select a port to change an operation characteristic.
Apply	Click to apply selected port operation characteristics.
Disable	Click to disable a PHY port (cannot transmit, receive, or repeat serial bus signals).
Suspend	Click to suspend a PHY port (connected but not operational).
Clear fault bit	Click to clear preset fault bit.
Enable	Click to activate the PHY port.
Resume	Click resume the PHY port (completed before becoming active).
Resume All	Click to resume connected PHY ports.

Node Info Window: Node Tab Controls

Use the **Node** tab to view node information and to set node properties.



Node Info Window Nodes Tab

Bus Info Block box

Item	Definition
Node ID	Displays the number assigned to a node on the bus.
GUID	Displays the globally unique identifier of a device.
Cycle Master	Displays if a node is Cycle Master capable. The field is blank if the node is not capable of the function.
Iso	Displays if a node is capable of Isochronous packet generation. The field is blank if the node is not capable of the function.
IRM	Displays if a node is Isochronous Resource Manager capable. The field is blank if the node is not capable of the function.
Bus Manager	Displays if a node is Bus Manager capable. The field is blank if the node is not capable of the function.

Response Option box

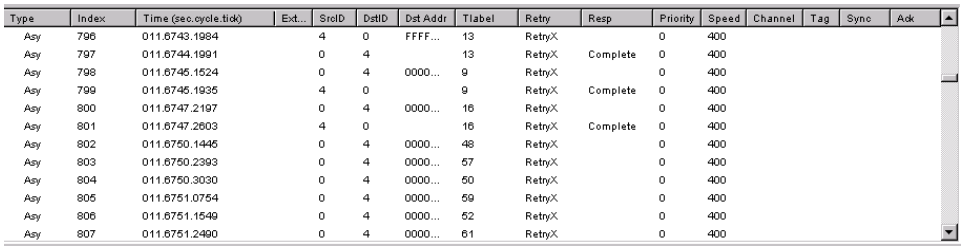
Item	Definition
Type list	Select a packet type for an auto response. Then check the Auto Response check box and click OK.
Auto Response on check box	Select to set the auto response packet type.
Disable Asynch Receive check box	Select to disable the sending of Ack packets when a Async request is received.

Operation box

Item	Definition
Cycle Master	Set the node as Cycle Master.
Iso Resource Mgr	Set the node as Isochronous Resource Manager.
Bus Manager	Set the node as the Bus Manager.
Force Root	Set the node as the root.
Apply	Click to apply selected settings.

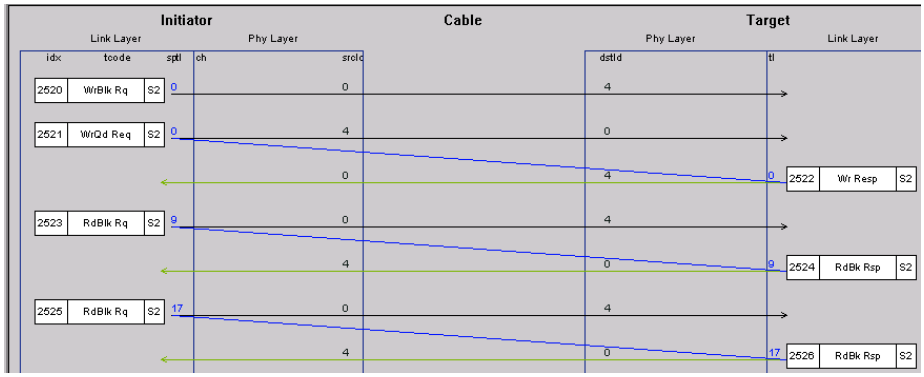
3.3 Event List and Transaction Viewer Overview

The **Event List** displays packets captured in the buffer. The **Event List** provides a high-level overview or summary of each packet. From the **Event List**, you can launch the **Data Explorer** or **Classic Details** window to examine any packet in greater detail.



Type	Index	Time (sec.cycle.tick)	Ext...	SrcID	DstID	Dst Addr	Tlabel	Retry	Resp	Priority	Speed	Channel	Tag	Sync	Ack
Asy	796	011.6743.1984		4	0	FFFF...	13	RetryX		0	400				
Asy	797	011.6744.1991		0	4		13	RetryX	Complete	0	400				
Asy	798	011.6745.1524		0	4	0000...	9	RetryX		0	400				
Asy	799	011.6745.1935		4	0		9	RetryX	Complete	0	400				
Asy	800	011.6747.2197		0	4	0000...	16	RetryX		0	400				
Asy	801	011.6747.2603		4	0		16	RetryX	Complete	0	400				
Asy	802	011.6750.1445		0	4	0000...	48	RetryX		0	400				
Asy	803	011.6750.2393		0	4	0000...	57	RetryX		0	400				
Asy	804	011.6750.3030		0	4	0000...	50	RetryX		0	400				
Asy	805	011.6751.0754		0	4	0000...	59	RetryX		0	400				
Asy	806	011.6751.1549		0	4	0000...	52	RetryX		0	400				
Asy	807	011.6751.2490		0	4	0000...	61	RetryX		0	400				

Event List Window



Transaction Viewer Window

Packets in the **Event List** are displayed chronologically. The oldest packet is at the top of the **Event List**, and the newest packet is at the bottom of the **Event List**.

Several controls are available to adjust the appearance of the **Event List** window.

The **Transaction Viewer** window provides a graphical representation of activity on the 1394 bus. It is divided into three major sections: Initiator, Cable, and Target. Initiator and Target are further subdivided into PHY Layer and Link Layer sections. The PHY Layer or Link Layer for the Initiator and Target contain 1394 packets reflecting bus activity.

Tip

On the **View** menu select the **Display Options** window **Protocol** tab to customize the various protocol display options. Selecting one of the options enables protocol recognition in the **Event List and Transaction Viewer**—quick way to immediately recognize protocols contained in a 1394 packet. Settings on the **Protocol** tab are saved for the next user session.

To view packet data in the Transaction Viewer

- Select the **Transaction** tab. Data is displayed in the **Transaction Viewer**—requires live or logged data.

To view packet data in the Event List

- Select the **Event List** tab. Data is displayed in the **Event List**—requires live or logged data.

To adjust the relative sizes of the Event List and Topology window

- Drag the horizontal bar dividing the **Topology Map** and the **Event List** up or down.

To hide the Topology Map and fill the entire area with the Event List

- Select the **Event List Only** command from the **View** menu.

To restore the Event List / Topology window split screen

- Select the **Topology and Event List** command from the View menu.

To change the width of a column in the Event List

- Drag the boundary on the right side of the column heading until the column is the appropriate width.

To display timestamps in ns

1. On the **View** menu select **Display Options**. The **Display Options** dialog box appears.
2. Select the **Event List** tab and select **Display in milli sec.microsec.nanosec**.

To display timestamps in Ticks

1. On the **View** menu select **Display Options**. The **Display Options** dialog box appears.
2. Select the **Event List** tab and select **Display in sec.cycle.tick**.

To hide all Acknowledge packets

1. On the **View** menu select **Display Options**. The **Display Options** dialog box appears.
2. Select the **Event List** tab and select **Hide All ACK packets**.
3. Capture data as needed
4. On the **File** menu select **Save**.

Note

Data must be saved to a file to remove Ack packets from the capture buffer display.

Enabling Protocol Recognition in the Event List

The VK9000 supports protocol recognition in the **Event List**. For instance, when this feature is enabled users can quickly scan packets in the **Event List** a select the higher level protocol from the **Event List** and then double-click the packet to examine it in greater detail in the **Data Explorer**. Protocol recognition can, in the case of large data captures slow, data display in the **Event List**. For optimal performance, users should select which protocol(s) to recognize, if any, in the **Event List**.

To enable protocol recognition in the Event List

1. On the **View** menu select **Display Options**. The **Display Options** window appears.
2. On the **Display Options** window click the Protocols tab and select **Enable Protocol Display in Event List**. As needed, select other settings including **AV/C**, **IPv4**, **SBP2**, **IEC 61883**, **HAVi**, and CP1 (CP2).
3. Click **OK**.

3.4 Using the Event List

Event List Fields

The following section describes the fields in the **Event List**. Not all fields are present in each packet. For information about 1394 packet types and the fields contained in each, refer to the packet description section in the 1394-1995 specifications and related updates.

Item	Definition
Type	Indicates whether the packet is an Asynchronous, Stream, or PHY packet. If protocol recognition is enabled (Display Options window, Topology tab), the specific protocol contained in the 1394 packet is recognized
Index	A sequential number. The first packet is assigned the numerical value of one. When the packet is displayed in the Data Explorer, the packet's index appears in the Data Explorer's title bar.
Time	Timestamp taken at the end of the packet. When the network has a Cycle Master, the timer is set to zero as the first Cycle Start packet is captured. If there is no Cycle Master, the counter is reset by the VK9000's internal clock. The timestamp is of the form AAA.BBBB.CCCC. AAA A seconds counter. BBBB Cycle starts. The time segment between two cycle start packets is 125 ms. When this counter value reaches a maximum of 8000, it rolls over and the seconds counter is then increased by one. CCCC Number of ticks (40.7 ns). This is the time period generated by the onboard oscillator. When this counter value reaches a maximum of 3092, it rolls over and the cycle start counter is then increased by one.
Tcode	Transaction Code. The transaction code is decoded and displayed in English.
ExTcode	Extended Transaction Code. This code is only relevant when the transaction code indicates a Lock Request or Lock Response packet type. The extended transaction code is decoded and displayed in English.
SrcID	Source ID. Specifies the Node ID of the sending node.
DestID	Destination ID. Specifies the Node ID of the receiving node. This is only available for Asynchronous packets. A Destination ID with the value 63 indicates that the Asynchronous packet is being broadcast, that is, no single specific destination node
DstAddr	Stream and Cycle Start packets are always broadcast. Destination Address Low. Specifies the lower 48 bits of the destination node address for a request packet.
Tlabel	The Transaction Label specifies a unique tag for each outstanding transaction from a node. The Transaction Label sent in a request subaction is then used as the Transaction Label returned in the corresponding response subaction.
Retry	Retry Code. Indicates whether this packet is a retry attempt and then defines the retry protocol to be followed by the destination node. The Retry Code is decoded and displayed in English.
Resp	Response Code. Specifies the response to an earlier corresponding request subaction. The response code is decoded and displayed in English.
Priority	A priority level of 0 (0000) ≥ corresponds to the fair arbitration mechanism and 15 (1111) ≥ to the highest priority with fairness disabled.
Speed	Specifies the data rate used to transmit the packet.
Channel	Specifies the Isochronous channel number for the packet assigned by the Isochronous Resource Manager. The available channel numbers are 0 through 63.
Tag	Specifies the data format carried by an Isochronous packet: 00 Data field unformatted 01 Reserved 10 Reserved 11 Reserved
Sync	Synchronization Code. Specifies an application specific control field.

Item	Definition
Ack	Acknowledgement. Displays the content of the acknowledge packet that is sent as the immediate response to a non-broadcast or to a non-Isochronous packet. The Ack code is decoded and displayed in English. **Note: When 00? appears in this field, it means that no acknowledgment was received or that the acknowledgement contained an illegal Ack code of 00.**
Data Length	Displays the length of the data field of block payload packets and Isochronous data-block packets. The length is expressed as a decimal value.

Viewing Packet details

From the **Event List or Transaction Viewer**, you can view packet contents in detail in the **Data Explorer**.

To view packet details

- Double-click the desired packet in the **Event List**.

Searching for Packets

Use the **Search** tool to search the **Event List** for packets with specific characteristics. Use the Search tool for quick simple searches. For more complex searches, use the search features in the **Data Explorer**.

To search for packets in the Event List

1. On the **View** menu click the **Search for Event** command. The **Dialog for Searching Event** dialog box appears.
2. Select a category to search and if necessary, enter search criteria. Some categories, such as **Tcode**, require a specific value to be entered. For example, selecting **Tcode** and selecting **Iso** in the associated list will cause the VK9000 to search the **Event List** for an Isochronous packet. The first Isochronous packet found is then highlighted. Press F3 to find the next matching packet.
3. Option: Select the **Invert Value** check box to perform a NOT search. For example, selecting Tcode, Iso, and Invert Value will result in finding the first packet that is not an Isochronous packet.
4. Click **OK**.

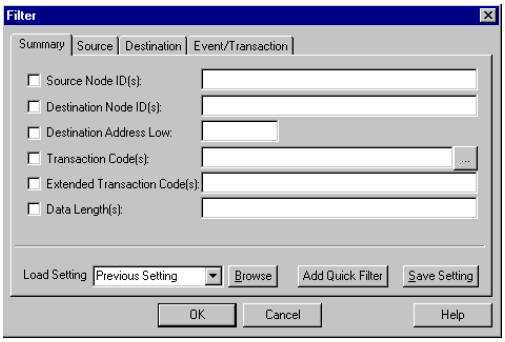
Tip

Click the **Search** toolbar button icon to display the **Dialog for Searching Event** dialog box.

Filtering the Event List

Filter Packets

Use the **Packet Filter** to hide packets in the **Event List**. For example, if you are interested in viewing only Asynchronous packets but the **Event List** also contains many Isochronous and PHY packets, you can use the **Packet Filter** to display only Asynchronous packets.



Filter Window

To filter packets in the Event List

- On the **Filter** menu click the Summary command.
  The **Summary** tab displays all the available filter settings. You can, however, limit filter settings by using any of the other three tabs. For example, click on the **Source** tab to limit the display to only the **Source Node ID(s)** setting. All six of these settings can be combined. For example, to specify that you want to see only Read Quadlet Requests sent from Node 2 to Node 3, Specify 2 as the Source ID, 3 as the Destination ID, and Read Quadlet Request (4) as the Transaction Code.

  Tip

  On the toolbar menu click the **Filter** button.

Filter Window Settings

Use the **Filter** window setting to customize data filtering.

Item	Definition
Source Node ID(s)	Displays only packets in the Event List containing the specified Source IDs. If multiple IDs are entered, separate with commas.
Destination Node ID(s)	Displays only packets in the Event List containing the specified Destination IDs. If multiple IDs are entered, separate with commas.
Destination Address Low	Displays only packets in the Event List containing the specified value in the destination Address Low field. The value entered must be in hexadecimal.
Transaction Code(s)	Displays only packets in the Event List containing the specified transaction codes. Use the … button to select from a list of transaction codes.
Extended Transaction Code(s)	Displays only packets in the Event List containing the specified extended transaction codes. If codes are entered, separate them with commas.
Data Length(s)	Displays only packets in the Event List containing the specified data Length values. If multiple values are entered, separate them with commas. Data Length values must be entered in hexadecimal.
Save Setting	Use this button to save the displayed combination of filter settings for later re-use.
Load Setting	Use to load a filter setting saved as a file.
Add Quick Filter	Add the filter setting to the Quick Filter pop-up menu. You must also save the settings to a file using the Save Setting button.

Saving Filter Settings

If needed, save Filter conditions for future. On the **Summary** tab click the **Save Setting** button. In the **Save As** dialog box assign a name, and click **Save**.

Load trigger settings by selecting a special file from the combo box. All files stored in the settings-directory will be displayed. Or use the **Browse** button to select from any other directory.

Saving, Loading, and Exporting Data Displayed in the Event List / Transaction Viewer

Use the **Save** command to save to a file data from the **Event List** and the **Topology Map**.

Use the **Open** command to display **Event List / Transaction Viewer** and **Topology Map** data saved to a file.

Use the **Save Event List as (CSV)** command to export **Event List** data in a comma separated value format (text). Use the **Save Topology as (BMP)** to save to a bitmap format file the **Topology Map**.

To save to a file

- On the **File** menu select **Save**.

To load a file

- On the **File** menu select **Open**.

To save Event List data in a csv. file format

- On the **File** menu select **Save Event List as (CSV).**

To save Topology Map data in a bmp. file format

- On the **File** menu select **Save Topology as (BMP).**

3.5 Bandwidth Tab Overview

Bandwidth analysis is provided via four tab options which provide graphical and tabular information about bus performance including:

- Bandwidth utilization
- Histogram of Isochronous packet arrival times
- Isochronous channel utilization

The four tab sections for displaying bandwidth information: **Bandwidth, Transmit Time, Event Time Distribution, and Statistics.**

Accessing Bandwidth Data

To analyze Bandwidth, Transmit Time, Event Time Distribution, and Statistics for the entire contents of the Event List / Transaction Viewer

1. On the **Event List / Transaction Viewer** window click any event—need to click only one event located anywhere in the **Event List / Transaction Viewer**.
2. Click **Bandwidth**, **Transmit Time**, **Event Time Distribution**, or **Statistics** tab. Data for the entire contents appears in the selected window.

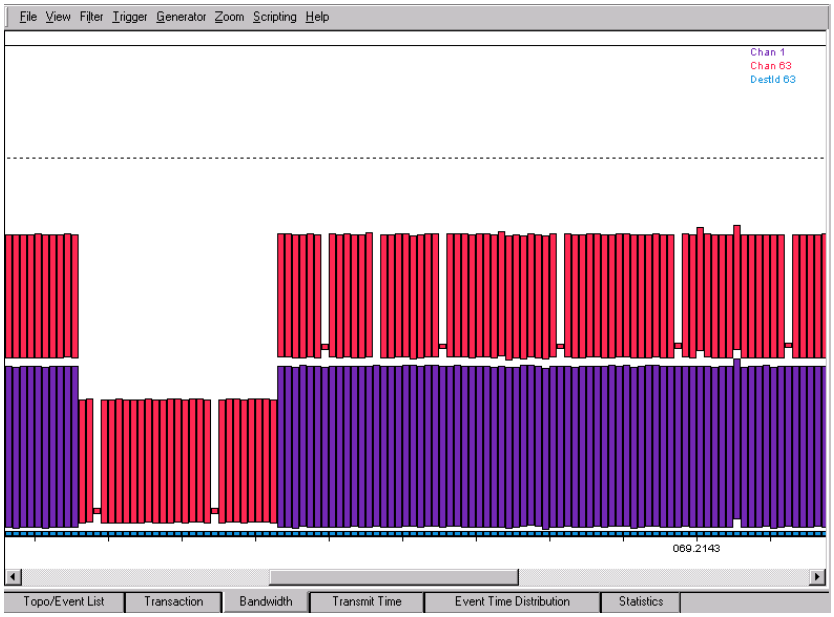
To analyze Bandwidth, Transmit Time, Event Time Distribution, and Statistics for a selected range of packets in the Event List / Transaction Viewer

1. On the **Event List / Transaction Viewer** window click the first event in the desired range.
2. Press the **SHIFT** key and click the last event in the desired range. The desired range is selected.
3. Click **Bandwidth**, **Transmit Time**, **Event Time Distribution**, or **Statistics** tab. Data appears in the selected window.

To display a packet from the Bandwidth Chart in the Data Explorer

- On the **Bandwidth Chart** tab double-click a packet to display the packet in the **Data Explorer** window. For more information about the **Data Explorer**, refer to the **Data Explorer** section.

Bandwidth Tab



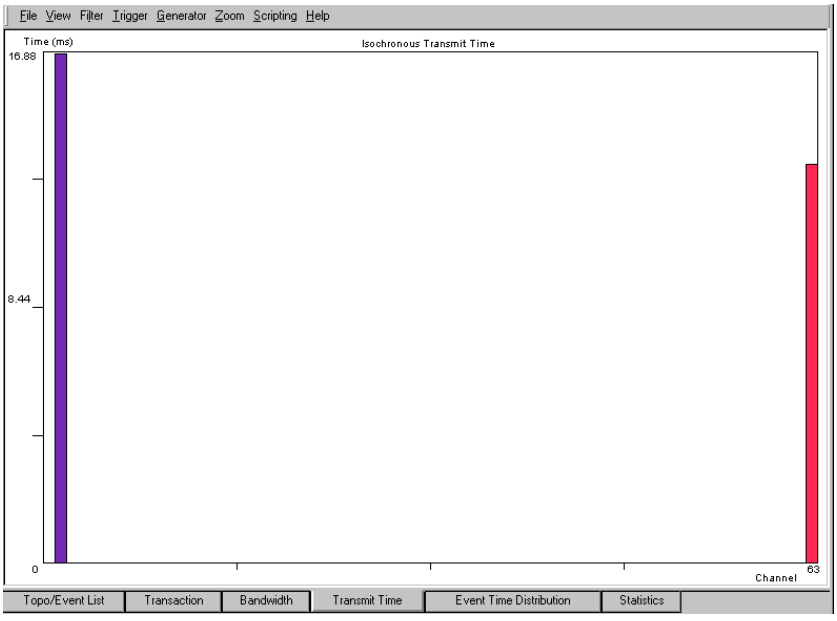
Bandwidth Chart Tab

Each 125ms cycle is oriented vertically, with the start of the cycle at the bottom and the end of the cycle at the top. Each Cycle Start packet appears as a small square at the beginning (bottom) of each cycle. Successive cycles appear left-to-right, with a total of 100 cycles displayed.

Vertical bars within each cycle denote packets being transmitted, with color-coding used to differentiate packets. Isochronous packets are differentiated by a channel number. Asynchronous packets are differentiated by Destination ID. Broadcast Cycle Starts are labeled DestID63. The key to the color-coding appears in the upper right corner of the chart.

Transmit Time Tab

The **Transmit Time** tab displays the utilization of Isochronous channels. The unit of measure is milliseconds (ms).

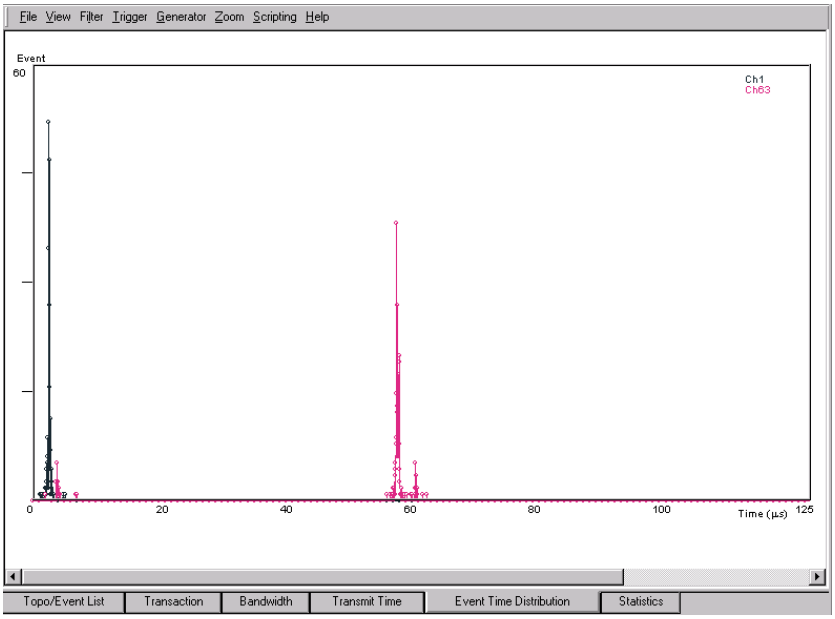


Transaction Time Tab

Event Time Distribution Tab

The **Event Time Distribution** tab shows the packet arrival time distribution for each Isochronous channel. The histogram displays Isochronous packet arrival times for all cycles within the selected range. The time measurement is taken at the start of the packet.

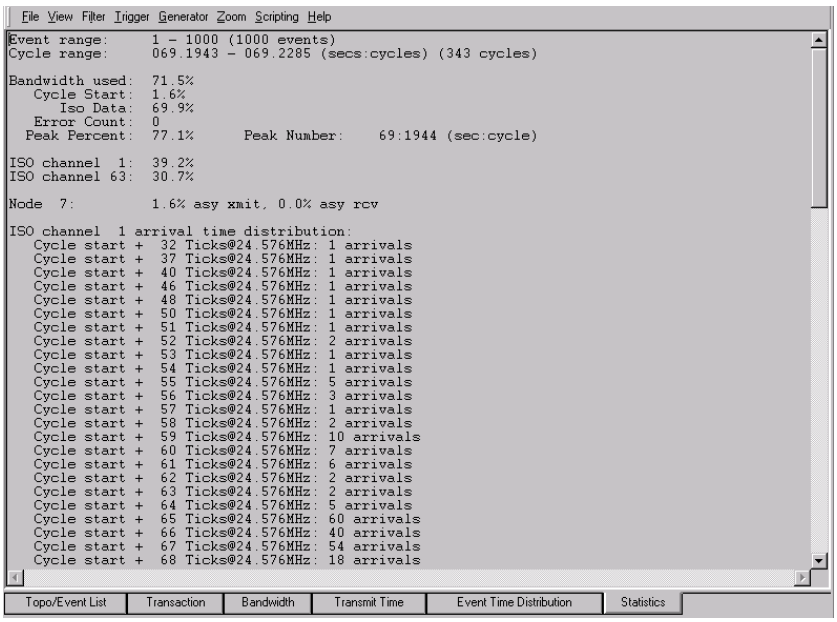
By default, the X-axis displays the entire 125ms cycle. The **Event Time Chart** displays only Isochronous data. Asynchronous and PHY traffic is not displayed.



Event Time Distribution Tab

Statistics Tab

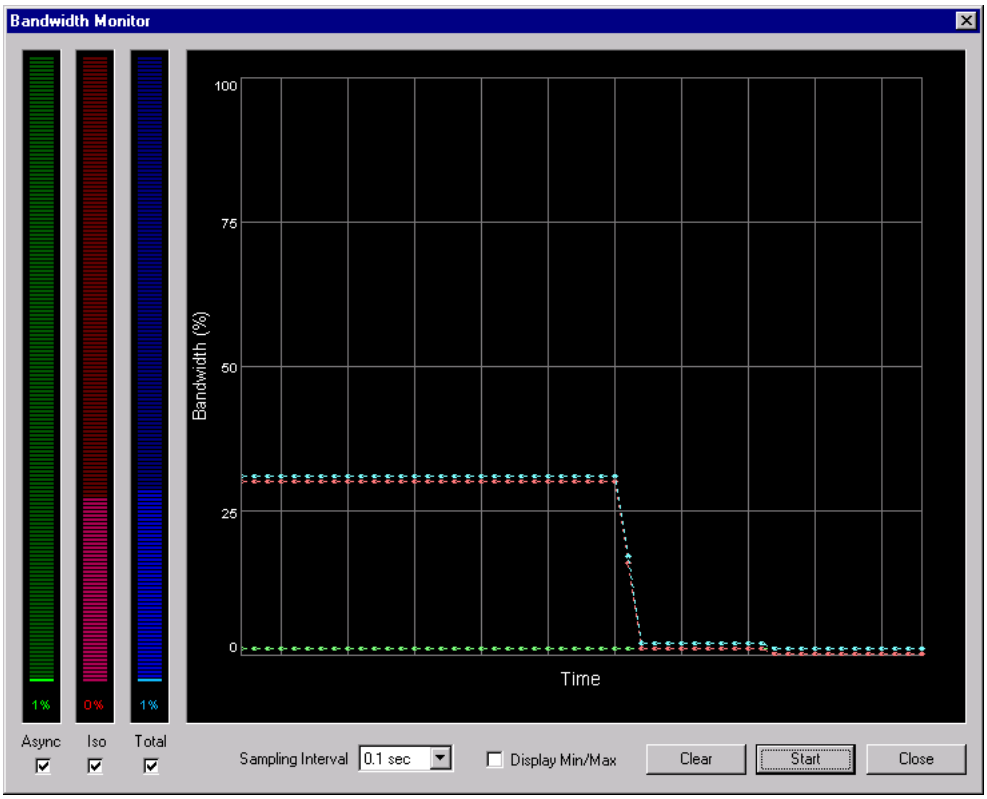
The **Statistics tab** displays the same data displayed in the other related tabs, but in tabular format instead of a graphical/visual format.



Statistics Tab

3.6 Real-Time Bandwidth Monitor Overview

The **Real Time Bandwidth Monitor** displays current bandwidth consumption on the 1394 serial bus. Bandwidth is measured by selecting a Sampling Interval and then selecting whether to measure Asynchronous bandwidth usage by clicking the **Async** check box, Isochronous bandwidth by clicking the **Iso** check box, or total bandwidth by clicking the **Total** check box. The Async, Iso, and Total vertical columns display in real time the average consumed percentage of bandwidth and also continuously track high and low bandwidth with horizontal marks. These high and low marks carry over from previous sampling cycles until replaced by new higher or lower values.
Bandwidth is also tracked via the sampling period in the right hand section of the window. This display also shows the average and high and low, but the high and low numbers do not carry over from previous sampled cycles. Instead each measure of high, low, and average reflect the sample interval only.



Real-Time Bandwidth Monitor

4.1 Capturing Packets Overview

Take advantage of the VK9000's advanced triggering and data capturing abilities to create specific trigger scenarios for capturing 1394 traffic. Create and test a triggering scenario and save it to a file for later use. Like triggering scenarios, save to a file packets captured in the online buffer for later use. The VK9000, while offering triggering from software, also provides a BNC Connector for external hardware triggering.

The VK9000 utilizes two capture buffer settings:

- Buffer Fill Mode
- Rotational Buffer Mode

Buffer Fill Mode

In **Buffer Fill Mode**, the buffer begins filling with 1394 packets when the **Start** button is clicked. If no trigger condition is specified, or if the trigger condition is not met, the VK9000 stops capturing packets when one of the following events occurs:

- When the capture buffer is full
- When the **Stop** button on the **Gathering Data** window is clicked

If the trigger condition is met, the VK9000 will stop capturing packets when one of the following events occurs:

- When your VK9000 has captured the number of packets specified by the **After Trigger** field
- When the capture buffer is full
- When the **Stop** button on the **Gathering Data** window is clicked

Rotational Buffer Mode

Use the **Rotational Buffer Mode** when attempting to trigger on an infrequent event. In this mode, the buffer begins filling with 1394 packets when the **Start** button is clicked and is filled in two phases:

Phase One

Packets are captured and fill the capture buffer until the number of packets equals the value specified in the **Before Trigger** field. Data capture continues, but the number of packets in the capture buffer remains constant, with the oldest packet discarded to make room for the newest packet (in FIFO fashion). This process continues until the trigger condition is met. At any time during this phase, if the trigger condition is met, the VK9000 switches to Phase Two. You can also stop the capture at any point by clicking the **Stop** button in the **Gathering data** window.

Phase Two

After the trigger condition is met, the VK9000 continues to capture packets, capturing the number of packets specified in the **After Trigger** field.
If the capacity of the capture buffer is less than the sum of the values specified in the **Before Trigger** and **After Trigger** fields, the oldest packets are overwritten.

Note

In Rotational Buffer Mode it is possible to capture packets indefinitely until a trigger condition is met; however, earlier captured packets are continuously overwritten.

4.2 Capturing Packet Scenarios

To capture 1394 bus traffic

1. On the **Trigger** menu select **New Capture**. The **Trigger** window appear.
2. On the **Trigger** window select appropriate settings from the various tabs.
3. Click the **Start** button. The **Gathering Data** dialog box appears and displays the status of the capture. The progress bar in the **Gathering Data** dialog box indicates what percentage of the buffer has been filled. The **Events** field indicates the number of packets detected.
4. The **Stop** button to stop capturing bus traffic or wait until the capture buffer is full. The **Capturing Data** dialog box closes and after a few moments the captured packets are displayed in the **Event List**.

To capture all 1394 bus traffic

1. On the **Trigger** menu select **New Capture.** The **Trigger** window appear.
2. On the **General** tab select the **Log Cycle Start** and **Log Iso Packets** check boxes.
3. On the **General** tab select the **Buffer Fill** radio button.
4. If desired, limit the size of the capture buffer by specifying a maximum packet count in the **Stop After** field.
5. Click the **Start** button. The **Gathering Data** dialog box appears and displays the status of the capture. The progress bar in the **Gathering Data** dialog box indicates what percentage of the buffer has been filled. The **Events** field indicates the number of packets detected.
6. Click the **Stop** button to stop capturing bus traffic or wait until the capture buffer is full. The **Capturing data** dialog box closes and after a few moments the captured packets are displayed in the **Event List / Transaction Viewer**.

To ignore all Isochronous packets

1. On the **Trigger** menu select **New Capture.** The **Trigger** window appear.
2. On the **General** tab clear the **Log ISO Packets** check box.
3. Select other trigger settings as needed.
4. Click **Start**. All packets, except Isochronous packets, are captured in the capture buffer and then displayed in the **Event List / Transaction Viewer** window.

To ignore all Cycle Start packets

1. On the **Trigger** menu select **New Capture.** The **Trigger** window appear.
2. On the **General** tab clear the **Log Cycle Start** check box.
3. Select other trigger settings as needed.
4. Click **Start**. All packets, except cycle start packets, are captured in the capture buffer and then displayed in the **Event List / Transaction Viewer** window.

Setting External Hardware Trigger Conditions

Use the **Ext. Trigger** check box to trigger on an incoming pulse. The end of the packet after the pulse will be marked as a triggered packet.
Use the **Enable Ext. Trigger Out** box to generate a pulse of 5 volts and 150 ns in length after a trigger condition is met.
These options are mutually exclusive—cannot be selected together.

To set an external hardware trigger in condition

1. Connect a device to the BNC connector on the left-hand side of the VK9000.
2. On the **Trigger** menu select **New Capture.** The **Trigger** window appear.
3. On the **General** tab of the **Trigger** window click on the **Ext Trigger** check box on **Basic Triggers** box.
4. Set other conditions as needed
5. Click **Start**. All packets, except Isochronous packets, are captured in the capture buffer and then displayed in the **Event List / Transaction Viewer** window.

Note

Requires a device capable of generating a pulse. There is a latency period between the triggering event and the signal/pulse generation.

To set an external hardware trigger out condition

1. Connect a device to the BNC connector on the left-hand side of the VK9000.
2. On the **Trigger** menu select **New Capture.** The **Trigger** window appear**.**
3. On the **General** tab of the **Trigger** window click on the **Enable Ext**. **Trigger Out** check box on the **Capture Options** box.
4. Set other conditions as needed
5. Click **Start**. All packets, except Isochronous packets, are captured in the capture buffer and then displayed in the **Event List / Transaction Viewer** window.

Note

Requires a device capable of receiving a pulse.

4.3 General Trigger Conditions

Trigger Conditions

The purpose of a trigger is to stop the data capture process when a specified event occurs (or stop n events after the trigger event has occurred). Define a trigger event by selecting the **Trigger** window. The purpose of most of the controls on the tabs of the **Trigger** window is to define the trigger events that stop the capture (in many cases you can define multiple trigger events). For example, you can specify that the trigger event is either a Read Quadlet Request or a Read Block Request.

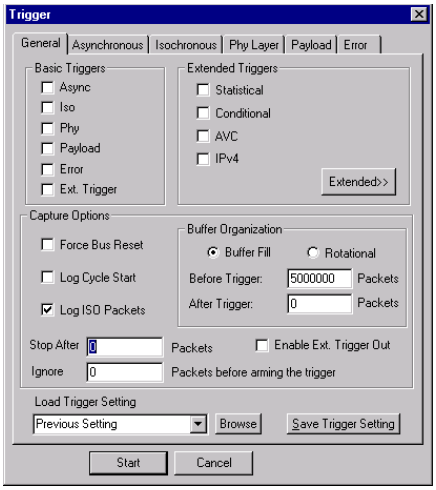
Some of the types of events you can trigger on are:

- Any Asynchronous packet sent to a specific node or to one of several specified nodes
- Any Asynchronous packet sent from a specific node or from one of several specified nodes
- Any Asynchronous packet of a specific type or one of several specified types
- Bad CRC values, incorrect Iso data lengths or invalid Tcodes
- Packets containing one or two specified quadlets at a specified offset
- Asynchronous packets containing one or more specified Transaction Labels, Transaction Codes or Retry Codes
- Asynchronous packets containing a specified value in the Destination Address Low / High field
- Isochronous packets containing one or more specified Channel numbers, Sync Codes, Tags, and Payload Lengths
- Conditional or statistical events

General Trigger Conditions

The **General** tab contains two types of information:

- Triggering features common to all packet types
- Capture options



Trigger Window General Tab

Trigger Window: General Tab Control Settings

Basic Trigger box

Item	Description
Asyn	A shortcut for the Enable Asynchronous Packet Triggering check box on the Asynchronous tab.
Iso	A shortcut for the Enable Isochronous Packet Triggering check box on the Isochronous tab.
Phy	A shortcut for the Enable PHY Packet Triggering check box on the Phy Layer tab.
Payload	Trigger on the presence of one or two quadlets in a packet at a specified location. Use the Value, Mask, and Offset fields to specify the search criteria
Error	Trigger on a CRC error (header or payload), incorrect Iso length, or invalid Tcode
External Trigger In	Trigger on a pulse via the BNC connector from an external hardware device.

Extended Triggers box

Item	Description
Statistical	Trigger conditions used to log the number of packets after the initial trigger condition is met.
Conditional	Set a second and third trigger condition once the first condition is met.
AV/C	Trigger on an AV/C packet. Use the AV/C tab to customize capture settings.
IPv4	Trigger on an IPv4 packet. Use the IPv4 tab to customize capture settings.
Extended button	Click to open the Extended Trigger window and use the Statistical, Conditional, AV/C and IPv4 tabs to customize capture settings.

Capture Options box

Item	Description
Force Bus Reset	Forces a bus reset. The purpose of this feature is to capture Self ID packets.
Log Cycle Starts	Clear the Log Cycle Start check box, to ignore Cycle Start packets and not capture them. When the Log Cycle Start check box is selected, Cycle Start packets are captured. **Note: If the Log Cycle Start check box is cleared, the VK9000's internal clock cannot synchronize with the timing of the Cycle Master. This condition may affect the accuracy of the packet timestamps.**
Log ISO Packets	Clear the Log Iso Packets check box to ignore Isochronous packets. During the capture, the Event Counter in the Gathering data window is advanced each time an Isochronous packet is encountered; the Isochronous packets, however, are not captured. When the Log Iso Packets check box is selected, Isochronous packets are captured.
Enable External Trigger Out	Trigger on an event and generate a 5 volt 150 ns in length pulse.
Stop After	Enter an absolute limit to the number of packets to be captured. Specifying 0 sets the limit to the full capacity of the capture buffer.
Ignore	Enter the number of packets ignored before the trigger is armed.

Buffer Organization box

Item	Description
Buffer Fill	Select to use the Buffer Fill mode for capturing packets.
Rotational	Select to use the Rotational Buffer Fill mode for capturing packets.
Before Trigger	Specifies the number of packets to maintain in the capture buffer prior to the trigger event. This field is used in Rotational Buffer Mode only, and is disabled in Buffer Fill Mode. See Rotational Buffer Mode for more information.
After Trigger	Specifies the number of packets to capture after the Trigger event occurs.

Load Trigger Setting box

Item	Description
Load Trigger Setting list	Loads a set of trigger conditions saved as a file.
Browse button	Click to select trigger settings saved as a file.
Save Trigger Setting button	Save the set of trigger conditions currently selected in the Trigger window.

Setting General Trigger Conditions

To trigger on an intermittent problem

1. On the **Trigger** window **General** tab click the **Rotational** radio button.
2. In the **Before Trigger** field enter the number of packets captured before the trigger event.
3. In the **After Trigger** field enter the number of packets captured after the trigger event.
4. Verify that the value in the **Stop After _____ Packets** is 0 or is greater than the sum of the **Before Trigger** and **After Trigger** fields.
5. Select other settings as needed.
6. Option: if desired, click the **Save Trigger Setting** to save the trigger settings for future use.
7. Click **Start**.

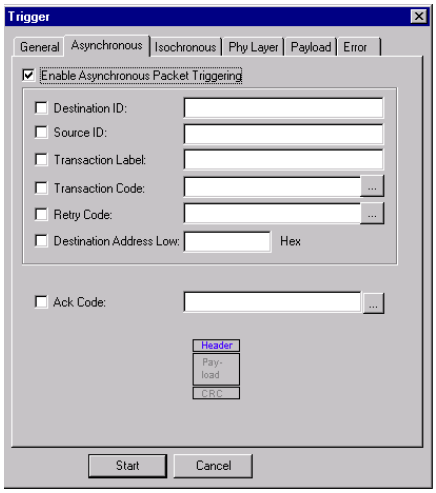
4.4 Asynchronous Trigger Conditions

Trigger conditions specific to Asynchronous packets are on the Asynchronous tab.
If trigger conditions are specified for more than one of the following properties, then the VK9000 ANDs the specified properties to create the trigger. For example, if Destination ID is specified as 2, and Transaction Code is specified as Read Quadlet Request, then the trigger condition is met only when a packet is encountered with a Destination ID of 2 and a Transaction Code of Read Quadlet Request.

You can also specify multiple values for each property, separated by commas. In this case, the VK9000 ORs the values together. The trigger condition is met when any of the specified value(s) is encountered. For example, you could enter 2, 3, 4 in the Destination ID, and the trigger condition would be met when a packet is set to Node 2, 3, or 4.

Trigger Window: Asynchronous Tab Control Settings

The controls on the **Trigger** window **Asynchronous** tab are described in the following section.



Trigger Window Asynchronous Tab

Item	Description
Enable Asynchronous Packet Triggering	Select to trigger on Asynchronous packets. Then further qualify triggering conditions by setting other capturing condition. If no other properties are specified, then the trigger is set for any Asynchronous packet. This check box and the Async check box on the General tab are the same.
Destination ID	Select to trigger on packets with the specified destination ID. If multiple destination IDs are entered, then the trigger is set for any values entered.
Source ID	Select to trigger on packets with the specified source ID. If multiple source IDs are entered, then the trigger is set for any values entered.
Transaction Label	Select to trigger on packets with the specified Transaction Label. If multiple Transaction Labels are entered, then the trigger is set for any values entered.
Transaction Code	Select to trigger on packets with the specified Transaction Code. Click the … button to select from a list of valid Transactions by name. If multiple Transaction Codes are selected, then the trigger is set for any of values entered.
Retry Code	Select to trigger on packets with the specified Retry Code. Click the … button to select from a list of valid Retry Codes by name. If multiple retries are selected, then the trigger is set for any of values selected.
Destination Address Low	Select to trigger on packets containing the specified value in their Destination Address Low field.
Ack Code	Select to trigger on packets with the specified Ack Code. Click the … button to select from a list of valid Ack Codes by name. If multiple Ack Codes are selected, then the trigger is set for any of values selected.

Setting Asynchronous Trigger Conditions

To trigger on the presence of a specific packet type (such as a Read Quadlet Request) from a specific node

1. Click the **Asynchronous** tab on the **Trigger** window.
2. Select **Enable Asynchronous Packet Triggering** check box.
3. Click the … button next to the **Transaction Code** field and select the desired transaction type from the list.
4. Enter the **Node ID** of the desired node in the **Source ID** field.
5. Select other settings as needed.
6. Click **Start**.

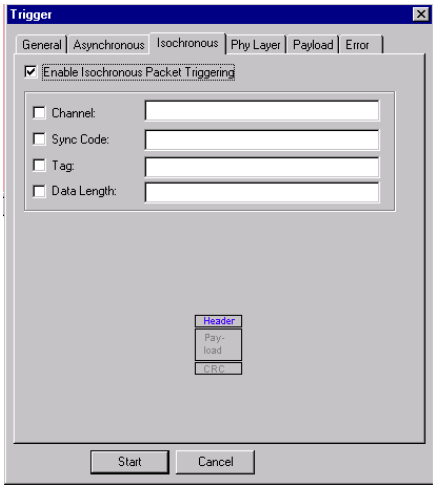
4.5 Isochronous Trigger Conditions

If trigger conditions are specified for more than one of the following properties, then both values are used to create the trigger. For example, if Channel is specified as 2, and Data Length is specified as 10, then the trigger condition is met only when a packet is encountered with a Channel number of 2 and a Data Length of 10.

You can also specify multiple values for each property, separated by commas. In this case, the trigger condition is met when any of the specified values are encountered. For example, you could enter 2,3,4 in the Channel field, and the trigger condition would be met when an Iso packet is encountered on channel 2 or channel 3 or channel 4.

Trigger Window: Isochronous Tab Control Settings

Use the controls on the Isochronous tab to set trigger conditions for Isochronous packet capturing.



Trigger Window Isochronous Tab

Item	Description
Enable Isochronous Packet Triggering	Select to trigger on Isochronous packets. Then further qualify triggering conditions by setting other capturing conditions. If no other properties are specified, then the trigger is set for any Isochronous packet. This check box and the Iso check box on the General tab are the same.
Channel	Select to trigger on packets with the specified Channel code. If multiple Channel numbers are entered, then the trigger is set for any values entered. Separate multiple channel numbers with commas.
Sync Code	Select to trigger on packets with the specified Sync code. If multiple Sync code numbers are entered, then the trigger is set for any values entered. Separate multiple channel numbers with commas.
Tag	Select to trigger on packets with the specified Tag. If multiple tags are entered, then the trigger is set for any of the values entered. Separate multiple Tags with commas.
Data Length	Select to trigger on packets with the specified payload length. Separate multiple data length values with commas.

Setting Isochronous Trigger Conditions

To trigger on an Isochronous packet containing a specific Channel number

1. On the **Trigger** window click the **Isochronous** tab.
2. Select the **Enable Isochronous Packet Triggering** check box.
3. Enter the desired Channel number in the **Channel** field.
4. Select other settings as needed.
5. Click **Start**.

To trigger on an Isochronous packet containing a specific Sync Code

1. On the **Trigger** window click the **Isochronous** tab.
2. Select the **Enable Isochronous Packet Triggering** check box.
3. Enter the desired Sync Code in the **Sync Code** field.
4. Select other settings as needed.
5. Click **Start**.

To trigger on an Isochronous packet containing a specific Tag value

1. On the **Trigger** window click the **Isochronous** tab.
2. Select the **Enable Isochronous Packet Triggering** check box.
3. Enter the desired Tag value in the **Tag** field.
4. Select other settings as needed.
5. Click **Start**.

To trigger on an Isochronous packet containing a payload of a specific length

1. On the **Trigger** window click the **Isochronous** tab.
2. Select the **Enable Isochronous Packet Triggering** check box.
3. Enter the payload length in the **Data Length** field.
4. Select other settings as needed.
5. Click **Start**.

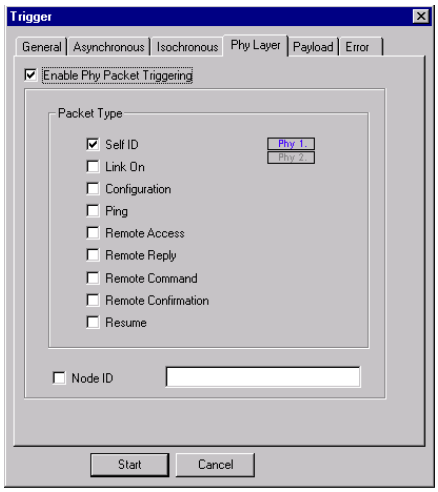
4.6 PHY Trigger Conditions

PHY Trigger Conditions

Trigger conditions specific to PHY packets are on the **Phy Layer** tab.

Trigger Window: PHY Tab Control Settings

Use the controls on the **Phy Layer** tab to create trigger conditions for capturing PHY packets.



Trigger Window PHY Layer Tab

Item	Description
Enable PHY Packet Triggering	Select to trigger on PHY packets. Select other properties to further qualify the triggering event. If no other properties are specified, then the trigger is set for any PHY packet. This check box and the PHY check box on the Trigger window General tab are the same.
Self ID	Select to trigger on Self ID packets.
Link On	Select to trigger on Link On packets.
Configuration	Select to trigger on Configuration packets.
Ping	Select to trigger on Ping packets.
Remote Access	Select to trigger on Remote Access packets.
Remote Reply	Select to trigger on Remote Reply packets.
Remote Command	Select to trigger on Remote Command packets
Remote Confirmation	Select to trigger on Remote Confirmation packets.
Resume	Select to trigger on Resume packets.
Node ID	Select to trigger on PHY packets containing the specified Node IDs.

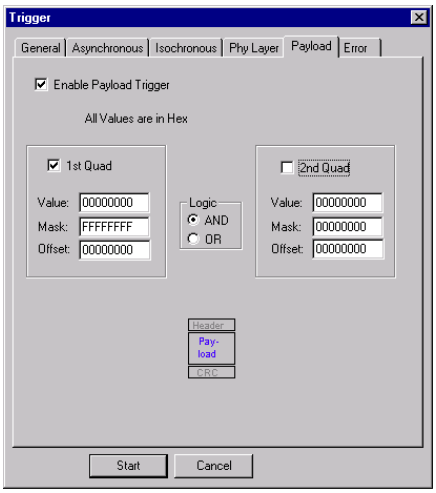
Setting PHY Trigger Conditions

To trigger on a specific type or types of PHY packets from a specific node

1. On the **Trigger** window click the **PHY Layer** tab.
2. Select the **Enable PHY Packet Triggering** check box.
3. Select the appropriate PHY packet check boxes as needed.
4. Enter the desired Node ID in the **Node ID** field.
5. Click **Start**.

4.7 Trigger Window: Payload Tab Control Settings

Use the **Payload** tab to set up trigger conditions for a packet's payload.



Trigger Window Payload Tab

Item	Description
Enable Payload Trigger	Select to set a payload trigger. This check box is the same as the Payload check box on the General tab.

1st Quad box

Item	Description
1st Quad check box	Select to set trigger data for the first quadlet.
Value	Search for a specific first quadlet value. The value must be entered in hexadecimal, and must be exactly one quadlet (eight characters) in length.
Mask	A mask used to specify that certain bits in 1st Quad Value are to be ignored. The mask must be exactly one quadlet (eight characters) in length. A 0 bit in the mask means that the corresponding bit in 1st Quad Value is to be ignored. For example, a 1st Quad Mask of 00FFFF00 specifies that the first and last bytes of the 1st Quad Value are ignored.
Offset	Offset from the beginning of the packet to search for 1st Quad Value.

Logic box

Item	Description
AND	Select AND to specify that the trigger condition is met only if the packet contains both quadlets
OR	To trigger on just a single quadlet, select OR and set the 2nd Quad Mask to 00000000. Select OR to specify that the trigger condition is met if the packet contains either quadlet. To trigger on just a single quadlet, select OR and set the 2nd Quad Mask to 00000000.

2nd Quad box

Item	Description
2nd Quad check box	Select to set trigger data for the second quadlet.
Value	Search for a specific second quadlet value. The value must be entered in hexadecimal and must be exactly one quadlet (eight characters) in length.
Mask	A mask used to specify that certain bits in 2nd Quad Value are to be ignored. The mask must be exactly one quadlet (eight characters) in length. A 0 bit in the mask means that the corresponding bit in 2nd Quad Value is to be ignored. For example, a 2nd Quad Mask of 00FFFF00 specifies that the first and last bytes if the 2nd Quad Value are to be ignored.
Offset	Offset from the beginning of the packet to search for 2nd Quad Value.

To trigger on the presence of one specific quadlet at a specific offset in a packet

1. Select the **Payload** tab on the **Trigger** window tab and select the **Enable Payload Trigger** check box.
2. Select the **1st Quad** check box and enter a quadlet value in the **1st Quad Value** field.
3. If needed, enter a value in the **1st Quad Mask** field.
4. Enter the offset in hexadecimal in the **1st Quad Offset** field. The offset must be from the beginning of the packet.
5. Click the **OR** button and enter 00000000 in the **2nd Quad Mask** field. (This setting is used to search for only the first quadlet.)
6. Select other settings as needed.
7. Option: if desired, click the **Save Trigger Setting** on the **General** tab to save the trigger settings for future use.
8. Click **Start**.

To trigger on the presence of a pair of quadlets

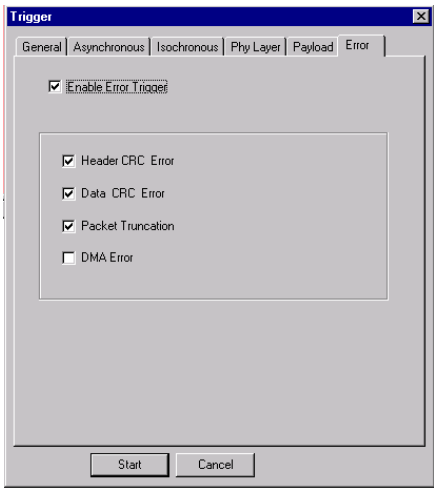
1. Select the **Payload** tab on the **Trigger** window and select the **Enable Payload Trigger** check box.
2. Select the **1st Quad** check box and enter quadlet values for **1st Value**, **1st Mask**, and **1st Offset**.
3. Select the **AND** radio button.
4. Select the **2nd Quad** check box and enter quadlet values for **2nd Value**, **2nd Mask**, and **2nd Offset**.
5. Select other settings as needed.
6. Option: if desired, click the **Save Trigger Setting** to save the trigger settings for future use.
7. Click **Start**.

To trigger on the presence of either of two quadlets

1. Select the **Payload** tab on the **Trigger** window and select the **Enable Payload Trigger** check box.
2. Select the **1st Quad** check box and enter quadlet values for **1st Value**, **1st Mask**, and **1st Offset**.
3. Select the **OR** radio button.
4. Select the **2nd Quad** check box and enter quadlet values for **2nd Value**, **2nd Mask**, and **2nd Offset**.
5. Select other settings as needed.
6. Option: if desired, click the **Save Trigger Setting** to save the trigger settings for future use.
7. Click **Start**.

4.8 Trigger Window: Error Tab Control Settings

Trigger on a CRC error (header or payload), DMA Error, and a truncated (length doesn't match) packet.



Item	Descripton
Enable Error Trigger	Select to trigger on a CRC, data length, or DMA error.
Header CRC Error	Select to trigger on a CRC error in the header.
Data CRC Error	Select to trigger on a CRC error in payload.
Packet Truncation	Select to trigger on a data length error.
DMA Error	Select to trigger on a DMA error.

4.9 Setting Extended Triggers

Extended Trigger Window Overview

Use the **Extended Trigger** window to load a statistical or conditional trigger condition or create a trigger condition for AV/C or IPv4 packets. The window has four tab sections: the **Statistical** tab, **Conditional** tab, **AV/C** tab, and **IP** tab.

To set a statistical trigger

1. On the **Trigger** window click the **General** tab.
2. Click the **Extended** button and select the **Statistical** tab.
3. On the tab click the **Browse** button. The **Open** dialog box appears.
4. Select a file from the list and click **Open**.

To set a conditional trigger

Note

Before loading a statistical trigger, use the controls on the Trigger window tabs to create and save a particular trigger.

1. On the **Trigger** window click the **General** tab.
2. Click the **Extended** button and select the **Conditional** tab.
3. On the tab click the **Browse** button. The **Open** dialog box appears.
4. Select a file from the list and click **Open**.

To set an AV/C trigger

Note

Before loading a statistical trigger, use the controls on the Trigger window tabs to create and save a particular trigger.

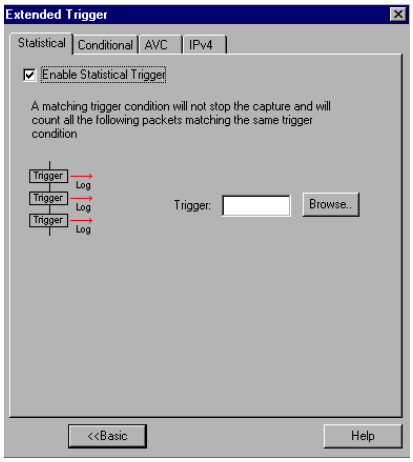
1. On the **Trigger** window click the **General** tab.
2. Click the **Extended** button and select the **AV/C** tab.
3. On the **AV/C** tab click the **Enable AV/C Trigger** check box.
4. Option: use the **AV/C Trigger** list to select a type of AV/C packet.
5. Select either the **Command** or **Response** option buttons.
6. Select either the **Write block** or **Write quadlet** option buttons.
7. Select and enter values in the **AV/C** lists and check boxes. Choices include: **cts** check box and field, **ctype** check box and list, **Response** check box and list, **Subunit** check box and field, **Opcode** check box and field, and **Operand0** check box and field.
8. Click the **Basic** button.
9. Option: click the **Save Trigger Setting** button to save to a file trigger conditions.
10. On the **General** tab click **OK**. The **Trigger** window closes and data capture begins.

To set an IP trigger

1. On the **Trigger** window click the **General** tab.
2. Click the **Extended** button and select the **IPv4** tab.
3. On the **IPv4** tab click the **Enable IP Trig** check box.
4. Select either the **Asy** radio button or the **Iso** radio button.
5. On the **IP Payload** box select **ARP**, **MCAP**, or Datagram radio buttons.
6. Select values and enter data in the **ARP/MCAP** box or the **Datagram** box to further qualify the trigger.
7. Click the **Basic** button.
8. Option: click the **Save Trigger Setting** button to save to a file trigger conditions.
9. On the **General** tab click **OK**. The **Trigger** window closes and data capture begins.

Statistical Tab Controls

Use the controls on the **Statistical** tab to customize trigger conditions to log individual events in the **Event List**.

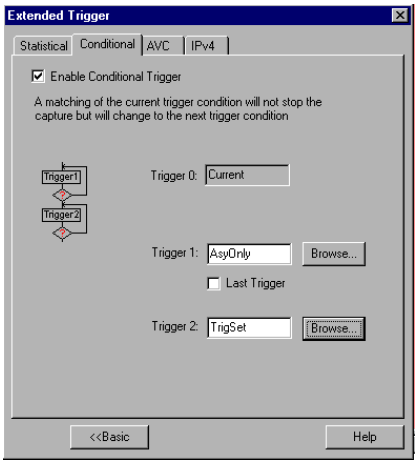


Extended Trigger Window Statistical Tab

Item	Description
Enable Statistical Trigger	Select to set a statistical trigger.
Browse	Using the Browse button select a trigger condition saved to a file. The trigger condition is displayed in the Trigger field.
Trigger	Click to select a trigger condition saved to a file.

Conditional Tab Controls

Use the controls on the **Conditional** tab to customize trigger conditions to create a second or a third trigger condition that occurs once the first or second trigger conditions are met.

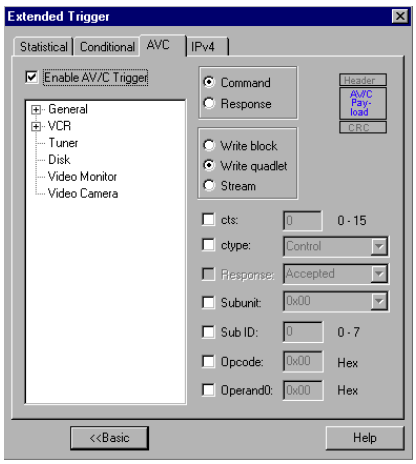


Extended Trigger Window Conditional Tab

Item	Description
Enable Statistical Trigger	Select to set a statistical trigger.
Trigger 0	Reflects the trigger set on the other trigger tab (that is, the Basic tab).
Trigger 1	Using the Browse button select a trigger condition saved to a file. The trigger condition is displayed in the Trigger 1 field.
Last Trigger	Select to set Trigger 1 as the last Conditional trigger condition. If cleared, Trigger 2 is the last Conditional trigger condition.
Trigger 2	Using the Browse button select a trigger condition saved to a file. The trigger condition is displayed in the Trigger 2 field.
Browse	Click to select a trigger condition saved to a file.

AV/C Tab Controls

Use the controls on the **AV/C** tab to set AV/C trigger conditions.

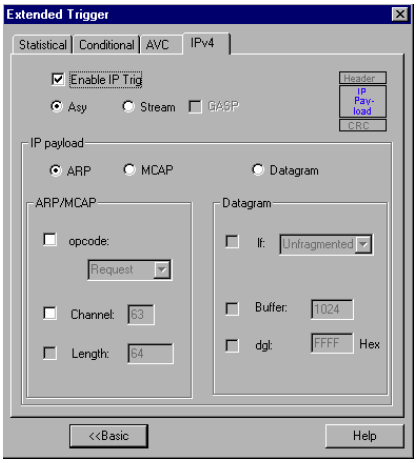


Extended Trigger Window AV/C Tab

Item	Description
Enable AV/C Trigger	Select to set an AV/C trigger.
Enable AV/C Trigger list	Select an AV/C unit or subunit.
Command	Select to trigger on a Command frame.
Response	Select to trigger on a Response frame.
Write block	Select to trigger on a Write Block Request packet.
Write quadlet	Select to trigger on a Write Quadlet Request packet.
Stream	Select to trigger on a Stream packet.
cts check box and cts field	Select to trigger on the cts value (0 is the default value) and if desired, enter a value (0-15 in the cts field).
ctype check box and ctype list	Select to trigger on the ctype (command type) and select from the list a ctype.
Response check box and Response list	Select to trigger on the response code and select from the list a response code.
Subunit check box and Subunit list	Select to trigger on the Subunit type and select from the list a Subunit.
Sub ID check box and Sub ID field	Select to trigger on the Subunit ID and enter a Subunit ID value (0-7).
Opcode check box and Opcode field	Select to trigger on the Opcode and enter an Opcode value in hexadecimal.
Operand0 check box and Operand0 field	Select to trigger on the Operand 0 and enter an Operand 0 value in hexadecimal.

IPv4 Tab Controls

Use the controls on the **IPv4** tab to set IP trigger conditions.



Extended Trigger Window IPv4 Tab

Item	Description
Enable IP Trig check box	Select to enable IP packet triggering.
Asy radio button	Select to trigger on an Asynchronous packet containing an IP payload.
Stream radio button	Select to trigger on a Stream packet containing an IP payload.
GASP check box	Select to trigger on IPv4 GASP.

IP Payload box

Item	Description
ARP radio button	Select to trigger on an ARP packet.
MCAP radio button	Select to trigger on an MCAP packet.
Datagram radio button	Select to trigger on an IP datagram. By trigger type set, applicable box becomes possile.

ARP/MCAP box

Item	Description
opcode check box and opcode list	Select and enter an opcode value for triggering.
Sender check box and Sender field	Select and enter a sender value for triggering.
Length check box and Length field	Select and enter a length value for triggering.

Datagram box

Item	Description
If check box and If list	Select the If check box and select from the list a type of datagram for triggering. Choices include: Unfragmented, First, Last, and Interior.
Buffer check box and Buffer field	Select and enter a buffer value for triggering.
dgl check box and dgl field	Select and enter a dgl value in hexadecimal for triggering.

Saving Trigger Settings

To save trigger settings

1. Click the **General** tab on the **Trigger** window.
2. Click the **Save Trigger Setting** button. The settings are saved with the file extension trg; the default directory is c:\dpx\settings.

Loading Trigger Settings

To load trigger settings using the Load Trigger Setting list

1. On the **Trigger** window click the **General** tab.
2. Select the **Load Trigger Setting** list.
3. Select a trigger setting from the list and click **Open**.

To load trigger settings using the Browse button

1. On the **Trigger** window click the **General** tab.
2. Option: click the **Extended** button and select the **Statistical** or **Conditional** tab.
3. On the tab click the **Browse** button. The **Open** dialog box appears.
4. Select a file from the list and click **Open**.

5.1 Command and Status (CSR) Access

The CSR (Command Status Register) Architecture (ANSI/1212 1994 Edition) standardizes the function of each node's core CSRs and their location in the node's initial register space. The addresses of these core registers are specified in terms of offsets within the initial register space, where the offset of the start of initial register space is FFFF F000 0000_{16}.

The VK9000 provides two facilities for browsing or reading any node's CSR or Config ROM. You can also modify any node's CSRs without the need to know the registers' addresses.

Use the **CSR and Config ROM Explorer** to view a node's CSR registers or Config ROM. Use this feature to browse through any node's Command and Status Registers. More importantly, you can browse the directory Hierarchy of any node's Config ROM, traversing up and down the hierarchy's tree structure. The contents of each directory and leaf are decoded and displayed in an easy-to-read format.

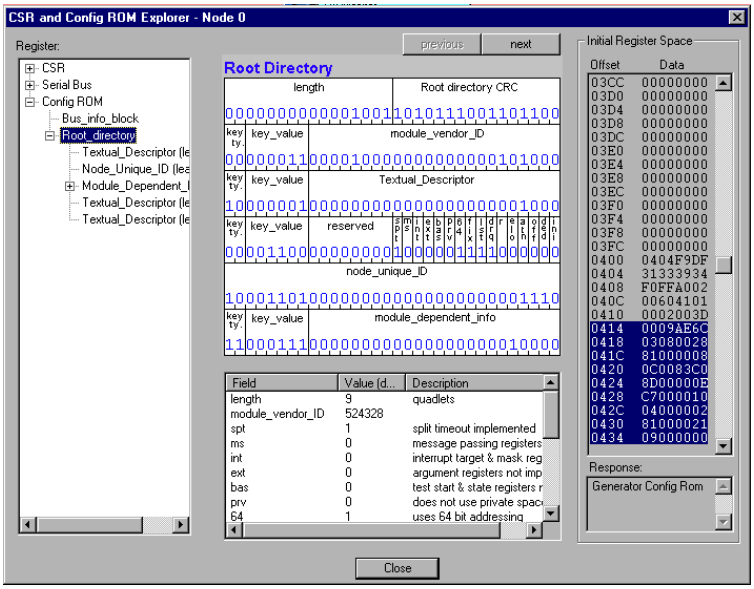
Users can also perform Read, Write, and Lock commands to write to a Node's CSR registers. These features are discussed in Node Info Window: CSR section of the Topology Window chapter.

5.2 CSR and Config ROM Explorer Overview

Use the **CSR and Config ROM Explorer** to browse through any node's register space and decode its contents into an easily readable format. Using the **CSR and Config ROM Explorer**, you can:

- Display and decode the contents of any node's CSR registers
- Display and decode the contents of any node's serial bus defined registers
- Display and decode any node's Bus Information Block
- Browse any node's directory structure, displaying each directory's contents in an easily readable format

The **CSR and Config ROM Explorer** contains four sections: **Raw Hex Register Display**, **Register Selection**, **Response**, and **Formatted Register Display**.



CSR and Config ROM Explorer Window

To Open the CSR and Config ROM Explorer

- Double-click the right-hand section of a node. If the node shows only node ID and speed data click the gray arrow to enlarge the node, then double-click the right-hand section. The **CSR and Config ROM Explorer** appears.

Raw Hex Register Display

The right section displays the node's register space in raw hexadecimal form. The left column is the offset from the beginning of the register space, and the right column is the quadlet of that offset.

If one or more quadlets are highlighted, they correspond to the highlighted field in the **Register Selection** window of the display.

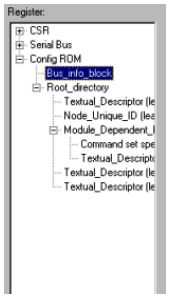
Raw Hex Register display Window

Register Selection Window

The **Register Selection** window appears in the left section of the **CSR and Config ROM Explorer**.

The register space is displayed in a tree view. A **+** indicates a branch of the tree that can be expanded (by clicking the **+**).

When you select a register in the **Register Selection** window, the contents of that register appear in the **Raw Hex Register Display** and the **Formatted Register Display**.



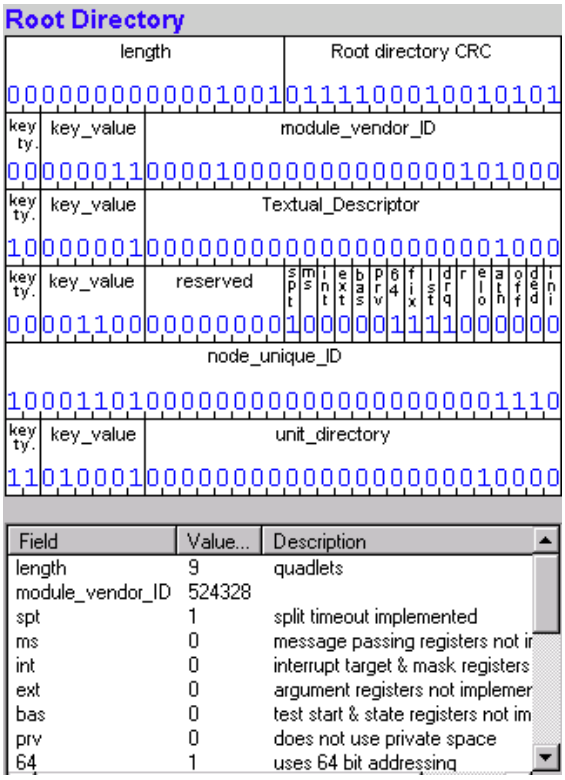
Register Selection Window

Formatted Register Display

The **Formatted Register Display** occupies the center section of the **CSR and Config ROM Explorer**.

It displays the contents of the register highlighted in the **Formatted Register Selection** window. The upper portion displays the register contents in a manner consistent with the 1394 Standard document. The lower portion displays the register contents in an easily-readable format.

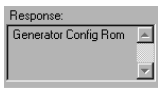
The **Formatted Register display** shows the contents of the selected node's Bus Information Block. The lower portion displays the bus information block in an easily-readable format.



Formatted Register Display Window

Response Box

The **Response** box, which occupies the lower right corner of the **CSR and Config ROM Explorer** window, lists the type of response packet.



Response Box

CSR and Config ROM Explorer Procedures

To display a node's Bus Information Block

1. Double-click the right-hand section of a node. If the node shows only node ID and speed data click the gray arrow to enlarge the node, then double-click the right-hand section. The **CSR and Config ROM Explorer** appears.
2. If there is a plus sign (**+**) next to **Config ROM** in the **Register Selection** window, click it to expand the Config ROM branch.
3. Select **Bus_info_block** in the **Register Selection** window.

To display a node's Control and Status Registers (CSR)

1. Double-click the right-hand section of a node. If the node shows only node ID and speed data click the gray arrow to enlarge the node, then double-click the right-hand section. The **CSR and Config ROM Explorer** appears.
2. If there is a plus sign (**+**) next to **CSR** in the **Register Selection** window, click it to expand the CSR branch.
3. Select a register to view in the **Register Selection** window. The **Formatted Register display** shows the contents of the selected register. The lower portion displays the register in an easily-readable format.

To display a node's Serial Bus defined Registers

1. Double-click the right-hand section of a node. If the node shows only node ID and speed data click the gray arrow to enlarge the node, then double-click the right-hand section. The **CSR and Config ROM Explorer** appears.
2. If there is a plus sign (**+**) next to **Serial Bus** in the **Register Selection** window, click to expand the Serial Bus Register branch.
3. Select the register you want to view in the **Register Selection** window. The **Formatted Register display** shows the contents of the selected Serial Bus Defined Register. The lower portion displays the register in an easily-readable format.

To display a node's Config ROM directory Structure

1. Double-click the right-hand section of a node. If the node shows only node ID and speed data click the gray arrow to enlarge the node, then double-click the right-hand section. The **CSR and Config ROM Explorer** appears.
2. If there is a plus sign (**+**) next to **Config ROM** in the **Register Selection** window, click to expand the **Config ROM** branch.
3. If there is a plus sign (**+**) next to **Root_directory** in the **Register Selection** window, click to expand the directory branch. The expanded directory branch displays the first-level unit directories and leaves.
4. Option: if desired, continue to expand lower-level directories. The contents of the desired directory or leaf appear in the **Formatted Register Display**.
5. Option: for directories, if the upper portion of the **Formatted Register Display** is not large enough to show the entire directory, use the **next** and **previous** buttons to browse the directory.

5.3 Data Explorer

The **Data Explorer** is a powerful tool used to search, display, and analyze 1394 packets. Double-click any packet in the **Event List / Transaction Viewer** to display it in the **Data Explorer**. The **Data Explorer** can:

- Display packet data in hexadecimal
- Display packet header information consistent with the 1394 Standard document
- Decode packet header fields
- Determine and display packet type
- Display the packet payload in hexadecimal, ASCII, or binary
- If the packet payload contains a higher-level protocol, such as IEC61883, SBP-2, AV/C, IPv4, HAVi or Customize decode it (optional feature:SBP-2, AV/C, IPv4, HAVi, Customize)
- Search for other packets with similar contents
- Search for other packets with identical header fields

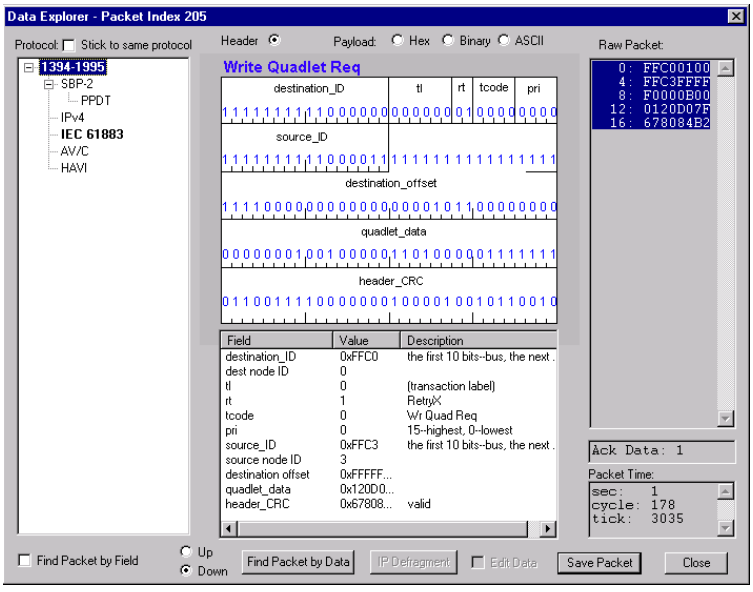
After opening the **Data Explorer** window, you can use it to examine any packet in the capture buffer. Simply scroll through the **Event List / Transaction Viewer** and select a packet(s).

The **Packet Index** number shown in the title bar corresponds to the packet's index value shown in the **Event List / Transaction Viewer**.

The **Data Explorer** contains five sections: **Raw Packet** box, **Packet Time** box, **Packet Format** box, **Ack Data** box, and **Protocol Selection** list.

Note

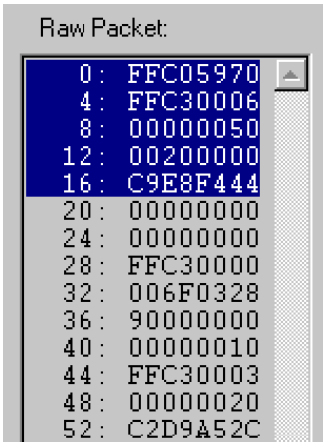
About the detail of Customize function, refer to Chap.7.



Data Explorer Window

Raw Packet Box

The **Raw Packet** box, which appears in the right section of the **Data Explorer**, displays the contents of the 1394 packet in hexadecimal.
The left column of the **Raw Packet** box displays the offset from the beginning of the packet. The right column is the packet contents.



Raw Packet Box

Packet Time Box

The **Packet Time** box, which appears in the lower right corner of the **Data Explorer**, displays the following information about each packet:

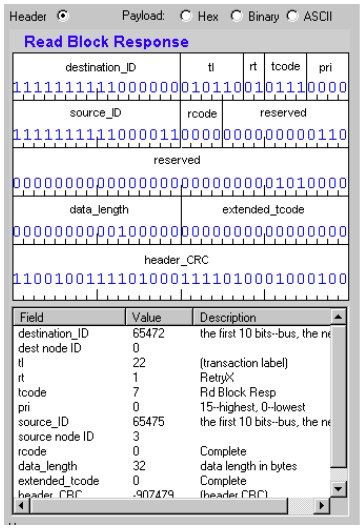
Item	Description
Sec	Timestamp, marking the end of the packet.
Cycle	Number of ticks from cycle start to the beginning of the packet. This value is calculated by subtracting the Transmission time from the Sec/Cycle/Tick timestamp.
Tick	The packet transmission time in Ticks.

Packet Time Box

Packet Format Box

The **Packet Format** box appears in the center section of the **Data Explorer** display. The upper portion of the **Packet Format** box displays the packet type and the bit fields of the packet in a manner consistent with the 1394 Standard document. The lower portion of the **Packet Format** box provides a display of the decoded values with a description.

Select the radio buttons above the **Packet Format** box to display either the packet's header or its payload. The payload can be displayed in hexadecimal, binary, or ASCII.



Packet Format Box

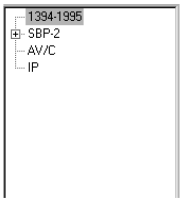
Ack Data Box

The **Ack Data** box, which appears in the right section of the **Data Explorer**, is used to display acknowledge packet data.

Ack Data Box

Protocol Selection List

The **Protocol Selection** list, which appears in the left section of the **Data Explorer**, is used to select a protocol to decode the packet shown in the **Packet Format** box. Typically, select **1394-1995** protocol.



Protocol Selection List

Stick to Same Protocol Box

The **Stick to Same Protocol box**, which appears in the left section of the **Data Explorer**, is used to keep the same protocol selected while switch between or opening different packets in the Data Explorer during a concurrent session.

5.4 Parsing and Analyzing Packets

To view packet data in the Data Explorer

- On the **Event List or Transaction Viewer**, double-click a packet. The **Data Explorer** window opens.

To view 1394 packet contents such as AV/C, IP, HAVi, SBP-2

Requirements

A registered version of the desired protocol plug-in. The plug-in, for instance AV/C, is used to parse the 1394 packet to examine the encapsulated protocol.

1. On the **Event List or Transaction Viewer**, double-click a packet. The **Data Explorer** window opens.
2. From the **Protocol Selection** list in the **Data Explorer**, click the appropriate protocol. The protocol data appears in the **Data Explorer**.

To enable protocol recognition in the Event List

1. On the **View** menu select **Display Options**. The **Display Options** window appears.
2. On the **Display Options** window click the **Protocols** tab and select **Enable Protocol Display in Event List**. As needed, select other settings including **AV/C**, **IPv4**, **SBP2**, **IEC 61883**, and **HAVi**.
3. Click **OK**.

To configure SBP-2 parsing

Note

This procedure must be completed before parsing any SBP-2 packets in the **Data Explorer**. Once configured, parse SBP-2 packets like any other packets—reconfigure if your SBP-2 testing needs demand it.

1. Using the keyboard mouse or an external mouse right-click in the **Event List** and from the menu select SBP-2 parser option. The SBP-2 parser option window appears.
2. Either accept the default management agent settings or specify the command block agent base address.
3. Click **OK**. SBP-2 can be parsed in the **Data Explorer**.

To select Stick to Same Proto

Select the **Stick to Same Proto** check box to select a protocol other than 1394 as the default; the protocol selected will become a temporary default setting. This feature is especially useful when comparing and analyzing multiple packets. Closing the **Data Explorer** window clears the selected setting from the check box.

1. From the **Protocol Selection** list in the **Data Explorer** window, click **AV/C**.
2. Select **Stick to Same Proto** check box.
3. Select the **Event List / Transaction Viewer** window and press the **UP ARROW** key and **DOWN ARROW** key to select other packets from the **Event List**, without the protocol setting returning to **1394-1995**.

Saving Captured Packets

You can save the packet appearing in the **Data Explorer** for later use when generating packets.

To save a packet appearing in the Data Explorer

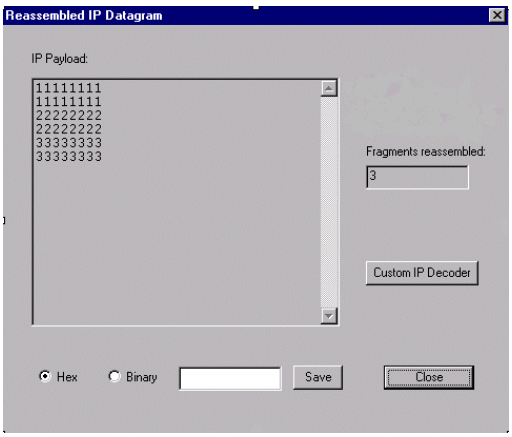
1. On **Data Explorer** window click the **Save Packet** button. The **Save As** dialog box appears.
2. Click **Save**.

Reassembling IP Fragments

Use the **IP Defragment Button** to open the **Reassembled IP Datagram** dialog box. **The Reassembled IP Datagram** dialog box provides controls to reassemble IP packets. An IP datagram is fragmented into three sections: a first, an internal (or multiple), and a last. This feature provides a way to reassemble the packets into a datagram and then save the datagram or export it using a customized DLL.

To reassemble IP fragments

1. On the **Data Explorer** window, select **IP** protocol.
2. Click the **IP Defragment button**. The **Reassembled IP Datagram** dialog box appears. Data displayed includes the IP payload and the number of fragments reassembled.
3. Option: click the **Binary** button to save in binary. The **Hex** button is the default setting and saves the datagram in hexadecimal.
4. To save the packet, enter a name for the datagram and click the **Save** button. The **Save As** dialog box appears.
5. Click **Save**.



Reassembled IP Datagram Window

Using the Custom IP Decoder

Users can also customize the **IP Parser** to call a DLL to handle or move a reassembled IP datagram to a user defined location, window, or application. This feature simplifies using IP data in other instances or applications.

Click the **Using the Custom IP Decoder** button to call the customized DLL and move the reassembled IP packet to the customized location. Before using this feature, users must set up the DDL. Use the following C code fragment as a model for setting up the DLL. After compiling, the DLL needs to reside in the FWX root directory.

Example

The following example is a sample C program for customizing the IP Decoder DLL. Use the exact same procedure signature (the first line of the following code fragment). This procedure is the entry point for the entire IP Decoder DLL, which means that the Data Analyzer will call this function if the **Custom IP Decoder** button is clicked. The parameters are: data is a pointer to IP payload, and len is the length of data in bytes.

```
#include <windows.h>
extern"C"__declspec(dllexport) BOOL IPDecoder (unsigned long *data, int len)
{
    // you could do whatever you want with data here
MessageBox(NULL,"This is in DLL","",MB_OK);
return TRUE
}
```

5.5 Searching For Packets

The **Data Explorer** contains a very powerful search tool. You can search for other packets in the capture buffer containing the same or similar contents. You can also search for packets containing one or more identical header fields.

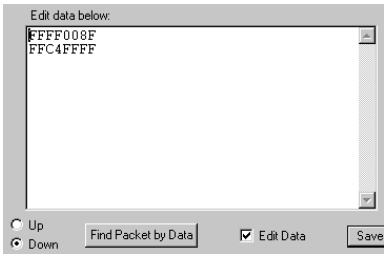
Searching for Packets by Content

Use the **Raw Packet** box and the **Find Packet by Data** button to search for packets by content.

Data Explorer Window Raw Packet Box

You can also search for packets containing one or more identical quadlets at the same offset. This is useful when, for example, you want to find packets containing the same payload, but with different headers. You can also search for packets with similar payloads (partial match).

Use the **Data Explorer** to modify search criterion. You can, for instance, specify a quadlet(s) to search for, modify it, and then perform a search based on the modified quadlet.



Data Explorer Window Raw Packet Box

To find an identical packet in the capture buffer

1. On the **Raw Packet** box drag the pointer to select all entries.
2. Select the **Up** or **Down** radio button to search the contents of the capture buffer preceding or following the current packet.
3. Click the **Find Packet by Data** button.

To find a packet with identical quadlets at the same offset

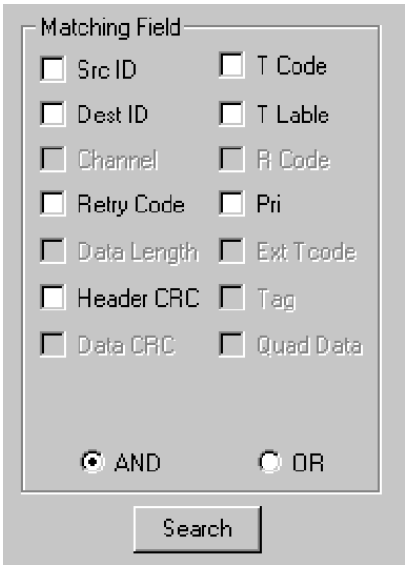
1. On the **Raw Packet** box drag the pointer to select the quadlet(s) and offset(s).
2. Select the **Up** or **down** radio button to search the capture buffer preceding (**Up**) or following (**Down**) the current packet.
3. Click the **Find Packet by Data** button.

To modify the search criterion

1. On the **Data Explorer** window select the **Hex** radio button.
2. On the **Raw Packet** box drag the pointer to select one or more quadlets.
3. On the **Data Explorer** window select the **Edit Data** check box. The bottom portion of the **Packet Format** box is replaced by the **Edit Data Below** box.
4. Click in **Edit Data Below** box. The selected quadlet(s) appear.
5. Edit the quadlets to create search criterion.
6. On the **Data Explorer** window select the **Up** or **Down** radio button to search the contents of the capture buffer preceding or following the current packet.
7. Click the **Find Packet by Data** button.

Searching for Packets by Header Field

- Use the **Find Packet by Field** check box to search for packets containing identical header fields.



Data Explorer Window Find Packet by Field

To find a packet with one or more identical header fields

1. On the **Data Explorer** window select the **Find Packet by Field** check box. The **Matching Fields** box appears.
2. On the **Matching Fields** box, select the appropriate check boxes to use for search criteria.
3. Select either the **AND** or the **OR** radio button. Select **AND** to set the search criteria so that all checked fields must match. Select **OR** to set the search criteria so that any of the checked fields must match.
4. Select the **Up** or **Down** radio button to search the contents of the capture buffer preceding (**Up**) or following (**Down**) the current packet.
5. Click the **Find Packet by Data** button.

Data Explorer Display Options: Start with Header Viewer vs. Start with Payload Viewer

Use these optional settings to specify whether the **Packet Format** box on the **Data Explorer** window initially displays the packet's header or displays the packet's payload in hexadecimal.

To select header or payload display options

1. On the **View menu** select the Display Options command. The **Display Options** window appears.
2. On the **Data Details** tab, select either the **start with Header Viewer** or **start with Payload viewer** radio button.

Data Explorer Display Options: Quadlets per Line in Payload View

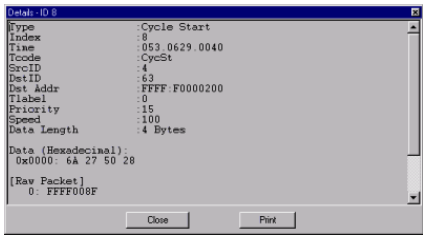
When displaying the packet's payload in hexadecimal, you can specify the number of quadlets per line.

To specify the number of quadlets displayed for a packet's payload

- On the **Number of data quadlets per line in Payload viewer** box, click the appropriate number.

Data Explorer Display Options: Classic Details Window

The **Classic Detail** window displays packet information in a simplified format. The payload is shown in hexadecimal.



Classic Dtails Window

At the bottom of the window, the packet is displayed as a raw packet (including one quadlet for the packet header, one quadlet for the header CRC, n quadlets for the data payload, and one quadlet for the payload CRC).

To select the Classic Details window

1. On the **View** menu select the **Display Options** command. The **Display Options** window appears.
2. On the **Data Details** tab, select the **Classic Details Window** radio button.

6.1 Generating Traffic Overview

Using the **Data Generator** you can build and send a single packet or a sequence of packets. You can send Asynchronous, Isochronous, and PHY packets, and even build illegal packets as well as valid packets.

The **Data Generator** feature is most powerful, however, when combined with the VK9000's data capture capability. You can capture packets, modify them, and then retransmit them. You can even retransmit a stream of Isochronous packets, replaying a stream you previously captured.

Specifying Data Generator Node Capabilities

Because the VK9000 may be used in an environment where no other nodes are capable of being Root, Cycle Master, or Isochronous Resource Manager, you can configure the VK9000's data Generation node to support one or more of these capabilities.

For more information, see Node Info Window: Node Tab Controls in the Topology Window section.

6.2 Asynchronous Packet Generation

Asynchronous Packet Generation Overview

Use the **Asynchronous** tab on the **Data Generator** window to generate Asynchronous packets.

Using the controls on this tab, you can:

- Build and send a 1394 packet, such as Read Quadlet Request, specifying the destination Address Low
- Build and send a packet such as Read Quadlet Request or Write Quadlet Request, specifying the payload and destination Address Low/Address High
- Build a packet and send it multiple times, specifying the delay between transmissions if desired
- Build a packet with incorrect Header CRC and/or Payload CRC values
- Build a packet and save it for later re-use
- Send an Asynchronous packet from the Event List
- Create and send (and optionally save for later use) a sequence of packets
- Build a packet or a sequence of packets, send it and simultaneously switch to capture mode

To open the data Generator window and select the Asynchronous tab

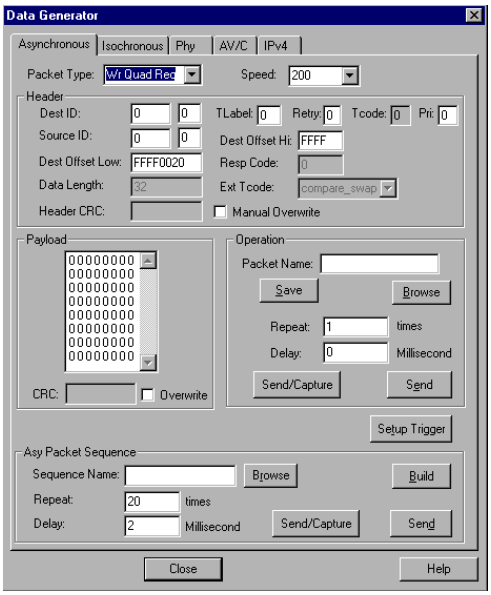
1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. On the **Data Generator** window click the **Asynchronous** tab.

Tip

On the toolbar click the **Data Generator** button.

Data Generator Window: Asynchronous Tab Controls

Use the controls on the **Asynchronous** tab to generate a customized packet.



Data Generator Window Asynchronous Tab

Item	Description
Packet Type	Selects the type of Asynchronous packet to generate. By selecting RAW PACKET, you can specify the contents of the entire packet in the Payload field, especially useful for custom packets.
Speed	Selects the speed to use to send the packet.
Setup Trigger	Button used to open the Trigger dialog box.

Header box on the Asynchronous tab

Item	Description
Dest ID	Specify the Destination ID of the packet.
Source ID	Specify the Source ID of the packet.
Dest Offset Low	Specify the contents of the packet's destination Memory Address Low field.
Dest Offset Hi	Specify the contents of the packet's destination Memory Address Hi field.
Data Length	Specify the contents of the packet's data Length field. If grayed out, the specified packet type has a fixed data length.
Header CRC	Use this field to enter your own value for the Header CRC. Using this feature requires that the adjacent Manual Overwrite check box is selected. If this field is grayed out (that is, if the Manual Overwrite check box is not selected), the VK9000 uses the correct CRC value.
Tlabel	Specify the Transaction Label.
Retry	Specify the Retry Code.
Tcode	Specify Transaction Code.
Pri	Specify Priority.
Resp Code	Response Code. Used in Response packets.
Ext Tcode	Extended Tcode.
Manual Overwrite check box	Select to enter your own Header CRC value in the adjacent Header CRC field.

Payload box on the Asynchronous tab

Item	Description
Payload	Use this field to enter the packet's payload. If the packet type implies a fixed data length, then enter the appropriate number of bytes. **Note: Enter an even number of characters (that is, complete bytes). If an odd number of characters is entered, the extra half byte is ignored.**
CRC	Use this field to enter your own value for the Payload CRC if the adjacent Manual Overwrite check box is selected. If this field is grayed out (that is, if the Manual Overwrite check box is selected), the VK9000 will use the correct CRC value.
Overwrite check box	Select to enter your own CRC value in the adjacent CRC field.

Operation box on the Asynchronous tab

Item	Description
Packet Name	Save the specified packet to a file for reuse. You can also reuse a packet saved to a file by clicking the Browse button.
Repeat	Use this field to send a specified packet more than once. Specify the number of times the packet is sent.
Delay	Specify the delay in milliseconds between the repeat sending of a packet.
Send/Capture	Send the specified packet and then enter capture mode.
Send	Send the specified packet. The Data Generator window remains open.

Asy Packet Sequence box

Item	Description
Build	Use this button to create a sequence of packets. Packets saved to a file are used to build the sequence. The Asynchronous Sequence Editor appears.
Sequence Name	Name of the sequence to send.
Browse	Load a previously saved sequence.
Delay	Specify delay in milliseconds between each repeated sequence.
Repeat	Specify the number of times the sequence is repeated. The default setting value is 1.
Send/Capture	Send the specified sequence of packets and enter capture mode.
Send	Send the specified sequence of packets. The Data Generator window remains open to specify and send, if needed, additional packets.

Asynchronous Editor Window

Item	Description
Sequence Name	Enter a new sequence name or click the Browse button to select a previously saved to a file sequence.
Current Directory	Displays the current directory in which files are stored.
List of Asy Packets	Box used to list the various packets in a Current Directory along with displaying individual packet characteristics like Destination ID and Transaction Code.
Sequence	Box used to create a new sequence by first viewing desired packets in the List of Asy Packets and clicking the left arrow to the move the packet into the Sequence box.
Delay	Enter a value for a delay in sending each packet.
Browse	Click to navigate to find a previously created packet sequence.
Refresh	Click to display the most current packets in the selected directory.
OK	Click OK to close the window and return to the Data Generator window.
Cancel	Click to return to the Data Generator window without making any changes.
Save	Click to save to a file the selected changes made in the Asy Sequence Editor window.

Generating Asynchronous Packets

To build and send a basic Asynchronous packet

1. On the **Generator** menu select the **Data Generator** command.
2. On the **Asynchronous** tab of the **Data Generator** window select the type of packet to build from the **Packet Type** list.
3. Select from the **Speed** list the packet speed. For speeds greater than 100 Mbps, check the **Topology Map** to insure that the speed is supported along the entire path between the VK9000 and the destination nodes.
4. In the **Header box**, enter the Destination ID. Depending upon the packet type, enter, as needed, values for the other fields in the **Header** box.
5. If the packet type includes a payload, enter it in the **Payload** field.
6. On the **Operation** box click the **Send** button. The **Data Generator** window remains open.
7. As needed, build and send other packets.

To build and send an Asynchronous packet containing a payload

1. From the **Packet Type** list on the **Asynchronous** tab select the packet type that contains a payload such as Read Quadlet Response, Write Quadlet Request, Read Block Response, Write Block Request, etc.
2. From the **Speed** list select a packet speed. For speeds greater than 100 Mbps, check the **Topology Map** to insure that the speed is supported along the entire path between the VK9000 and the destination nodes.
3. In the **Header** box, specify the Destination ID and Destination Offset Low. Depending upon the packet type, enter, as needed, values for the other fields in the **Header** box.
4. In the **Payload** field enter a packet payload. Enter the payload in hexadecimal. The **Data Length** field in the **Header** section is updated automatically.
5. On the **Operation** box, click the **Send** or **Send/Capture** buttons.

To build and send an Asynchronous packet and simultaneously capture bus traffic

1. On the **Generator** menu select the **Data Generator** command.
2. On the **Asynchronous** tab of the **Data Generator** window select the type of packet to build from the **Packet Type** list.
3. From the **Speed** list select the packet speed. For speeds greater than 100 Mbps, check the **Topology Map** to insure that the speed is supported along the entire path between the VK9000 and the destination nodes.
4. In the **Header box**, enter the **Destination ID**. depending upon the packet type, enter, as needed, values for the other fields in the **Header** box.
5. If the packet type includes a payload, enter it in the **Payload** field.
6. Click the **Setup Trigger** button to set any desired trigger conditions. For more information on Trigger conditions, refer to the section, Capturing Packets.
7. On the **Operation** box click the **Send/Capture** button. The **Data Generator** window closes and the **Capturing Data** dialog box appears. data capture stops when the capture buffer is full, the trigger condition is met, or the **Stop** button is clicked.

To build and send an Asynchronous packet containing an incorrect Header CRC or Payload CRC

1. Build an Asynchronous packet.
2. On the **Asynchronous** tab in the **Header** box, select **Manual Overwrite**.
3. In the **Header CRC** field enter an incorrect CRC value.
4. Option: to also include an incorrect payload CRC in the **Payload** box, select **Overwrite**; in the **CRC** field enter an incorrect CRC value.
5. On the **Operation** box click the **Send** or **Send/Capture** buttons.

To build an Asynchronous packet and save to a file for later use

1. Build an Asynchronous packet.
2. In the **Packet Name** field in the **Operation** box, enter a file name for the packet.
3. Click **Save**.

To send an Asynchronous packet currently residing in the Event List

1. Scroll through the **Event List** window and double-click a packet on the **Event List**. The **Data Explorer** window appears.
2. On the **Data Explorer** window click the **Save Packet** button. The **Save As** dialog box appears.
3. In the **File name** field enter a file name for the packet and click **Save**.
4. On the **Data Explorer** window click **Close**. The **Data Explorer** window closes.
5. From the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
6. On the **Data Generator** window select the **Asynchronous** tab.
7. In the **Operation** box click the **Browse** button. The **Open** dialog box appears.
8. On the **Open** dialog box select a packet and click **Open**. The packet information appears in the **Data Generator** window.
9. Option: use the controls on the **Data Generator** window to modify the packet.
10. On the **Operation** box click the **Send** or **Send/Capture** buttons.

To load and send an Asynchronous packet saved to a file

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. On the **Data Generator** window select the **Asynchronous** tab.
3. In the **Operation** box click the **Browse** button. The **Open** dialog box appears.
4. On the **Open** dialog box select a packet and click **Open**. The packet information appears in the **Data Generator** window.
5. Option: use the controls on the **Data Generator** window to modify the packet.
6. On the **Operation** box click the **Send** or **Send/Capture** buttons.

To build an Asynchronous packet and send it multiple times

Note

The Asynchronous Repeat option will send between 1-999 packets continuously and as fast as possible.

1. Build an Asynchronous packet.
2. In the **Repeat** field on the **Operation** box, enter the number of times to send the packet.
3. Option: in the **Delay** field on the **Operation** box enter the length of delay between each packet transmission.
4. On the **Operation** box click the **Send** or **Send/Capture** buttons.

To specify the entire contents of an Asynchronous packet in hexadecimal

1. On the **Packet Type** list on the **Data Generator** window select **RAW PACKET**. The name of the **Payload** box changes to **Raw Data**.
2. In the **Raw Data** field enter the packet contents in hexadecimal.
3. On the **Operation** box click the **Send** or **Send/Capture** buttons.

Sending Sequences of Asynchronous Packets

Use the **Asynchronous Sequence Editor** dialog box, which is accessed from the **Data Generator** window, to create a sequence of packets saved to a file(s) that are sent together.

To build and send a sequence of Asynchronous packets

1. Build an Asynchronous packet.
2. In the **Packet Name** field in the **Operation** box, enter a file name for the packet.
3. Click **Save**.
4. Repeat Steps 1 – 3 as needed.
5. Click the **Build** button in the **Asy Packet Sequence** section of the **Data Generator** window. The **Asynchronous Sequence Editor** dialog box appears. The left window contains a list of all Asynchronous packets saved to a file in the default folder.
6. Option: use the **Browse** button to search other folders.
7. To add a packet to the sequence, select it in the left list and click the **>>** button.
8. To remove a packet from the sequence, select it in the right list and click the **<<** button.
9. To save the sequence for later re-use, enter a name in the **Sequence Name** field, and click **Save**.
10. Click **OK**. The **Asynchronous Sequence Editor** dialog box closes.
11. On the **Asy Packet Sequence** box of the **Data Generator** window click the **Send** or **Send/Capture** button.

To load and send a sequence of Asynchronous packets saved to a file(s)

1. On the **Asy Packet Sequence** box of the Data Generator window click the **Browse** button. The **Open** dialog box appears.
2. On the **Open** dialog box, select the packet sequence and click **Open**.
3. On the **Operation** box click **Send** or **Send/Capture** buttons.

6.3 Isochronous Packet Generation

Isochronous Packet Generation Overview

Using the controls on this tab, you can:

- Build an Isochronous packet with a user-defined payload with the CRC and Data Length fields automatically updated
- Build an Isochronous packet containing a random pattern payload
- Send an Isochronous packet using any valid channel number
- Build a packet and save it for later use
- Send an Asynchronous packet (built using the controls on the Asynchronous tab) along with each transmission of an Isochronous packet
- Build, send, and simultaneously capture an Isochronous packet or a sequence of Isochronous packets

To open the data Generator window and select the Isochronous tab

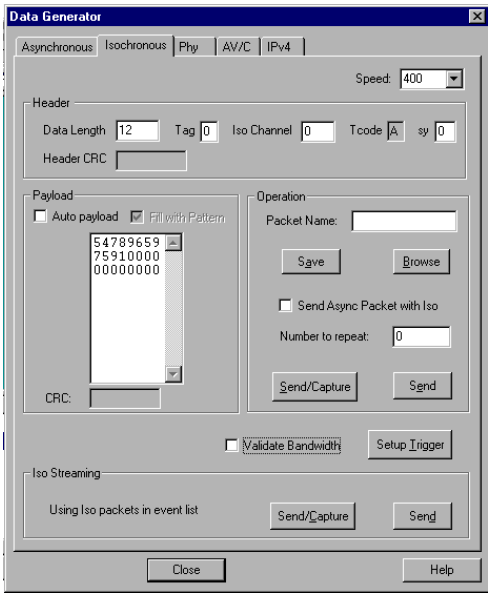
1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. On the **Data Generator** window click the **Isochronous** tab.

Tip

On the toolbar click the **Data Generator** button.

Data Generator Window: Isochronous Tab Controls

Use the controls on the Isochronous tab to generate a customized packet.



Data Generator Window Isochronous Tab

Item	Description
Speed	Select the speed to be used to send the packet.
Validate Bandwidth check box	Use to insure that bandwidth is available (by interacting with the Isochronous Resource Manager) before sending the packet.
Setup Trigger	Display the Trigger window to select trigger conditions. This is the same window displayed when selecting New Capture from the Trigger menu.

Header Box

Item	Description
Data Length	Specify the contents of the Data Length field in the packet.
Tag	Data Format Tag.
Iso Channel	Specifies the logical channel.
Tcode	Transaction Code (0 x A).
sy	Synchronization Code (application specific).
Header CRC	Use this field to enter your own value for the Header CRC if the adjacent Overwrite check box is checked. If this field is grayed out (that is, if the Overwrite box is not selected), the VK9000 uses the correct CRC value.

Payload Box

Item	Description
Payload field	Use this field to enter the packet's payload. If the packet type implies a fixed data length, then the appropriate number of bytes must be entered. **Note: enter an even number of characters (that is, complete bytes). If an odd number of characters is entered, the extra half byte is ignored.**
Auto Payload	Use to create randomly generated data to fill the packet's payload.
Fill with Pattern	Use to ignore the data in the Payload box and instead fill the packet with a data pattern.
CRC	Use this field to enter your own value for the Payload CRC if the adjacent Overwrite check box is selected. If this field is grayed out (that is, if the Overwrite box is not selected), the VK9000 uses the correct CRC value.

Operation Box

Item	Description
Packet Name	Save the specified packet to a file by entering a name and clicking the Save button. You can also open a saved packet by clicking the Browse button.
Save	Click to save.
Browse	Use to select an Isochronous packet saved to a file.
Send Asynch Packet with Iso	Send one Asynchronous packet during each cycle.
Send/Capture	Send the specified packet and enter capture mode.
Send	Send the specified packet. The Data Generator window remains open to specify and send additional packets.

Iso Streaming box

Item	Description
Send/Capture	Send all Isochronous packets in the Event List and enter capture mode. The packets are sent continuously. To stop Iso Streaming, select Stop Iso Streaming from the Generator menu, or click the Stop Iso Streaming button on the toolbar.
Send	Send all Isochronous packets in the Event List. The packets are sent continuously. The Data Generator window remains open to specify and send additional packets. To stop Iso Streaming, select Stop Iso Streaming from the Generator menu, or click the Stop Iso Streaming button on the toolbar.

Generating Isochronous Packets

To build and send an Isochronous packet containing user-supplied data as the payload

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears. Select the **Isochronous** tab.
2. From the **Speed** list select a packet speed. For speeds greater than 100 Mbps, check the **Topology Map** to insure that the speed is supported along the entire path between the VK9000 and the destination nodes.
3. On the **Header** box, enter the **Iso Channel** and enter the desired length in the **Data Length** field. As necessary, enter values for the other fields in the **Header** box.
4. On the **Payload** box clear the **Auto payload** check box.
5. In the **Payload** field enter a hexadecimal packet payload.
6. Option: on the **Isochronous** tab select the **Validate Bandwidth** check box (the VK9000 validates available bandwidth with the Isochronous Resource Manager before sending the packet).
7. On the **Operation** box click **Send**. The **Data Generator** window remains open to build and send additional packets.

To build and send an Isochronous packet containing random data as the payload

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears. Select the **Isochronous** tab.
2. From the **Speed** list select a packet speed. For speeds greater than 100 Mbps, check the **Topology Map** to insure that the speed is supported along the entire path between the VK9000 and the destination nodes.
3. On the **Header** box, enter the **Iso Channel** and enter the desired length in the **Data Length** field. As necessary, enter values for the other fields in the Header box.
4. On the **Payload** box select the **Auto payload** check box.
5. Option: On the **Isochronous** tab select the **Validate Bandwidth** check box (the VK9000 validates available bandwidth with the Isochronous Resource Manager before sending the packet).
6. On the **Operation** box click **Send**. The **Data Generator** window remains open to build and send additional packets.

To build and send an Isochronous packet containing a pattern as the payload

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears. Select the Isochronous tab.
2. From the **Speed** list select a packet speed. For speeds greater than 100 Mbps, check the **Topology Map** to insure that the speed is supported along the entire path between the VK9000 and the destination nodes.
3. On the **Header** box enter the **Iso Channel** and enter the desired length in the **Data Length** field. As necessary, enter values for the other fields in the **Header** box.
4. On the **Payload** box select the **Auto payload** check box and select the **Fill with Pattern** check box.
5. Option: on the **Isochronous** tab select the **Validate Bandwidth** check box (the VK9000 communicates with the Isochronous Resource Manager before sending the packet).
6. In the **Operation** box click **Send**. The **Data Generator** window remains open to build and send additional packets.

To build and send an Isochronous packet and simultaneously capture bus traffic

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears. Select the Isochronous tab.
2. From the **Speed** list select a packet speed. For speeds greater than 100 Mbps, check the **Topology Map** to insure that the speed is supported along the entire path between the VK9000 and the destination nodes.
3. On the **Header** box, enter the **Iso Channel** and enter the desired length in the **Data Length** field. As necessary, enter values for the other fields in the **Header** box.
4. On the **Payload** box select the **Auto payload** check box. Option: in the **Payload** box select the **Fill with Pattern** check box.
5. Option: on the **Isochronous** tab select the **Validate Bandwidth** check box (the VK9000 communicates with the Isochronous Resource Manager before sending the packet).
6. On the **Isochronous** tab click the **Setup Trigger** button. The **Trigger** window appears.
7. As needed, set trigger conditions and click **OK**. The **Trigger** window closes and the **Data Generator** window appears. For more information on setting trigger conditions, refer to the section, Capturing Packets.
8. On the **Operation** box on the **Isochronous** tab click **Send/Capture**. The **Data Generator** window closes and the **Capturing data** dialog box appears. The Capturing Data dialog box remains open until the capture buffer is full, the trigger condition is met or the **Stop** button is clicked.

To build an Isochronous packet and save to a file for later use

1. Build an Isochronous packet.
2. In the **Packet Name** field on the **Operation** box, enter a file name for the packet.
3. Click **Save**.

To send one Isochronous packet currently residing in the Event List

1. Scroll through the **Event List** window and double-click an Isochronous packet on the **Event List**. The **Data Explorer** window appears.
2. On the **Data Explorer** window click the **Save Packet** button. The **Save As** dialog box appears.
3. In the **File name** field enter a file name for the packet and click **Save**.
4. On the **Data Explorer** window click **Close**. The **Data Explorer** window closes.
5. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
6. On the **Data Generator** window select the **Isochronous** tab.
7. On the **Operation** box click the **Browse** button. The **Open** dialog box appears.
8. On the **Open** dialog box select a packet and click **Open**. The packet information appears in the **Data Generator** window.
9. Option: use the controls in the **Data Generator** window to modify the packet.
10. On the **Operation** box click the **Send** or **Send/Capture** buttons.

To send all Isochronous packets in the Event List

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears. Select the **Isochronous** tab.
2. From the **Speed** list select a packet speed. For speeds greater than 100 Mbps, check the **Topology Map** to insure that the speed is supported along the entire path between the VK9000 and the destination nodes.
3. To send the packets using a different Isochronous channel, enter a channel in the **Iso Channel** field.
4. In the **Iso Streaming** box click the **Send** or **Send Capture** buttons. The Isochronous packets in the **Event List** window are repeatedly transmitted.
5. To stop Iso Streaming, from the **Generator** menu select the **Stop Iso Generation** command.

Tip

- To stop Iso Streaming, on the toolbar click the **Stop Iso Generation** button.

To load and send an Isochronous packet saved to a file

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. On the **Data Generator** window select the **Isochronous** tab.
3. In the **Operation** box click the **Browse** button. The **Open** dialog box appears.
4. On the **Open** dialog box select a packet and click **Open**. The packet information appears in the **Data Generator** window.
5. Option: use the controls in the **Data Generator** window to modify the packet.
6. In the **Operation** box click the **Send** or **Send/Capture** buttons.

To send one Asynchronous packet with each Isochronous packet

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. Click the **Asynchronous** tab and build an Asynchronous packet. Do not click **Send** or **Send/Capture**.
3. Click the **Isochronous** tab and build an Isochronous packet.
4. On the **Operation** box on the **Isochronous** tab select the **Send Asynch Streaming** check box.
5. On the **Operation** box click the **Send** or **Send/Capture** buttons.

Note

Please off the software keyboard before Isochronous packet generate.

6.4 PHY Packet Generation

PHY Packet Generation Overview

Using the controls on this tab, you can:

- Build and send PHY packets including Self ID, Link On, Configuration, Ping, Remote Access, Remote Reply, Remote Command, Remote Confirmation, and Resume
- Change the Gap Count of all nodes on the bus
- Build a PHY packet and save it for later use
- Create (and optionally save for later use) a sequence of saved packets

To open the data Generator window and select the PHY tab

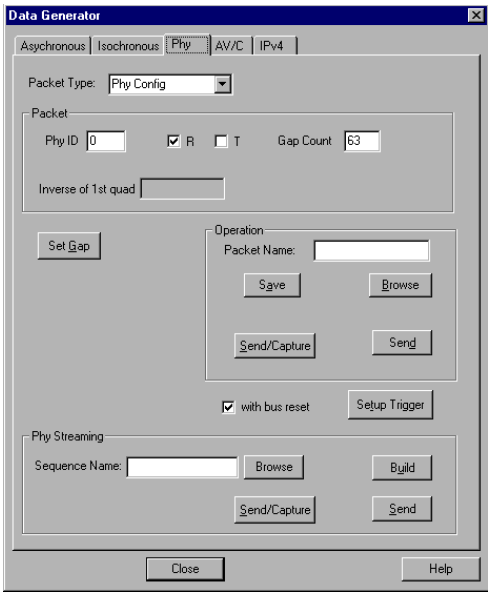
1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. On the **Data Generator** window click the **PHY** tab.

Tip

- On the toolbar, click the **Data Generator** button.

Data Generator Window: PHY Tab Controls

Use the controls on the **PHY** tab to generate a customized packet.



Data Generator PHY Tab

Item	Description
Packet Type	Specify the type of packet to be generated.
Set Gap	Set the gap count for the data Generator nodes to the specified value and transmit a PHY Config packet with the specified gap count.
With Bus Reset	When checked, a bus reset precedes each PHY packet sent.
Setup Trigger	Display the Trigger window to specify trigger conditions. This is the same window displayed when selecting New Capture from the Trigger menu.

Packet box

Item	Description
Phy ID	Specify the PHY ID (node) of the packet.
R check box	If selected, the node specified by PHY ID will set its Force Root bit. (In case of Phy config)
T check box	If selected, all nodes will set their gap count to the value specified in Gap Count. (In case of Phy config)
Gap Count	Gap Count. (In case of Phy config)
Inverse of 1st quad	Reserved for future use.
Type field	Displays the packet type value. (In case of Remote Access, Remote Command)
Page field	Enter a Page value. (In case of Remote Acess)
Port field	Enter a Port value. (In case of Remote Access, Remote Command)
Reg field	Enter a Reg value. (In case of Remote Access)
Command list	Select a command to send to a particular node. (In case of Remote Command)

Operation box

Item	Description
Packet Name	Save the specified packet for future use by providing a name and clicking the Save button. Re-use a packet saved to a file by clicking the Browse button. For more information refer to the Saving Captured Packets section.
Save	Click to save.
Browse	Click to browse for a packet.
Send/Capture	Send the specified packet and enter capture mode.
Send	Send the specified packet. The Data Generator dialog remains open to specify and send additional packets.

PHY Streaming box

Item	Description
Build	Use this button to open the PHY Sequence Editor and then create a sequence of saved packets that are then sent together.
Sequence Name	Name of the sequence to send.
Send/Capture	Send the specified sequence of packets and enter capture mode.
Send	Send the specified packet. The Data Generator dialog remains open to specify and send additional packets.
Browse	Click to browse for a packet.

Generating PHY Packets

To build and send PHY packet

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. Click the **PHY** tab of the **Data Generator** window.
3. From the **Packet Type** list select the type of packet to build.
4. In the **PHY ID** field in the **Packet** box enter a source Id.
5. Option: in the **Packet** box select other values as needed.
6. Option: to precede a PHY packet with a bus reset, select the **with bus reset** check box.
7. On the **Operation** box click the **Send** button. The **Data Generator** window remains open.

To build and send a PHY packet and simultaneously capture bus traffic

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. Click the **PHY** tab of the **Data Generator** window.
3. From the **Packet Type** list select the type of packet to build.
4. On the **Packet** box in the **PHY ID** field enter a Source ID.
5. Option: in the **Packet** box select other values as needed.
6. Option: to precede a PHY packet with a bus reset, select the **with bus reset** check box.
7. On the **PHY** tab click the **Setup Trigger** button. The **Trigger** window appears.
8. As needed, set trigger conditions and click **OK**. The **Trigger** window closes and the **Data Generator** window appears. For more information on setting trigger conditions, refer to the section, Capturing Packets.
9. In the **Operation** box click the **Send/Capture** button.

To build a PHY packet and save to a file for later use

1. Build a PHY packet.
2. In the **Packet Name** field on the **Operation** box, enter a file name for the packet.
3. Click **Save**.

To send a PHY packet currently residing in the Event List

1. Scroll through the **Event List** window and double-click a PHY packet on the **Event List**. The **Data Explorer** window appears.
2. On the **Data Explorer** window click the **Save Packet** button. The **Save As** dialog box appears.
3. In the **File name** field enter a file name for the packet and click **Save**.
4. On the **Data Explorer** window click **Close**. The **Data Explorer** window closes.
5. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
6. On the **Data Generator** window click the **PHY** tab.
7. In the **Operation** box click the **Browse** button. The **Open** dialog box appears.
8. On the **Open** dialog box select a packet and click **Open**. The packet information appears in the **Data Generator** window.
9. Option: use the controls in the **Data Generator** window to modify the packet.
10. On the **Operation** box click the **Send** or **Send/Capture** buttons.

To load and send a PHY packet saved to a file

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. On the **Data Generator** window click the **PHY** tab.
3. In the **Operation** box click the **Browse** button. The **Open** dialog box appears.
4. On the **Open** dialog box select a packet and click **Open**. The packet information appears in the **Data Generator** window.
5. Option: use the controls in the **Data Generator** window to modify the packet.
6. In the **Operation** box click the **Send** or **Send/Capture** buttons.

Sending Sequences of PHY Packets

Sending Sequences of PHY Packets Overview

Use the controls on the **PHY Sequence Editor** to select saved PHY packets and then create a sequence of PHY packets that are sent together.

To build and send a sequence of PHY packets

1. Build a PHY packet.
2. In the **Packet Name** field on the **Operation** box, enter a file name for the packet.
3. Click **Save**.
4. Repeat Steps 1 – 3 as needed.
5. Click the **Build** button in the **PHY Streaming** box of the **Data Generator** window. The **PHY Sequence Editor** dialog box appears. The left window contains a list of all Asynchronous packets saved to a file residing in the default folder.
6. Option: use the **Browse** button to search other folders.
7. To add a packet to the sequence, select it in the left list and click the **>>** button.
8. To remove a packet from the sequence, select it in the right list and click the **<<** button.
9. To save the sequence for later re-use, enter a name in the **Sequence Name** field, and click **Save**.
10. Click **OK**. The **PHY Sequence Editor** dialog box closes.
11. In the **PHY Streaming** section of the **Data Generator** window click the **Send** or **Send/Capture** button.

To load and send a sequence of PHY packets saved to a file(s)

1. On the **PHY Packet Sequence** box of the **Data Generator** window click the **Browse** button. The **Open** dialog box appears.
2. On the **Open** dialog box, select the packet sequence and click **Open**.
3. On the **Operation** box click **Send** or **Send/Capture** buttons.

6.5 AV/C Packet Generation

Overview

To open the Data Generator window and select the AV/C tab

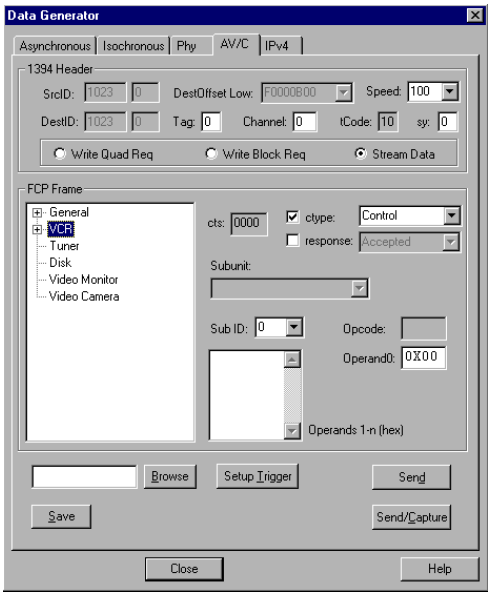
1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. On the **Data Generator** window click the **AV/C** tab.

Tip

- On the toolbar, click the **Data Generator** button.

Data Generator Window: AV/C Tab Controls

Use the controls on the AV/C tab to customize AV/C packet generation.



Data Generator Window AV/C Tab

1394 Header box

Item	Description
SrcID	Enter a source ID.
DestID	Enter a destination ID.
DestOffset Low	Select a destination offset address for the packet.
Write Quad Req	Select to generate a write quadlet request packet.
Write Block Req	Select to generate a write block request packet.
Stream Data	Select to generate a stream packet.

FCP Frame box

Item	Description
FCP Frame list	Select an AV/C unit or subunit.
cts	Displays the cts value (0 is the default value).
ctype check box and ctype list	Select from the list a ctype.
response check box and response list	Select from the list a response code.
Subunit list	Select from the list a Subunit.
Sub ID list	Select a Subunit ID value (0-7).
Opcode field	Enter an Opcode value in hexadecimal. (ex: 0X1F)
Operand0 field	Enter an Operand value in hexadecimal. (ex: 0X3C)
Operand 1-n box	Enter an Operand 1-n value in hexadecimal. (ex: 00002345)
Save	Click to save.
Browse	Click to browse for a packet.
Send/Capture	Send the specified packet and enter capture mode.
Send	Send the specified packet. The Data Generator dialog remains open to specify and send additional packets.
Setup Trigger	Display the Trigger window to select trigger conditions. This is the same window displayed when selecting New Capture from the Trigger menu.

Generating AV/C Packets

To build and send an AV/C packet

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. Click the **AV/C** tab of the **Data Generator** window.
3. Option: on the **1934 Header** box on the **AV/C** tab enter a value in the **Dest ID** field.
4. Option: from the **DestOffset** list select a destination offset.
5. Select either the **Write Quad Req** or **Write Block Req** option buttons.
6. From the **ctype** list select an option.
7. On the **FCP Frame** box on the **AV/C** tab from the **FCP** list select an AV/C unit or subunit.
8. Enter in the **Sub ID** field a value.
9. In the **Opcode** field enter a hexadecimal value.
10. Enter hexadecimal values in the **Operand-1** and **Operand-n** fields.
11. Click **Send**. The **Data Generator** window remains open.

To build and send an 1394 AV/C packet and simultaneously capture bus traffic

1. From the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. Click the **AV/C** tab on the **Data Generator** window.
3. Option: on the **1934 Header** box on the **AV/C** tab enter a value in the **DestId** field.
4. Option: from the **DestOffset** list select a destination offset.
5. Select either the **Write Quad Req** or **Write Block Req** option buttons.
6. From the **ctype** list select an option.
7. On the **FCP Frame** box on the **AV/C** tab from the **FCP** list select an AV/Cm unit or subunit.
8. Enter in the **Sub ID** field a value.
9. In the **Opcode** field enter a hexadecimal value.
10. Enter hexadecimal values in the **Operand-1** and **Operand-n** fields.
11. On the **AV/C** tab click the **Setup Trigger** button. The **Trigger** window appears.
12. As needed, set trigger conditions and click **OK**. The **Trigger** window closes and the **Data Generator** window appears. For more information on setting trigger conditions, refer to the section, Capturing Packets.
13. In the **Operation** box click the **Send/Capture** button.

To build an AV/C packet and save to a file for later use

1. Build an AV/C packet.
2. In the **Packet Name** field enter a file name for the packet.
3. Click **Save**.

To load and send an AV/C packet saved to a file

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. On the **Data Generator** window click the **AV/C** tab.
3. On the **AV/C** tab click the **Browse** button. The **Open** dialog box appears.
4. On the **Open** dialog box select a packet and click **Open**. The packet information appears in the **Data Generator** window.
5. Option: use the controls on the **Data Generator** window to modify the packet.
6. In the **Operation** box click the **Send** or **Send/Capture** buttons.

6.6 IPv.4 Packet Generation Overview

Overview

To open the Data Generator window and select the IPv.4 tab

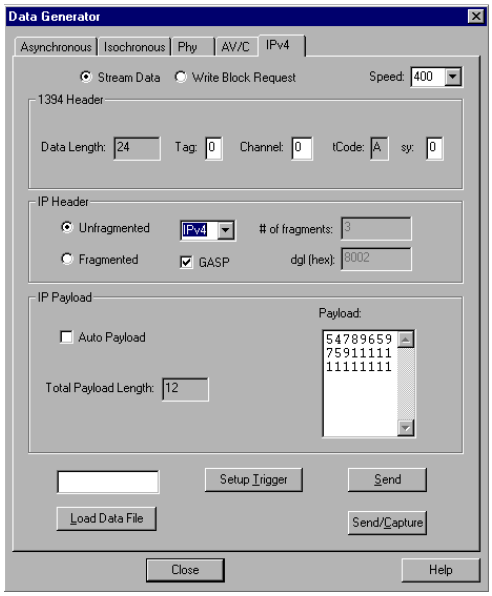
1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. On the **Data Generator** window click the **IPv4** tab.

Tip

- On the toolbar, click the **Data Generator** button.

Data Generator Window: IPv4 Tab Controls

Use the controls on the IP tab to customize IP packet generation.



Data Generator Window IPv.4 Tab

Item	Description
Stream Data radio button	Select to create a stream data packet.
Write Block Request radio button	Select to create a Write Block Request packet.
Load Data File button	Click to load a data packet saved to a file.
Setup Trigger button	Click to open the Trigger window.
Send button	Click to send a packet without closing the Data Generator window.
Send/Capture button	Click to generate and capture a packet.

1394 Header box

Item	Description
Data Length field	Displays payload data length.
Tag field	Enter Tag data information.
Channel field	Enter Channel data information.
tCode Field	Displays TCode information.
sy field	Enter a Sync value.
Dest Offset Low field	Enter a Destination Offset value.
SrcID field	Displays Source ID information.
DestID field	Enter Destination ID data.

By the Contents specified with IP Header box, it changes box which able to input.

IP Header box

Item	Description
Unfragmented radio button	Select to create an unfragmented IP packet.
Fragmented radio button	Select to create a fragmented IP packet.
IP Packet list	Select a packet type.
# of fragments field	Specify the number of fragments for a packet.
dgl field	Specify the dgl value for a packet.

These items under box menu are changed by the IP Header box selection.

IP Payload box

Item	Description
Auto Payload check box	Select to include an automatically generated payload value.
Payload Length field	Displays the payload length.
IP Payload Display box	Enter a payload value for the IP packet.

ARP box

Item	Description
Opcode list	Select an opcode for an ARP packet.
Sender_unicast_FIFO box	Enter a sender_unicast_FIFO value for an ARP packet.
Sender_IP_addr field	Enter a sender_IP_addr value for an ARP packet.
Target_IP_addr field	Enter a target_IP_addr value for an ARP packet.

MCAP box

Item	Description
Opcode list	Select an opcode for an MCAP packet.
Payload Length field	Displays the payload length for an MCAP packet.
IP Payload Display box	Enter a payload value for an MCAP packet.

Generating IP Packets

To build and send an IP packet

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. Click the **IPv4** tab of the **Data Generator** window.
3. Select the **Stream Data** radio button or the **Write Block Request** radio button.
4. On the **1394 Header** box enter or select data in needed fields.
5. On the **IP Header** select the **Unfragmented** or **Fragmented** radio button.
6. If **Unfragmented** was selected in step 5, on the **IP Header** box select **IPv4** from the list.
7. If **Fragmented** was selected, enter data in the **# of fragments** field and **dgl** field.
8. Option: on the **IP Payload** box select the **Auto Payload** check box.
9. Option: on the **IP Payload** box enter an **IP** payload.
10. Click the **Send** button. The **Data Generator** window remains open.

To build and send an IP packet and simultaneously capture bus traffic

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. Click the **IPv4** tab of the **Data Generator** window.
3. Select the **Stream Data** radio button or the **Write Block Request** radio button.
4. On the **1394 Header** box enter or select data in needed fields.
5. On the **IP Header** select the **Unfragmented** or **Fragmented** radio button.
6. If **Unfragmented** was selected in step 5 select on the **IP Header** box select **IPv4** from the list.
7. If **Fragmented** was selected, enter data in the **# of fragments** field and **dgl** field.
8. Option: on the **IP Payload** box select the **Auto Payload** check box.
9. Option: on the **IP Payload** box enter an **IP** payload.
10. On the **IPv4** tab click the **Setup Trigger** button. The **Trigger** window appears.
11. As needed, set trigger conditions and click **OK**. The **Trigger** window closes and the **Data Generator** window appears. For more information on setting trigger conditions, refer to the section, Capturing Packets.
12. Click the **Send/Capture** button. Data generation and capturing begins.

To build and send an ARP packet

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. Click the **IPv4** tab of the **Data Generator** window.
3. Select the **Stream Data** radio button or the **Write Block Request** radio button.
4. On the **1394 Header** box enter or select data in needed fields.
5. On the **IP Header** select the **Unfragmented** radio button.
6. On the **IP Header** box select **ARP** from the list.
7. On the **ARP** box select an option from the **Opcode** list and enter values in the Sender_unicast_FIFO, Sender_IP_addr, and Target_IP_addr fields.
8. Click the **Send** button. The **Data Generator** window remains open.

To build and send an ARP packet and simultaneously capture bus traffic

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. Click the **IPv4** tab of the **Data Generator** window.
3. Select the **Stream Data** radio button or the **Write Block Request** radio button.
4. On the **1394 Header** box enter or select data in needed fields.
5. On the **IP Header** select the **Unfragmented** radio button.
6. On the **IP Header** box select **ARP** from the list.
7. On the **ARP** box select an option from the **Opcode** list and enter values in the **Sender_unicast_FIFO**, **Sender_IP_addr**, and **Target_IP_addr** fields.
8. On the **IPv4** tab click the **Setup Trigger** button. The **Trigger** window appears.
9. As needed, set trigger conditions and click **OK**. The **Trigger** window closes and the **Data Generator** window appears. For more information on setting trigger conditions, refer to the section, Capturing Packets.
10. Click the **Send/Capture** button. Data generation and capturing begins.

To build and send an MCAP packet

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. Click the **IPv4** tab of the **Data Generator** window.
3. Select the **Stream Data** radio button.
4. On the **1394 Header** box enter or select data in needed fields.
5. On the **IP Header** select the **Unfragmented** radio button.
6. On the **IP Header** box select **MCAP** from the list.
7. On the **MCAP** box select an option from the **Opcode** list.
8. Option: on the **IP Payload** box enter a payload.
9. Click the **Send** button. The **Data Generator** window remains open.

To build and send an MCAP packet and simultaneously capture bus traffic

1. On the **Generator** menu select the **Data Generator** command. The **Data Generator** window appears.
2. Click the **IPv4** tab of the **Data Generator** window.
3. Select the **Stream Data** radio button.
4. On the **1394 Header** box enter or select data in needed fields.
5. On the **IP Header** select the **Unfragmented** radio button.
6. On the **IP Header** box select **MCAP** from the list.
7. On the **MCAP** box select an option from the **Opcode** list.
8. Option: on the **IP Payload** box enter a payload.
9. On the **IPv4** tab click the **Setup Trigger** button. The **Trigger** window appears.
10. As needed, set trigger conditions and click **OK**. The **Trigger** window closes and the **Data Generator** window appears. For more information on setting trigger conditions, refer to the section, Capturing Packets.
11. Click the **Send/Capture** button. Data generation and capturing begins.

7.1 Custom Protocol Plug-In Procedures Overview (Optional)

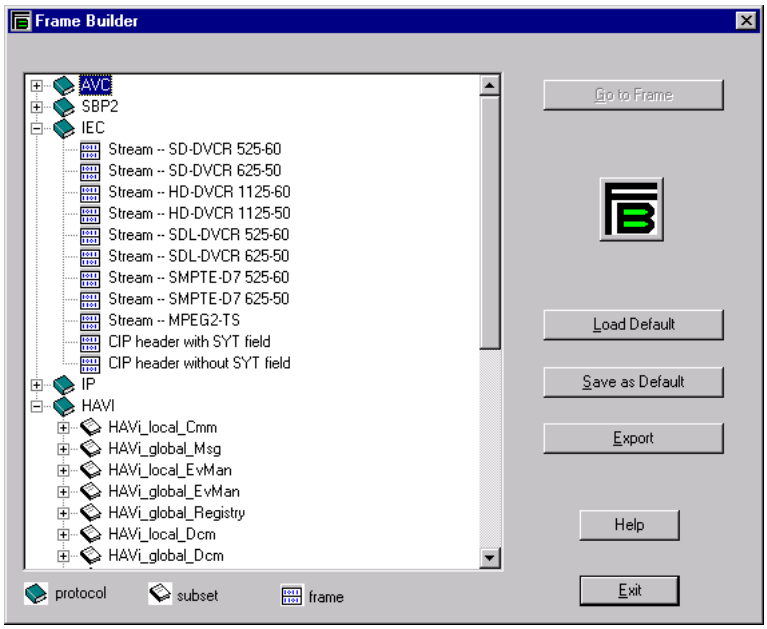
The Custom Protocol Plug-In consists of two elements: the free Frame Builder software which is used to create frame files and protocols and runs on any PC platform and the Custom Protocol Plug-In which takes the data from the Frame Builder and parses it and displays it in the Data Explorer window.

The **Data Explorer** in **Protocols** box displays two lines for loading protocols created in the Frame Builder.

Note

The free Frame Builder is not installed in VK9000 without Customize option order at shipping. Please install Frame Builder from backup CD-ROM when user will get this option separately.

7.2 Frame Builder Procedures Overview



To start the Frame Builder application

- Clicks Start from menu bar and select programs, Frame bilder.

To create a unique protocol containing at least one frame and field

1. In the **Protocol** box on the **Frame Builder** window, right-click and select **Add**. The **Add New** window appears.
2. On the **Add New** window on the **Option** box select the **Protocol** button.
3. In the **Enter** the name field enter a name for the protocol—for best results select a name with four on less characters. If needed, in the **Enter revision field**, enter a revision number or name.
4. Click **OK**.
5. On the **Protocol** box, select the newly created protocol.
6. In the **Protocol** box on the **Frame Builder** window, right-click and select **Add**. The **Add New** window appears.
7. On the **Add New** window on the **Option** box select the **Subset** button.
8. In the **Enter** the name field enter a name for the subset—for best results select a name with four on less characters. If needed, in the **Enter the revision field**, enter a revision number or name.
9. Click **OK**.
10. On the **Protocol** box, double-click the newly created protocol and select the newly created subset.
11. In the **Protocol** box on the **Frame Builder** window, right-click and select **Add**. The **Add New** window appears.
12. On the **Add New** window on the **Option** box select the **Frame** button.
13. In the **Enter the name field** enter a name for the frame—for best results select a name with four on less characters. If needed, in the **Enter the revision field**, enter a revision number or name.
14. Click **OK**.

To add data to a unique protocol containing at least one frame and field

1. On the **Protocol** box, double-click the newly created protocol, double-click the newly created subset, and select the newly created frame file. Click the **Go to Frame** button. The **Frame** window appears.
2. On the **Operation** box, click the **Insert** button.
3. On the **Field name** box enter a name for the field.
4. On the **Field length** box enter a value in bits and if a constant value is desired select the Is constant check box and enter a value in the **Field constant value** box.
5. On the **Display format** box select a display value and click **Apply**. The newly created field appears in the display section of the **Frame** window.
6. If needed define and assign default values to a field by clicking the field in the display section of the **Frame** window and click the **Field** button. The **Field** window appears.
7. On the **Operation** box click the **Add** radio button.
8. On the **Value** box enter a numeric value and on the **Description** box enter a textual description.
9. On the **Input Preference** box click either the **Decimal** or **Hex** button. Click **Apply**.
10. As needed define other field values and when finished click the **Finish** button.

To modify an existing protocol field and save it to a file

1. On the **Protocol** box, double-click the desired protocol, double-click a subset, and select a frame file. Click the **Go to Frame** button. The **Frame** window appears.
2. On the **Operation** box, click the **Edit** button.
3. On the **Field name** box enter a name for the field.
4. On the **Field length** box enter a value in bits and if a constant value is desired, select the **Is constant** check box and enter a value in the **Field constant** value box.
5. On the **Display format** box select a display value and click **Apply**. The newly created field appears in the display section of the **Frame** window.
6. If needed define and assign default values to a field by clicking the field in the display section of the **Frame** window and click the **Field** button. The **Field** window appears.
7. On the **Operation** box click the **Edit** radio button.
8. On the **Value** box enter a numeric value and on the **Description** box enter a textual description.
9. On the **Input Preference** box click either the **Decimal** or **Hex** button. Click **Apply**.
10. As needed define other field values and when finished click the **Finish** button.

To delete protocols, subsets, and frames

1. Select the protocol, subset or frame to delete.
2. Right-click the desired element and select **Delete**.

To export load protocol, frame, and field changes

- On the **Frame Builder** window click the **Export** button.

To save changes/new protocol, frame, and field changes as default

Note

Use this feature carefully. Selecting it will permanently overwrite the factory default settings that shipped with the unit and use instead the user entered data.

1. On the **Frame Builder** window click the **Save as Default** button. The **Frame Builder** dialog box appears.
2. Click **Yes**.

To load default settings that shipped with the software

Note

Use this feature carefully. Selecting it will erase any changes or new information added and reset the factory settings.

1. On the **Frame Builder** window click the **Load Default** button. The **Frame Builder** dialog box appears.
2. Click **Yes**.

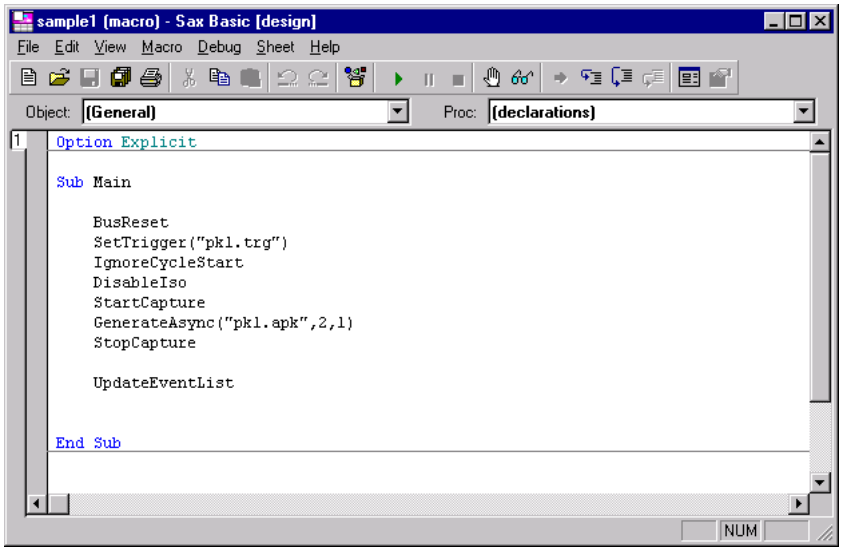
7.3 Scripting API Overview

The purpose of a scripting language is to provide an easy-to-use method for users of a Yokogawa Data Analyzer to set up their own automated test sequences. These scripts run automatically with setting trigger conditions, generating packets, etc.

The system is based on a scripting package from Sax Software Corp. called Sax Basic Engine *Version 5.0*. It provides all the flexibility and versatility of a standard Visual Basic language. Additionally, the VB command set was extended to control the Data Analyzer with intuitive commands defined in the Scripting API.
The Scripting API needed for supporting an effective Scripting Language can be organized in seven different groups.

1. General
2. Data Management
3. Capture
4. Trigger
5. Generate
6. Combined
7. Miscellaneous

Review in detail in the following sections of document for a description of the various API features.



7.4 Scripting API: General

BusReset

Element	Description
Prototype	BusReset
Parameters	none
Description	Generates Bus Reset on Generator, i.e. generates a complete list of SelfIDs from all nodes on the bus
Return Value	none

QueryPort

Element	Description
Prototype	QueryPort (nodeID, portID)
Parameters	nodeID : defines node that shall be queried portID : defines port that shall be queried
Description	Queries individual port for current port status
Return Value	00(binary), 0(decimal) - no info available 01(binary), 1(decimal) - disabled 10(binary), 2(decimal) - suspended 11(binary), 3(decimal) – active

QueryAllPorts

Element	Description
Prototype	QueryAllPorts
Parameters	none
Description	Updates all ports on all nodes for current port status
Return Value	none

UpdateEventList

Element	Description
Prototype	UpdateEventList
Parameters	none
Description	Updates Event List with last packet list
Return Value	none

UpdateTopology

Element	Description
Prototype	UpdateTopology
Parameters	none
Description	Updates Topology with current Topology, no BusReset is generated in order to capture SelfIDs
Return Value	none

7.5 Scripting API: Data Management

SavePacket

Element	Description
Prototype	SavePacket (“filename.*”)
Parameters	filename.* : specifies filename for packet save
Description	Saves active packet
Return Value	TRUE if successful FALSE if failed

SaveCapture

Element	Description
Prototype	SaveCapture (“filename.*”)
Parameters	filename.* : specifies filename for capture save
Description	Saves entire capture to file
Return Value	TRUE if successful FALSE if failed

SaveCaptureSequence

Element	Description
Prototype	SaveCaptureSequence (n, m, “filename.*”)
Parameters	n : packet index of sequence start m : packet index of sequence end filename.* : specifies filename for capture save
Description	Saves captured sequence from index n up to index m
Return Value	SUCCESSFUL

OpenCapture

Element	Description
Prototype	OpenCapture (“filename.*”)
Parameters	filename.* : specifies filename to be opened
Description	Opens previously saved data file
Return Value	TRUE if successful FALSE if failed

SetActivePacket

Element	Description
Prototype	SetActivePacket (index)
Parameters	index : specifies index of packet in packet list
Description	Sets packet with index active
Return Value	none

SetTriggeredPacketActive

Element	Description
Prototype	SetTriggeredPacketActive
Parameters	none
Description	Sets triggered packet to active packet
Return Value	TRUE if successful FALSE if failed

FindPacket

Element	Description
Prototype	FindPacket (tcode, dir)
Parameters	tcode : specifies tcode of packet to search for dir : specifies the direction of search in packet list, i.e., 0 — up/ 1 – down
Description	Finds next packet with matching tcode
Return Value	0 if fail to find the packet packet index in packet list if successful

FindPacketPattern

Element	Description
Prototype	FindPacketPattern (quad_offset1, pattern1, quad_offset2, pattern2, logic, dir)
Parameters	quad_offset1(Integer) : specifies offset (in quadlets) for pattern1 from packet start pattern1(String) : 8 Hex characters data pattern quad_offset2(Integer) : specifies offset (in quadlets) for pattern2 from packet start pattern2 (String): 8 Hex characters data pattern logic(Integer) : AND – 1 /OR — 0 dir(Integer) : direction of search, i.e. UP – 0 /DOWN – 1
Description	Search for packet with matching data pattern as specified by bit pattern for 2 quadlets
Return Value	Index of the packet, if successful 0, otherwise

7.6 Scripting API: Capture

SetBufFill

Element	Description
Prototype	SetBufFill
Parameters	none
Description	Sets the buffer mode to Buffer Fill.
Return Value	TRUE if successful FALSE if failed

SetBufRot

Element	Description
Prototype	SetBufRot (n)
Parameters	n : specifies buffer size, i.e. total number of packets in buffer
Description	Sets the buffer mode to rotational Buffer.
Return Value	TRUE if successful FALSE if failed

IgnoreCycleStart

Element	Description
Prototype	IgnoreCycleStart
Parameters	none
Description	Disables logging of Cycle Start
Return Value	TRUE if successful FALSE if failed

EnableCycleStart

Element	Description
Prototype	EnableCycleStart
Parameters	none
Description	Enables logging of Cycle Start
Return Value	TRUE if successful FALSE if failed

DisableIso

Element	Description
Prototype	DisableIso
Parameters	none
Description	Disables logging of isochronous packets
Return Value	TRUE if successful FALSE if failed

EnableIso

Element	Description
Prototype	EnableIso
Parameters	none
Description	Enables logging of isochronous packets
Return Value	TRUE if successful FALSE if failed

StartCapture

Element	Description
Prototype	StartCapture
Parameters	none
Description	Starts logging data.
Return Value	TRUE if successful FALSE if failed

StartCaptureNumber

Element	Description
Prototype	StartCaptureNumber (number)
Parameters	number : total number of packets to be captured
Description	Starts logging data until a total of number packets are captured. Captured will be terminated, script will continue.
Return Value	TRUE if successful FALSE if failed

StartCaptureTrigger

Element	Description
Prototype	StartCaptureTrigger
Parameters	none
Description	Starts logging data with active trigger. Trigger must be defined in previous script statement. Will stop if triggered, script will resume.
Return Value	TRIGGERED

StopCapture

Element	Description
Prototype	StopCapture
Parameters	none
Description	Stops logging data. Active packet is first packet in packet list
Return Value	TRUE if successful FALSE if failed

7.7 Scripting API: Trigger

SetTrigger

Element	Description
Prototype	SetTrigger (“triggername.*”)
Parameters	triggername.* : specifies trigger file to be opened
Description	Opens previously saved trigger file and arms trigger
Return Value	TRUE if successful FALSE if failed

SetTriggerCurrent

Element	Description
Prototype	SetTriggerCurrent
Parameters	none
Description	Arms trigger with current settings in the trigger window
Return Value	TRUE if successful FALSE if failed

ClearTrigger

Element	Description
Prototype	ClearTrigger
Parameters	none
Description	Clears all trigger settings
Return Value	TRUE if successful FALSE if failed
Comment	New trigger set will clear previous trigger settings Each script shall start with ClearTrigger as default

IsTriggered

Element	Description
Prototype	IsTriggered
Parameters	none
Description	Test if triggered on any packet
Return Value	TRUE if triggered FALSE otherwise

ClearIsTriggered

Element	Description
Prototype	ClearIsTriggered
Parameters	none
Description	Clears IsTriggered condition
Return Value	TRUE successful FALSE otherwise

7.8 Scripting API: Generator

GenerateActive

Element	Description
Prototype	GenerateActive (repeat, delay)
Parameters	repeat : specifies how often this packet is generated delay : time delay between repeats
Description	Generates active packet from packet list repeat times
Return Value	TRUE if successful FALSE if failed

GenerateAsync

Element	Description
Prototype	GenerateAsync (“packetname.*”, repeat, delay)
Parameters	packetname.* : specifies packet name to be opened repeat : specifies how often this packet is generated delay : time delay between repeats
Description	Generates individual asynchronous packet (previously saved) n times
Return Value	TRUE if successful FALSE if failed

GenerateIso

Element	Description
Prototype	GenerateIso
Parameters	none
Description	Generates stream of isochronous packet with same payload
Return Value	TRUE if successful FALSE if failed

GenerateAsyncSeq

Element	Description
Prototype	GenerateAsyncSeq (“seqname.*”, repeat, delay)
Parameters	packetname.* : specifies packet name to be opened repeat : specifies how often this packet is generated delay : time delay between repeats
Description	Generates sequence of asynchronous packets
Return Value	TRUE if successful FALSE if failed

StopGenerateIso

Element	Description
Prototype	StopGenerateIso
Parameters	none
Description	Stop generating stream of isochronous packet
Return Value	TRUE if successful FALSE if failed

7.9 Scripting API: Combined

StartCapture_GenerateActive

Element	Description
Prototype	StartCapture_GenerateActive(repeat, delay)
Parameters	repeat : specifies how often this packet is generated delay : time delay between repeats
Description	Starts logging data and will immediately commence generation of active packet
Return Value	TRUE if successful FALSE if failed

StartCapture_GenerateAsync

Element	Description
Prototype	StartCapture_GenerateAsync(“packetname.*”, repeat, delay)
Parameters	packetname.* : specifies packet name to be opened repeat : specifies how often this packet is generated delay : time delay between repeats
Description	Starts logging data and will immediately commence generation of async packet
Return Value	TRUE if successful FALSE if failed

StartCapture_GenerateIso

Element	Description
Prototype	StartCapture_GenerateIso
Parameters	none
Description	Starts logging data and will immediately commence generation of isochronous stream
Return Value	TRUE if successful FALSE if failed

StartCapture_GenerateAsyncSeq

Element	Description
Prototype	StartCapture_GenerateAsync (“sequencename.*”, repeat, delay)
Parameters	sequencename.* : specifies sequence name to be opened repeat : specifies how often sequence is generated delay : time delay between repeats
Description	Starts logging data and will immediately commence generation of async sequence
Return Value	TRUE if successful FALSE if failed

7.10 Scripting API: Miscellaneous

Delay

Element	Description
Prototype	Delay(time)
Parameters	time : specifies how many milliseconds needed to delay
Description	Delays time milliseconds
Return Value	none

7.11 Examples

Script1

BusReset, define capture settings, capture packets, update Event List and Topology Map.

SetBufRot
ClearTrigger
SetBufFill
BusReset
IgnoreCycleStart
DisableIso
StartCapture
StopCapture
UpdateTopology
UpdateEventList

Script2

Capture with armed trigger loaded from trigger file test1.trg.

SetBufRot
ClearTrigger
SetTrigger(“test1.trg”)
StartCapture
StopCapture
UpdateEventList

Script3

Start capture with armed trigger, find packet with bit pattern before trigger, start capture with different trigger, regenerate packet with certain bit pattern, if triggered generate async sequence 20 times while triggering on another packet.

SetBufRot
ClearTrigger
SetTrigger(“test1.trg”)
StartCapture
StopCapture
FindPacketPattern(0,”FFFF0123”,1,”AAAA0123”,AND,UP)
SetActivePacket(index)
SetTrigger(“test2.trg”)
StartCaptureTrigger_GenerateActive
SetTrigger(test3.*)
StartCaptureTrigger_GenerateAsyncSeq(“test.seq”,20,0)
UpdateEventList

Script4

Start Capture with armed trigger (Phy Packet), Loop creating 5 BusResets , if triggered successful generate Async. test sequence and clear IsTriggered status, if not triggered on bus Reset change trigger condition to lock request and generate async. Lock Request packet (twice with delay), if triggered generate test sequence (repeat twice).

```
SetBufRot
ClearTrigger
SetTrigger(“PhyTrig.trg”)
StartCapture
For n = 1 To 5, Step 1
BusReset
Next n
If IsTriggered Then
GenerateAsyncSeq(“test.asq,1,0)
ClearIsTriggered
Else
   SetTrigger(“Lock.trg”)
   GenerateAsyn(“Lock.apk”,2,10)
   If Is Triggered Then
        GenerateAsyncSeq(“test.asq”,2,0)
   End If
End If
StopCapture
UpdateEventList
```

8.1 Contacting Customer Support

For technical support on this product please contact your local Yokogawa distributor or:

North America:

Yokogawa Corporation of America
Phoenix Technology Center
Phone: +1-480-783-8990
Fax: +1-480-783-0209
Email: 1394support@yca.com

Europe:

Yokogawa Europe B.V.
Phone: +31-33-4641-670
Fax: +31-33-4641-659

Japan and Others :

Yokogawa Electric Corporation
Test and Measurement Division Communication Product Sales
Phone: +81-422-52-5556
Fax:+ 81-422-52-6624
E-mail:da1394@csv.yokogawa.co.jp

8.2 Backup Software Installation

The VK9000 was shipped with a licensed copy of Windows NT on CD-ROM. It is provided in case it ever becomes necessary to re-install Windows NT. Do not lose or misplace your copy.

The VK9000 was also shipped with a backup copy of the VK9000 software on either CD-ROM or floppy disk. If it becomes necessary to re-install the software, contact Yokogawa or your local distributor.

Note

The VK9000 software will run only the hardware platform installed with the unit.

8.3 Common Troubleshooting Tips

Touchscreen Troubleshooting Tips

Problem:

Lighting for the LCD Monitor becomes dim or dark. Monitor lighting often relates to the VK9000's inverter card.

Solution:

1. Exit all applications and turn OFF the instrument. Do not use the VK9000 for approximately 10-15 minutes.
2. Turn ON the unit.
3. If the lighting for the LCD Monitor still remains dim the unit's inverter card is most likely malfunctioning. Contact your nearest Yokogawa dealer for customer support. If the lighting for the LCD Monitor is dark, then the inverter card has most likely failed. Contact your nearest Yokogawa dealer for customer support.

Problem:

Touchscreen does not respond when pressed. Check and change the COM Port Setting.

Solution:

1. On your desktop click the **Start** button and select **Settings**. From the **Settings** menu select **Control Panel**. The **Control Panel** window appears.
2. On the **Control Panel** window double-click **ELO Touchscreen** icon. The **ELO Touchscreen** window appears.
3. On the **General** tab of the **ELO Touchscreen** window make sure that the Touchscreen is configured to use COM Port 1. If the setting is incorrect change it to COM Port 1.
4. Click **OK**.

Note

If your VK9000's body colord green, please use COM Port3.

Problem:

When an icon on the Touchscreen is pressed, the action does not occur, or the action occurs if an area around the icon is pressed. Touchscreen is improperly calibrated. Change or adjust the calibration.

Solution:

1. On your desktop click the **Start** button and select **Settings**. From the **Settings** menu select **Control Panel**. The **Control Panel** window appears.
2. On the **Control Panel** window double-click **ELO Touchscreen** icon. The **ELO Touchscreen** window appears.
3. On the **General** tab of the **ELO Touchscreen** window click the **Calibrate** button. Follow the onscreen prompts, which call for pressing different sections of the LCD screen. When finished click **OK**.

Keyboard Usage Troubleshooting Tips

Problem:

Keyboard does not respond as anticipated. When a specific key is pressed a different letter, number, or symbol appears. The FN Key has been enabled by most likely the user accidentally pressing it.

Solution:

- Press the **FN Key** to disable. The keyboard will return to normal functioning.

Topology Map / Node Information Display Troubleshooting Tips

Problem:

When connecting another device to the VK9000, node information is not displayed on the Topology Map. Implement a time delay to allow all devices textra time to respond to the VK9000's Read Quadlet Request command.

Solution:

1. On the **File** menu select **Preferences** and from the **Preferences** submenu select the **Refresh Topology with Time Delay** command. The **Time Delay** window appears.
2. On the **Time Delay** window on the **Time** box enter a value of at least 10 milliseconds.
3. Click **OK**.
4. On the **Trigger** menu select the **Refresh Topology** command. A Bus Reset occurs. The missing node information will appear. If it does not appear after the Bus Reset, repeat the step and increase the value in the Time box by at least 10 milliseconds.

Problem:

When connecting another device to the VK9000, node information is not displayed on the Topology Map. The device in particular might have implemented a setup in which the device's Link is software powered, which means that the device must be turned ON to awaken the Link which will in turn allow for device information display on the VK9000's Topology Map.

Solution:

- Turn ON device.

9.1 Main Specification (dpx ver 1.2)

Item	Specification
Analysis Functions	Live Topology Analysis Transmission Analysis Timing Analysis Statistical Analysis Trigger and Filter Functions Real-time Bus Bandwidth Monitoring
Analyzer Input/Output	External Trigger Ethernet 100BaseT 2 × USB 1.0 (Master) CRT (ext. Monitor) S-Video 2 × PS2 (Mouse, Keyboard) 4 × Serial 1 × Parallel 12/5 V DC Out 100/220 V AC Power In
Display	14.1” Color TFT
Weight	9.53 kg
Dimensions	68 × 321 × 72 mm (W × H × D)
Operating Temperature	0 to 50°C
Relative Humidity	10~95%. non-condensing
Shock	10G peak acceleration

IEEE1394 Device Specification

Item	Specification
1394 Compliance Level	IEEE 1394-1995, IEEE 1394-2000 (physical layer)
1394 Transfer Speeds	100 Mbps, 200 Mbps, 400 Mbps
Number of 1394 Nodes	1
Number of 1394 Ports	3 (2 × 6-pin, 1 × 4-pin)
Packet Generation	Isochronous (max. 4096 Byte @ 400 Mbps) Asynchronous (max. 2048 Byte @ 400 Mbps) Physical layer packets (basic and extended)
Configurable 1394 Cable Power Provider	Class 1 (15 Ω @ 12 V) Class 5 self-powered (no cable power provider and consumer)
Phy Test Mode	Reduced SCLOCK rate, 1/32 @S400, 1/16 @ S200 and 1/8 @ S100 (Not available ver 1.2).
Standard Device Capabilities	Root Isochronous capable (isc)
Selectable Device Capabilities	Cycle Master (CM) Isochronous Resource Manager (IRM) Bus Manager (BM)
ConfigROM Compliance Level	ISO/IEC 13213 (ANSI/IEEE Std 1212), P1212r
Clock Accuracy	25 ppm
Port Operations	Disable/Enable, Suspend/Resume

Analyzer

Item	Specification
Data Capture Memory	128 MB (shared with OS)
Buffer Organization	Rotational or Buffer Fill
Bus Transaction Analysis	
Event Display Items	Type (including protocol decoding information), Index, Time, Tcode, ExtTcode, SrcID, DestID, DstAddr, Tlabel, Retry, Resp, Priority, Speed, Channel, Tag, Sync, Ack, Data Length) Packet Timestamp (rendered in sec:cycles:ticks or millsec:microsec:nanosec Display in absolute or delta values, roll-over period 16.6 min
Packet Display	Isochronous (Stream) Asynchronous (Write Quadlet Request, Write Block Request, Write Response, Read Quadlet Request, Read Block Request, Read Quadlet Response, Read Block Response, Lock Request, Lock Response Cycle Start) Acknowledge Physical Layer packets (SelfID, Phy Config, Link On Ping, Remote Access, Remote Command, Resume, Remote Reply, Remote Confirmation, Resume)
Error Analysis	Transmission Truncation Header CRC Verification Payload CRC Verification DMA Error
Real-time Monitors	Bandwidth monitor with sampling period values of .1, .5 and 1 sec.
Topology Analysis	Live bus topology display Speed map display Port connection status indicator (Active, Suspended, Disabled, Disconnected) Bus Info Block Display Node Icon Display Display Protocol functionality on remote nodes (IEC61883; (optional) SBP-2, IPv4, AV/C etc.)
ConfigROM Explorer	Node ConfigROM Decode and Verification of ISO/IEC 13213 (ANSI/IEEE Std 1212) and P1212r compliance

Trigger

Item	Specification
Trigger condition Setting	
Arming trigger	Configurable based on event traffic
Pre/Post trigger setting	Configurable based on event traffic
Trigger Condition	Bit pattern matching Packet header matching (tcode, srcID, destID, Address etc.) Packet Payload Patterns Errors (Header CRC, Payload CRC, Truncation) Pre-defined Payload Patterns for Protocol (AV/C, IPv4)
Sequential trigger	3 stages deep
Statistical trigger	Log events without stopping data capture
External Trigger I/O	BNC connector configurable for: Trigger In Input Impedance: 1 Meg Ω (-0.3 Vdc < Vin < 3.6 Vdc) 4.7 K Ω (Vin < –0.3 Vdc or Vin >3.6 Vdc) Max input: +/- 20 Vdc Minimum Pulse Width: 20 nS Positive Threshold: 2.0 V Nominal 2.5 V Max Negative Threshold: 1.2 V Nominal 0.8 V Min Input Logic: positive logic Input Latency: 10 ns Trigger Out Output Level: CMOS=3.2 24 mA Output Impedance: 50 Ω Positive Logic: Rising Edge = Trigger Rise Time: 2.5 nS Logic Low: 0.55 V @ 25 mA Logic High: 2.5 V @ –25 mA (Standard) Logic High: 4.0 V @ 25 mA (Optional) Pulse Width: 150 nS Output Latency: max. 200 ms External Clock Output (Not available ver 1.2) Rising Clock Edge: 2.5 ns Output impedance: 50 Ω Logic Low 0.55V @ 25m A Logic High 2.5 @ –25m A Optional Configuration as shipped from Factory: Logic Low 0.55 V @ 25 mA Logic High 4.0 @ –25 mA

Real-Time Filter

Item	Specification
Packet matching Filter	Isochronous packets and Cycle Start

Post-Capture Filter

Item	Specification
Data Filter	Tcode, ExtTcode, SrcID, DestID, DstAddr, Data Length

Post-Capture Search

Item	Specification
Data Search	Index, Tcode, ExtTcode, SrcID, DestID, DstAddr, Tlabel, Retry, Resp, Priority, Speed, Channel, Tag, Sync, Ack, Data Length, Data Error, Trigger

Time Analysis

Item	Specification
Bandwidth Chart	
Time axis (horizontal)	Bus Cycles
Time resolution	125ms
Bus Utilization (vertical)	Transmission times
Utilization resolution	40.7 ns

Data Generator

Item	Specification
CSR Access	CSR register access with Read/Write/Lock commands send as either Read Quadlet or Read Block request Speed: 100 Mbps
Traffic Generator	
Packets	Asynchronous packet or sequences generation Isochronous sequences generation Phy packet or sequence generation All at speed of 100, 200, 400 Mbps
Error	Header CRC overwrite, Data CRC overwrite Asynchronous, Isochronous, and Phy packets Speed 100, 200, 400 Mbps

Advanced SW Modules

Item	Specification
Protocol Plug-ins	
AV/C (optional)	Packet Decode, Command/Response Generation, Command/Response Trigger Supported Specifications: General ver. 3.0 VCR Subunit Specification ver. 2.0.1 Monitor Subunit Model and Command Set ver. 1.0 Tape Subunit Model and Command Set ver. 1.0 Customizable and extendable with Framebuider software
SBP2 (optional)	Packet and Handshake Decode Supported Specifications: ANSI NCITS 325 1998 Customizable with Framebuider software
IPv4 (optional)	Packet Decode, ARP/MCAP Generation, ARP/MCAPTrigger, Defragmentation Supported Specifications: Draft-IETF-IP1394-IPv4-19 Customizable and extendable with Framebuider software
HAVi (optional)	Packet Decode Supported Specifications: HAVi 1.0 Customizable and extendable with Framebuider software
IEC-61883 1-4	Packet Decode Supported Specifications: IEC 61883-x 1.0 Customizable and extendable with Framebuider software
Custom1 (optional)	Packet Decode User defined with Framebuider software
Custom2 (optional)	Packet Decode User defined with Framebuider software
Scripting (optional)	VB Scripting Engine 37 API calls for atomization of analyzer operations and functions
Data Viewer	
Stand-alone application for remote PCs only	Remote Data viewing of captured traces including Filter and Search functions Off-line Topology and Speed map analysis Protocol decoding reflects protocols plug-ins in use at time of capture on VK9000 Supported operating systems: Win95, Win98, WinME, WinNT, Win2000
Framebuilder	
Stand-alone application	Runs on VK9000 and remote PCs (for operating system support see Data Viewer) Unlimited 1394 packet payload decoding rules construction Structured in predefined protocol tree featuring AV/C, SBP-2, IP, HAVi, IEC Factory defined frame defaults (user changeable and extendable)

Appendix.1 Protocol Support Detection Values

Protocol	Field	Location (24-bit immediate value)	Value	Note
SBP-2	Unit Spec ID	First octet (byte)	00_{16}	
(SBP2)		Second octet	60_{16}	*1
		Third octet	$9E_{16}$	
	SW Version	First octet	01_{16}	
		Second octet	04_{16}	
		Third octet	83_{16}	
IPv4	Unit Spec ID	First octet	00_{16}	
(IPv4)		Second octet	00_{16}	
		Third octet	$5E_{16}$	
	SW Version	First octet	00_{16}	
		Second octet	00_{16}	
		Third octet	01_{16}	
IEC61883	Unit Spec ID	First octet	00_{16}	
(IEC)		Second octet	$A0_{16}$	
		Third octet	$2D_{16}$	
	SW Version	First octet	01_{16}	*2
AV/C	Unit Spec ID	Same as IEC61883		
(AVC)	SW Version	First octet	01_{16}	
		Second octet	00_{16}	
		Third octet	01_{16}	
HAVi	Unit Spec ID	Same as IEC61883		
(HAVi)	SW Version	First octet	01_{16}	
		Second octet	00_{16}	
		Third octet	08_{16}	

1: Due to a limited space on a node display box, protocol names will be displayed as in parentheses.
2: The second and third octets are reserved for AV/C, HAVi, and other protocols. E.g. if a node supports AV/C protocol, both 'IEC' and 'AVC' will be displayed

Appendix.2 Reference

Standards relevant to the analyzer.

IEEE 1394-1995

IEEE Std 1394-1995
IEEE Standards for a High Performance Serial Bus

IEEE 1394-2000

IEEE Std 1394-2000

IEEE 1212

ISO/IEC 13213: 1004 [ANSI/IEEE Std 1212, 1994 Edition]
Information technology - Microprocessor systems – Control and Status Registers (CSR) Architecture for microcomputer buses

Upper Layer Protocol

AV/C Protocol
AV/C Digital Interface Command Set General Specification Version 3.0, April 15, 1998

FCP
Function Control Protocol (FCP) defined by IEC 61883

SBP-2 Protocol
Working Draft T10 Project 1155D Revision 4
Information technology – Serial Bus Protocol 2 (SBP-2)

IP over 1394 related documents
IEFT Internet-Drafts

IPv4 over IEEE 1394
Multicast Channel Allocation Protocol (MCAP) for IEEE 1394

DHCP for IEEE 1394
Transmission of IPv6 Packets over IEEE 1394 Networks