

Valkyrie2889

User Manual

This is the User Manual for Valkyrie2889. Valkyrie2889 is a PC application that enables you to perform advanced network tests according to the [RFC 2889 specification](#) using one or more of the [Xena test equipment chassis](#).

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INSTALLATION

Windows

Valkyrie2889 is a standard Windows .NET application supporting Windows XP (SP3) and all later Windows versions. It requires Microsoft .NET version 4.0.

After installation, you can find a shortcut to the application either in the **Start -> Programs -> Xena Networks** menu or (if you have selected this during setup) on your desktop.

The application is installed as part of the Xena software release package [which can be obtained here](#).

Linux Support

[Refer to this page for details on support for Linux.](#)

GENERAL INFORMATION

CAPABILITIES

The Valkyrie2889 application features the following capabilities:

- Enables the user to create, edit and execute test configurations using Xena Networks test equipment in accordance with [RFC 2889](#).
- Ability to individually configure and enable the test-types defined in RFC 2889.
- Support for multiple ValkyrieBay and ValkyrieCompact test chassis.
- Support for different network topologies and traffic flow directions.
- Support for both layer 2 and layer 3 testing.
- Support for IPv4 and IPv6.
- Support for all IGMP/MLD versions.
- Support for multiple ValkyrieBay and ValkyrieCompact test chassis.
- Ability to flexibly define the protocol layers supported by the test (Ethernet, VLANs, IP, UDP, etc.).
- Ability to assign separate protocol layer definitions to each test port.
- Test reports can be created in either PDF or XML format or both.
- Extensive configuration options to fine-tune the tests.

SUPPORTED TEST TYPES

The following RFC 2889 test types are fully supported by the Valkyrie2889:

- All Throughput and Forwarding rate tests (both Fully and Partially meshed)
- Congestion Control
- Forward Pressure and Maximum Forwarding Rate

- Address Caching Capacity
- Address Learning Rate
- Broadcast Frame Forwarding and Latency

The following RFC 2889 test types are partially supported by the Valkyrie2889:

- Errored Frames Filtering: Supported with the exception of the "Dribble Bit Errors" and "Alignment Errors" tests.

TERMINOLOGY

This section provides explanations for the terminology used by the Valkyrie2889.

Test Type

Denotes one of the test types defined in RFC 3918, sections 4 to 8, such as "Mixed Class Throughput" and "Multicast Latency".

Trial

A "trial" denotes a single execution of a test with a given set of test parameters. If the test configuration specifies that the tests shall be performed at various packet sizes a number of trials will then be executed - one for each packet size specified.

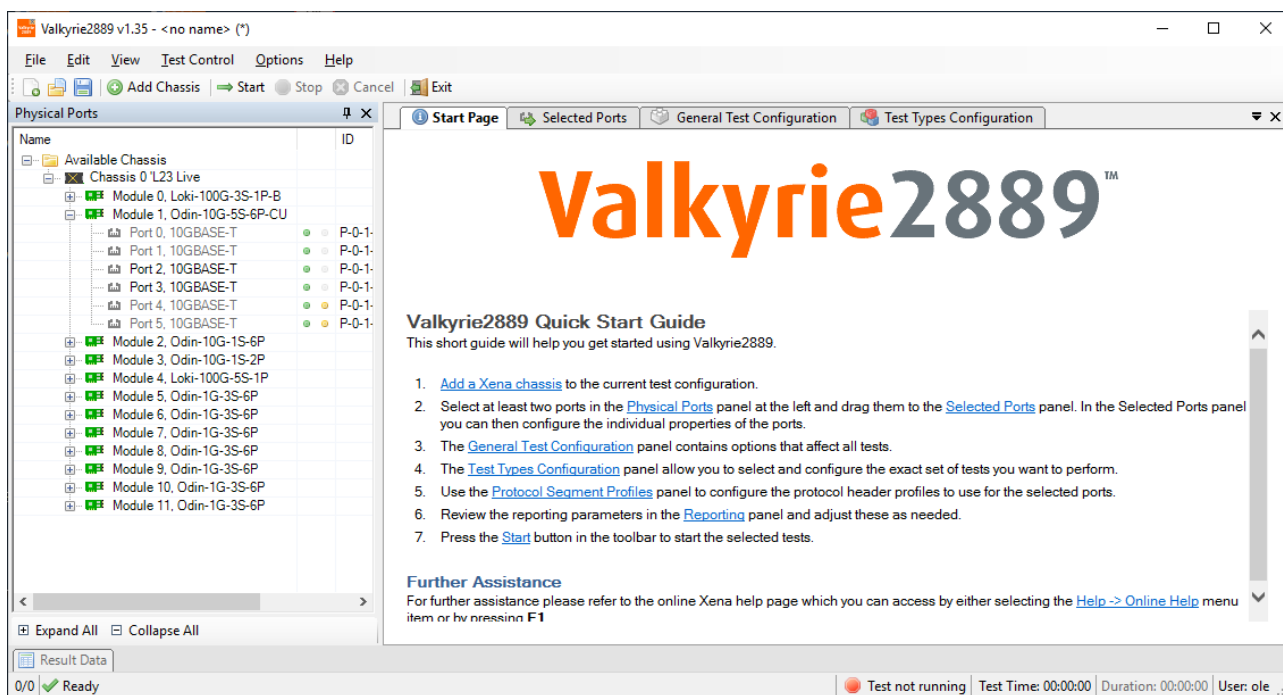
Iteration

Each test type can be configured to repeat the test a number of times. Each of these repetitions is called an iteration. One iteration may comprise several trials.

OVERVIEW

The main Valkyrie2889 application screen is shown in the image below.

- At the top you find a menu bar with accesses various application-level functions. You also find a toolbar with quick shortcuts to the most used functions.
- At the left you find a tree view named "Physical Ports" showing the available Xena chassis, modules and ports.
- At the right you find a tabbed view with various application panels. These are explained below.
- At the bottom you also find a tabbed view containing a few status panels. These are also explained below.



APPLICATION PANELS

Panel	Explanation
Start Page	The default main page shown to the user. This page contains a brief guide to assist you in creating an initial test configuration. You can close this panel once you feel that it is no longer useful to you.
Selected Ports	This panel allows you to include Xena testports in your test and to configure the behavior of these ports. You select the ports in the Physical Ports view and drag them to the Selected Ports panel to include them in the test.
General Test Configuration	This panel control the common aspects of the Test Configuration, such as frame sizes and port rates.
Test Types	This panel control what tests you are actually going to execute and

Configuration	also handles the testtype-specific configuration options.
Protocol Segment Profiles	This panel allow you to create and/or configure profiles for protocol segment headers. Each port can be assigned a different protocol header so that it is possible to give each port a different set of
Reporting Options	This panel control all aspects of the reporting function.

STATUS PANELS

Panel	Explanation
Result Data	This panel displays the test result data in a grid view. Both the progress counters and the final test data is shown. Progress counters are shown using an <i>italics</i> font whereas the final data is shown with a normal font.
Configuration Errors	This panel displays any configuration errors detected in your configuration when attempting to start a test.

GETTING STARTED

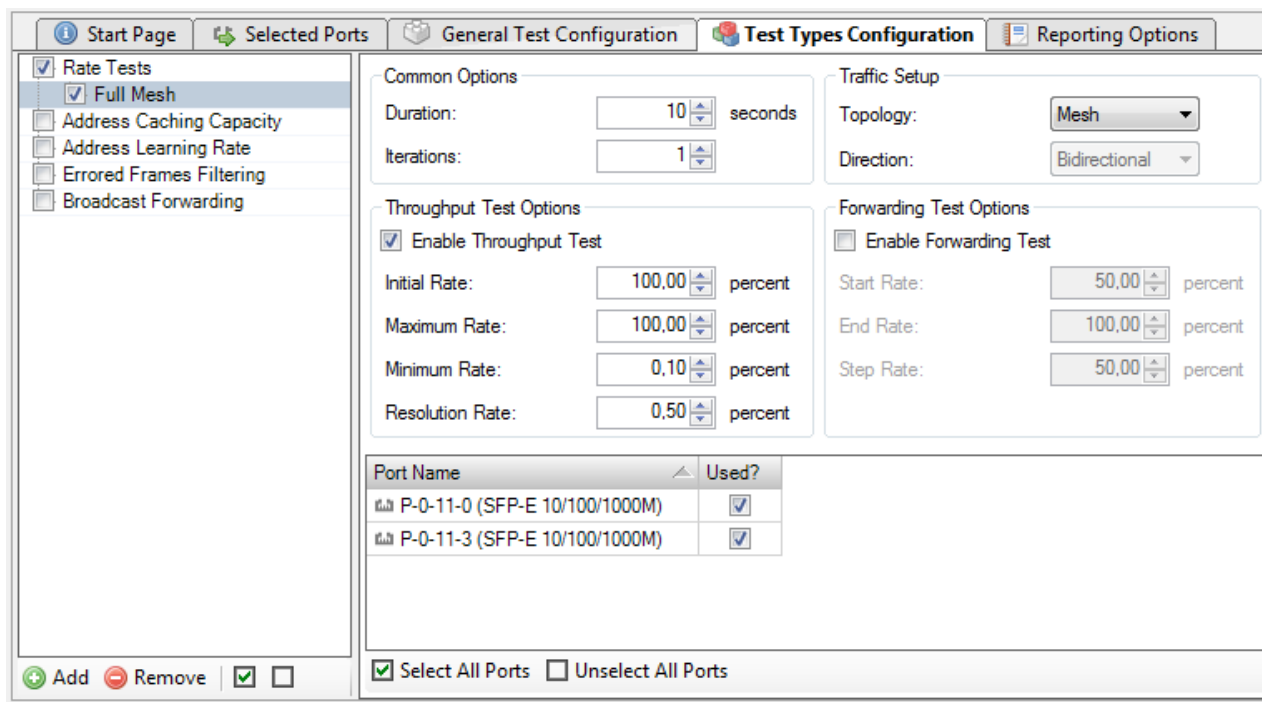
This section will help you getting started using the Valkyrie2889 by showing a few simple examples on how to create and to execute various tests.

PERFORMING A RATE TEST (PLAIN ETHERNET)

This example explains how to create and execute a simple rate test using two testports.

A "rate test" is a test that focus on the throughput and forwarding aspects of the DUT. All the tests defined in RFC 2889 sections 5.1 to 5.4 are considered to be rate tests. These tests mainly differ in terms of the used network topology and traffic direction but the basic test methodology is the same for all rate tests.

In this example we will use a Full Mesh topology with three testports, using plain Ethernet traffic.



The screenshot shows the 'Test Types Configuration' window. On the left, a tree view shows 'Rate Tests' expanded to 'Full Mesh'. The main area is divided into several sections:

- Common Options:** Duration: 10 seconds, Iterations: 1.
- Throughput Test Options:** Enable Throughput Test. Initial Rate: 100,00 percent, Maximum Rate: 100,00 percent, Minimum Rate: 0,10 percent, Resolution Rate: 0,50 percent.
- Traffic Setup:** Topology: Mesh, Direction: Bidirectional.
- Forwarding Test Options:** Enable Forwarding Test. Start Rate: 50,00 percent, End Rate: 100,00 percent, Step Rate: 50,00 percent.
- Port Selection Table:**

Port Name	Used?
P-0-11-0 (SFP-E 10/100/1000M)	<input checked="" type="checkbox"/>
P-0-11-3 (SFP-E 10/100/1000M)	<input checked="" type="checkbox"/>

At the bottom, there are buttons for 'Add', 'Remove', and checkboxes for 'Select All Ports' (checked) and 'Unselect All Ports'.

Perform the following steps to create and execute this test:

1. Start the Valkyrie2889 application.
2. Click the **Add Chassis** button in the toolbar and enter the IP address and password of the Xena tester you want to use. Keep the default value of 22606 for the port number unless you know that your tester is configured with a different port number. Press **OK**. The Valkyrie2889 will now connect to the chassis and display all available modules and ports in the **Physical Ports** panel to the left.

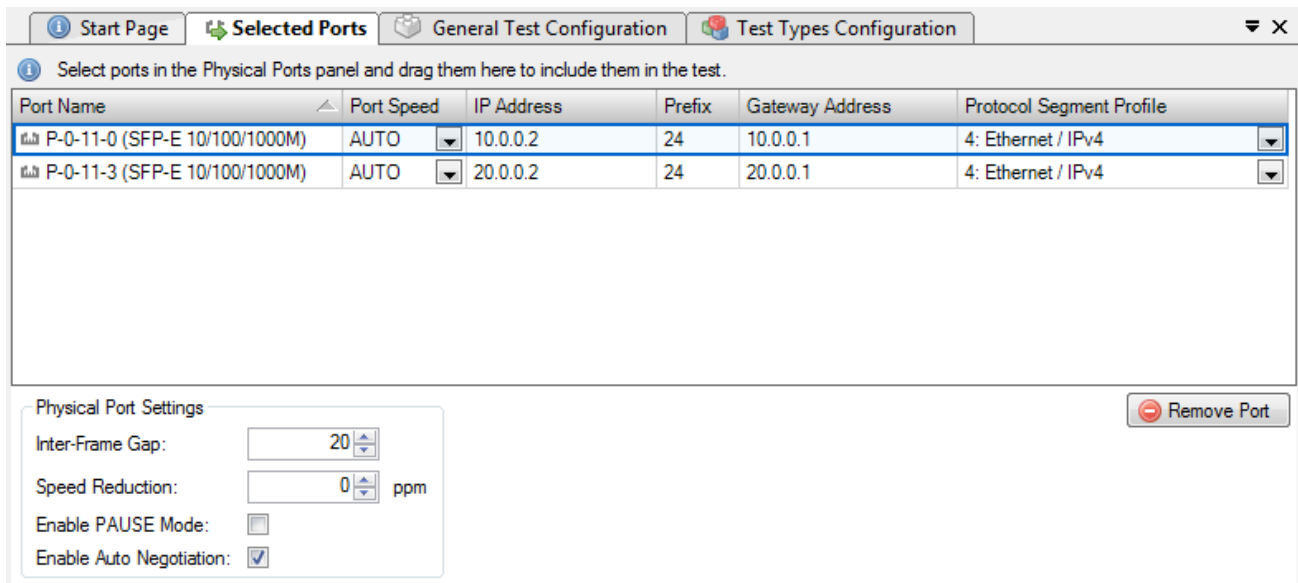
3. Locate three testports that you want to use in the **Physical Ports** panel and ensure that they are connected to your DUT. Select each port in the treeview, right-click and select the **Add Port to Test Configuration** menu option in the popup menu. You can select multiple ports by holding down the <Ctrl> or the <Shift> button while clicking with the mouse.
4. Change to the **Selected Ports** panel. You should now see the three ports you selected previously. Leave each port configuration at its default value.
5. Change to the **General Test Configuration** panel. If you know that your DUT has a throughput that is lower than the physical port speed by several orders of magnitude you can lower the used test port rate in the **Overall Test Port Rate** section at the top-right. Otherwise you may leave the general settings at the default values.
6. Change to the **Test Types Configuration** panel. You will now see a treeview to the left containing all defined tests. All tests are enabled by default so you should start with clicking the "Disable All Tests" button at the bottom of the treeview (this is the button with an empty square image). You can also disable all tests by clicking the checkbox to the left of each test.
7. Re-enable the **Full Mesh** rate test at the top and select the entry in the treeview. This is display the test options for this test in the configuration panel to the right. Note the list at the bottom of the configuration panel which show all the selected ports.
8. Press the **Select All Ports** button at the bottom of the configuration panel. This will include all the selected ports in the current rate test¹. Leave all other configuration options at their default values.
9. Select the **Save ...** menu item in the **File** menu (or press <Ctrl-S> in order to save your configuration. Give the configuration a suitable filename.
10. Press the **Start** button in the top toolbar (or press <Ctrl-T>). The test will now start.
11. The **Result Data** panel at the bottom will display both progress information while the test is ongoing and also the final test results. Progress data will be shown with an *italics font* whereas final test results will be shown with a normal font.
12. Once the test completes a PDF report will be generated and shown using your default PDF viewer application.

The overall result will contain one result for the throughput test and one result for the forwarding test.

PERFORMING A RATE TEST (IPv4 VERSION)

This example will show how to expand the above rate test using IPv4 test traffic. It expands on the previous example so we will only describe the main differences in detail. For the sake of variety we will use a Pairs topology instead of the Full Mesh topology used in the previous example.

¹ It may seem superfluous to have to select the ports you have already selected for the test. But several of the tests in RFC 2889 require a subset of the globally selected ports.



Select ports in the Physical Ports panel and drag them here to include them in the test.

Port Name	Port Speed	IP Address	Prefix	Gateway Address	Protocol Segment Profile
P-0-11-0 (SFP-E 10/100/1000M)	AUTO	10.0.0.2	24	10.0.0.1	4: Ethernet / IPv4
P-0-11-3 (SFP-E 10/100/1000M)	AUTO	20.0.0.2	24	20.0.0.1	4: Ethernet / IPv4

Physical Port Settings

Inter-Frame Gap: 20

Speed Reduction: 0 ppm

Enable PAUSE Mode:

Enable Auto Negotiation:

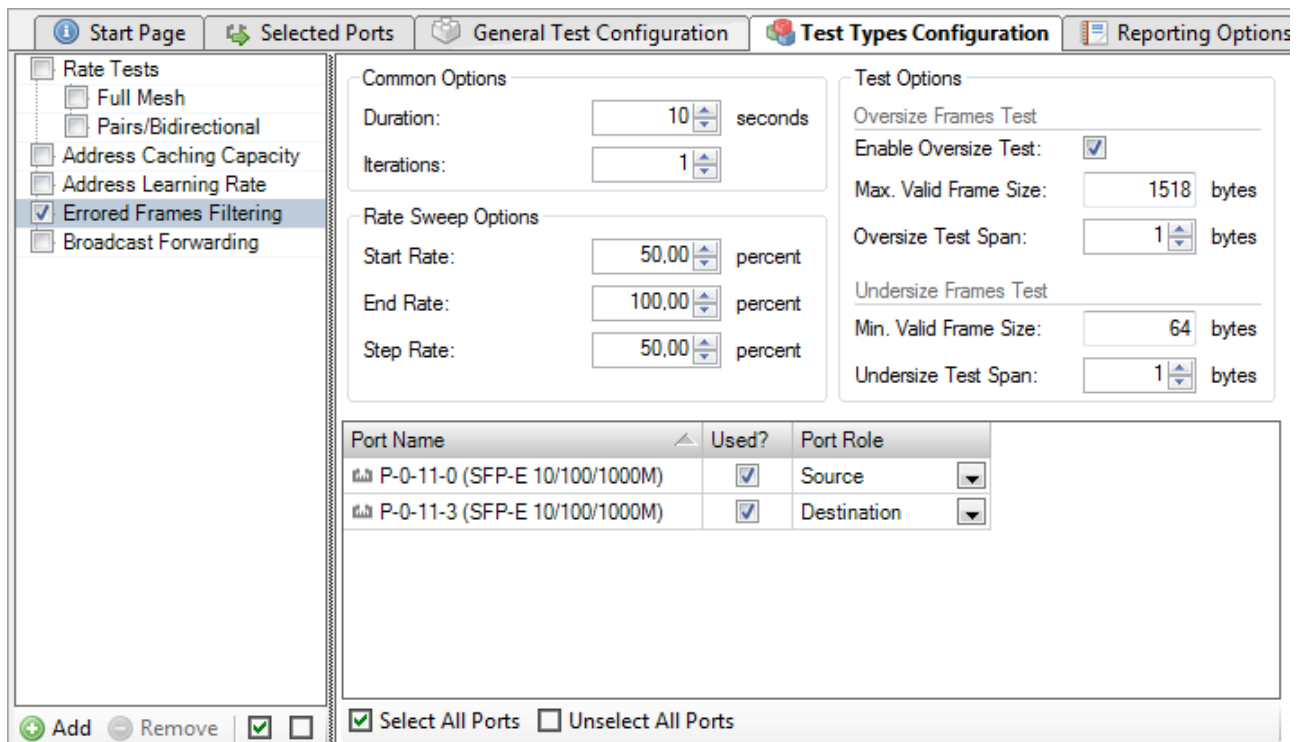
Remove Port

1. Start the application, and connect to a chassis as before.
2. Select two testports that are connected to a DUT that support IPv4 traffic and add them to the **Selected Ports** panel.
3. Change to the **Selected Ports** panel. For each port set the **Protocol Segment Profile** option to the "Ethernet / IPv4" profile.
4. Select the **IP Address** cell for the first port. Enter the IP address you want to assign to this port. Note that the **Gateway Address** cell is automatically initialized using an educated guess for what the gateway address might be. Change the **Prefix** and/or the **Gateway Address** cells as needed.
5. Configure the IP address options for the other port in a similar way.
6. Change the **General Test Configuration** options as needed.
7. Change to the **Test Types Configuration** panel, and disable all existing tests.
8. Add a new rate test by clicking on the **Add** button located at the bottom of the test treeview to the left. The new test will be enabled by default.
9. Set the topology to **Pairs** and the direction to **Bidirectional**.
10. Set both ports to be used. Set the first port role to **East** and the other port role to **West**. Pair the two ports together using the **Port Peer** column.
11. Save the configuration and start the test.

The overall result will contain one result for the throughput test and one result for the forwarding test.

PERFORMING AN *ERRORED* FRAMES FILTERING TEST

This example will show how to configure and run one of the other test types.



1. Start the application, and connect to a chassis as before.
2. Select two testports that are connected to a DUT and add them to the **Selected Ports** panel.
3. Change to the **Test Types Configuration** panel, and disable all existing tests, except the "Errored Frames Filtering" test.
4. Select both ports to be used in the test. Set one port as the **Source** and the other as the **Destination**.
5. Save the configuration and start the test.

The result will show the amount of frames transmitted and received in the various frame groups.

APPLICATION REFERENCE

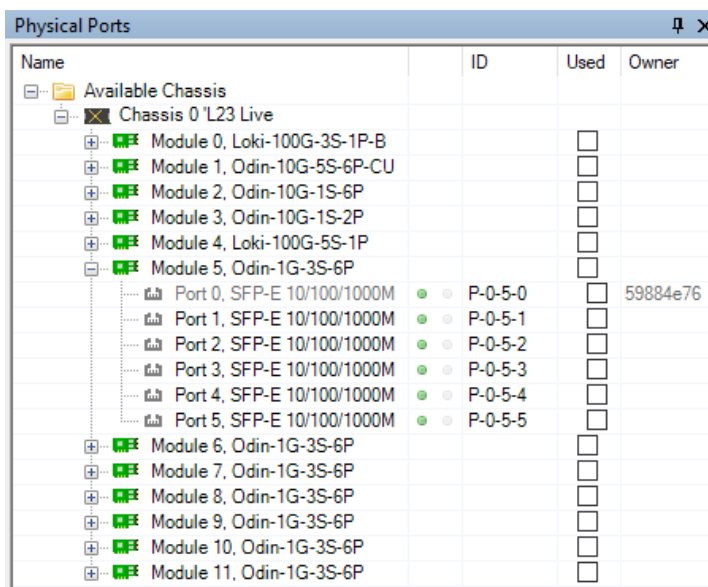
This section explains the options available in the various configuration panels.

PHYSICAL PORTS PANEL

This panel displays all available ports on the currently connected Xena chassis. It is possible to connect to multiple Xena chassis at the same time.

It also allows you to perform the following actions:

- View the current sync (link) and traffic state of the ports.
- View the ownership of the ports, i.e. are the ports reserved and by whom.
- Request or relinquish ownership of ports.
- Determine which ports will be used in the multicast tests.



Name	ID	Used	Owner
Available Chassis			
Chassis 0 'L23 Live'			
Module 0, Loki-100G-3S-1P-B		<input type="checkbox"/>	
Module 1, Odin-10G-5S-6P-CU		<input type="checkbox"/>	
Module 2, Odin-10G-1S-6P		<input type="checkbox"/>	
Module 3, Odin-10G-1S-2P		<input type="checkbox"/>	
Module 4, Loki-100G-5S-1P		<input type="checkbox"/>	
Module 5, Odin-1G-3S-6P		<input type="checkbox"/>	
Port 0, SFP-E 10/100/1000M	P-0-5-0	<input type="checkbox"/>	59884e76
Port 1, SFP-E 10/100/1000M	P-0-5-1	<input type="checkbox"/>	
Port 2, SFP-E 10/100/1000M	P-0-5-2	<input type="checkbox"/>	
Port 3, SFP-E 10/100/1000M	P-0-5-3	<input type="checkbox"/>	
Port 4, SFP-E 10/100/1000M	P-0-5-4	<input type="checkbox"/>	
Port 5, SFP-E 10/100/1000M	P-0-5-5	<input type="checkbox"/>	
Module 6, Odin-1G-3S-6P		<input type="checkbox"/>	
Module 7, Odin-1G-3S-6P		<input type="checkbox"/>	
Module 8, Odin-1G-3S-6P		<input type="checkbox"/>	
Module 9, Odin-1G-3S-6P		<input type="checkbox"/>	
Module 10, Odin-1G-3S-6P		<input type="checkbox"/>	
Module 11, Odin-1G-3S-6P		<input type="checkbox"/>	

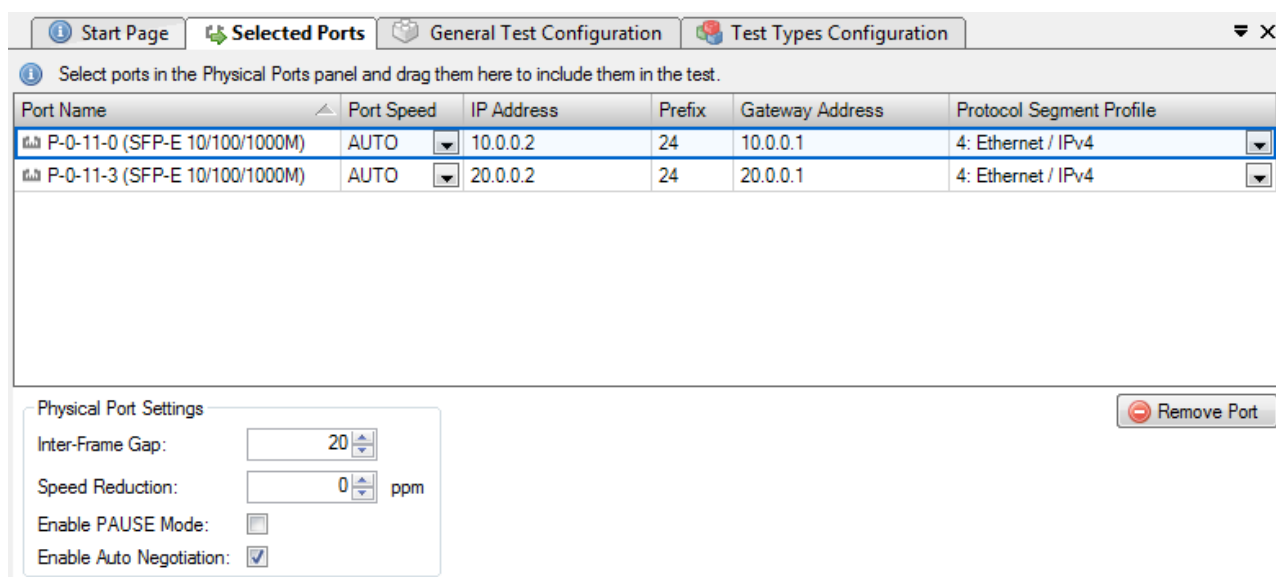
You can reserve or relinquish ownership of a port by right-clicking on it and selecting the appropriate action. Note that the Valkyrie3918 will automatically reserve ownership of used ports when a test is started.

SELECTED PORTS PANEL

This panel displays the ports that have been actively selected for use in the test configuration. The ports are shown in a grid view with the following columns:

Column	Explanation
Port Name	The name (ID and type) of the port.

Port Speed	The physical port speed to use in the test. Normally this should be left at the default AUTO value, but certain DUTs require that the port speed is fixed to a specific rate.
IP Address	The IP address that you want to use for the port. All ports in the configuration need an IP address.
Prefix	The decimal network prefix for the address.
Gateway Address	The gateway address for the assigned IP address. Usually this will be the address of the DUT port which the test port is connected to.
Protocol Segment Profile	The protocol segment profile to use for this port. Profiles can be created, edited and deleted in the separate Protocol Segment Profiles panel.



The screenshot shows the 'Test Types Configuration' tab in the XENA Networks software. It features a table for selecting ports and a 'Physical Port Settings' panel.

Port Name	Port Speed	IP Address	Prefix	Gateway Address	Protocol Segment Profile
P-0-11-0 (SFP-E 10/100/1000M)	AUTO	10.0.0.2	24	10.0.0.1	4: Ethernet / IPv4
P-0-11-3 (SFP-E 10/100/1000M)	AUTO	20.0.0.2	24	20.0.0.1	4: Ethernet / IPv4

Physical Port Settings

- Inter-Frame Gap: 20
- Speed Reduction: 0 ppm
- Enable PAUSE Mode:
- Enable Auto Negotiation:

Remove Port

Additional Port Settings

Below the grid view is a section with less-frequently-used settings:

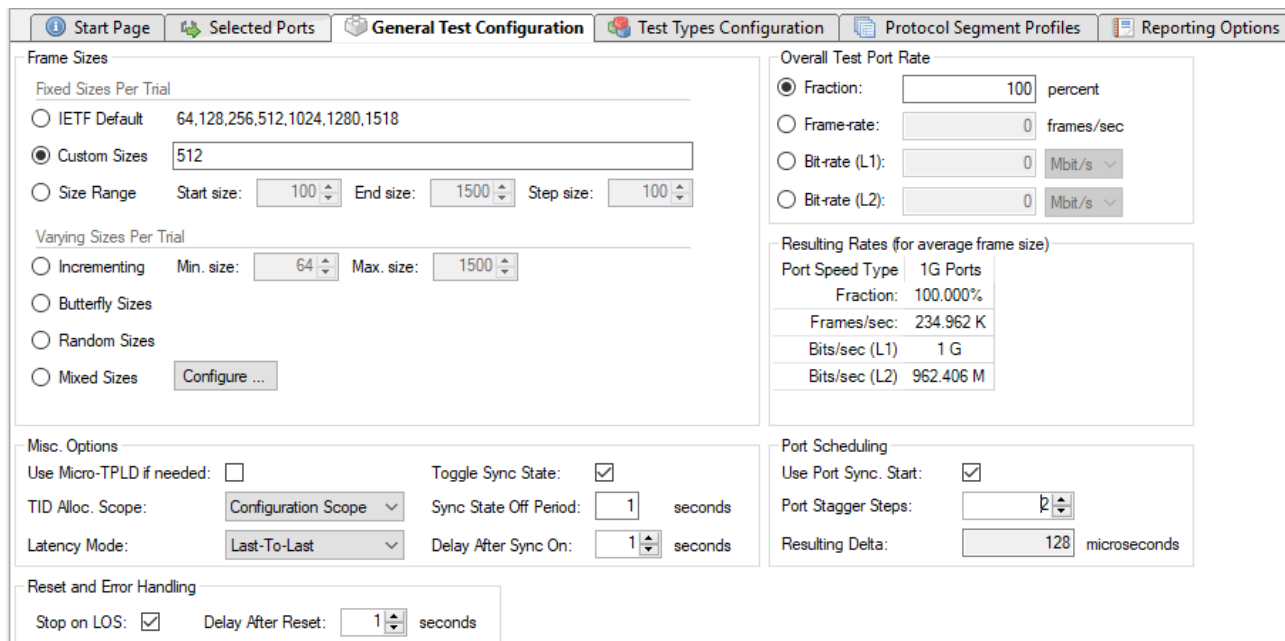
Property	Explanation
Inter-Frame Gap	Specifies the minimum gap between frames generated for a port, expressed as a number of bytes.
Speed Reduction:	Specifies an optional speed reduction on the transmit side of the port, expressed as a ppm value.
Enable PAUSE Mode:	Controls whether the port responds to incoming PAUSE frames.
Enable Auto Negotiation:	Controls whether auto-negotiation for the port is enabled or not.

Changing Settings on Multiple Ports

It is possible to change settings on multiple ports at the same time by selecting multiple ports in the grid view and then changing settings in either the grid view or the detailed settings panel below the grid. The only setting that does not allow this is the IP address field, as this must always be a unique value.

GENERAL TEST CONFIGURATION PANEL

This panel controls the test options that are common for all tests. The various sections in the panel are described below.



Port Speed Type	1G Ports
Fraction	100.000%
Frames/sec	234.962 K
Bits/sec (L1)	1 G
Bits/sec (L2)	962.406 M

Frame Sizes

This section allows you to specify the frame sizes to be used by the various tests. The available frame size options are divided into two groups, the "Fixed Sizes Per Trial" and the "Varying Sizes Per Trial".

As the name indicates the "Fixed Sizes Per Trial" group uses a single frame size per trial. It is possible to specify multiple frame sizes which will cause the test to be repeated for each frame size. The "Varying Sizes Per Trial" group will use many frame sizes for each trial. This is controlled by the hardware. Note that when calculating bitrates the average frame size will be used.

Also note that the **Errored Frames Filtering** test will not use the frame size setting as it uses its own frame size setup as part of the test.

Overall Test Port Rate

This section allow you to specify the overall rate used by the tests. You can specify the rate using one of the following methods:

- A fraction (percentage) of the physical port speed
- A frame-rate (Fps) value
- A bit-rate (Bps) value at either layer 1 or layer 2.²

² Bit-rate (layer 2) = bit-rate (layer 1) x framesize / (framesize + inter-frame-gap)

Below the controls you can see the resulting percentages or rates for all selected port types.

Note that the Address Caching Capacity and Address Learning Rate tests do not use the overall test port rate as they utilize their own rate definition. The Congestion Control and Forward Pressure tests also do not use the overall test port rate as these tests are always performed at port line speed.

Misc. Options

Option	Explanation
Use Micro-TPLD if needed:	<p>The normal Xena test payload (TPLD) section takes up 20 bytes and is used for various purposes, such as latency measurements, loss and misordering monitoring, payload integrity, etc. Due to this test payload it may be impossible to make room for protocol headers such as IPv4+UDP for smaller framesizes (e.g. ~64 byte).</p> <p>By enabling this option you permit Valkyrie2889 to use the smaller “micro”-TPLD if needed by the current framesize. The consequence of this will be that realtime monitoring of packet loss is no longer possible.</p> <p>Note that Valkyrie2889 will <u>only</u> use the micro-TPLD for a testrun if the current framesize requires it. If you for instance use the default IEEE packet size distribution you may encounter that the micro-TPLD is only used for 64 byte packets but not for the other packet sizes.</p>
TID Alloc.Scope:	<p>Determines how Valkyrie2889 allocates test payload identifier (TID) values.</p> <p><i>Configuration Scope:</i> Allocates a unique TID value for each stream created. This option ensures that only packets intended for a given port is taken into account. The downside is that for large configurations you may quickly run out of TID values due to hardware constraints.</p> <p><i>Rx Port Scope:</i> Allocate TIDs so that all streams received on any given port have a unique TID. TID values are reused between ports. This allow for larger configurations but the test is no longer able to detect if packets are mis-delivered by the DUT.</p> <p><i>Source Port ID:</i> Allocate TIDs so that all streams from a given port is set equal to the port index in the configuration. This is a slight variation of the previous method.</p>

Latency Mode:	Specifies the way the latency value is calculated. Refer to the description of P_LATENCYMODE in the Xena Scripting Manual for a description of the various values.
Toggle Sync State:	<p>If checked the sync state for all selected ports will be toggled off and on at the start of each test trial. This is done to ensure that the DUTs MAC-tables are cleared at the start of each test.</p> <p>Note that the Address Caching Capacity and Address Learning Rate tests do not use this option as they use their own definition.</p>
Sync State Off Period:	The number of seconds to keep the port sync state off.

Port Scheduling

Use Port Sync Start:	If this option is checked the Start button will activate a synchronized port start mechanism for the ports – if the chassis firmware version supports this feature.
Port Stagger Steps:	<p>This property delays start of traffic generation on one port relative to pressing Start button. The delay is programmed in steps of 64 microseconds. The Port Stagger function will work between ports on test modules installed in the same chassis. First port will not be delayed. Second port will be delayed with the Port Stagger Steps. Third port will be delayed with the Port Stagger Steps * 2. Fourth port will be delayed with the Port Stagger Steps * 3 etc. Maximum Port Stagger Steps value for a port is 31250. Therefore the programmed Port Stagger Steps must not exceed $31250 / (\text{number of ports})$. NB: This requires that “Use Port Sync Start” has been checked</p>
Resulting Delta:	The Port Stagger Steps * 64 microseconds

Reset and Error Handling

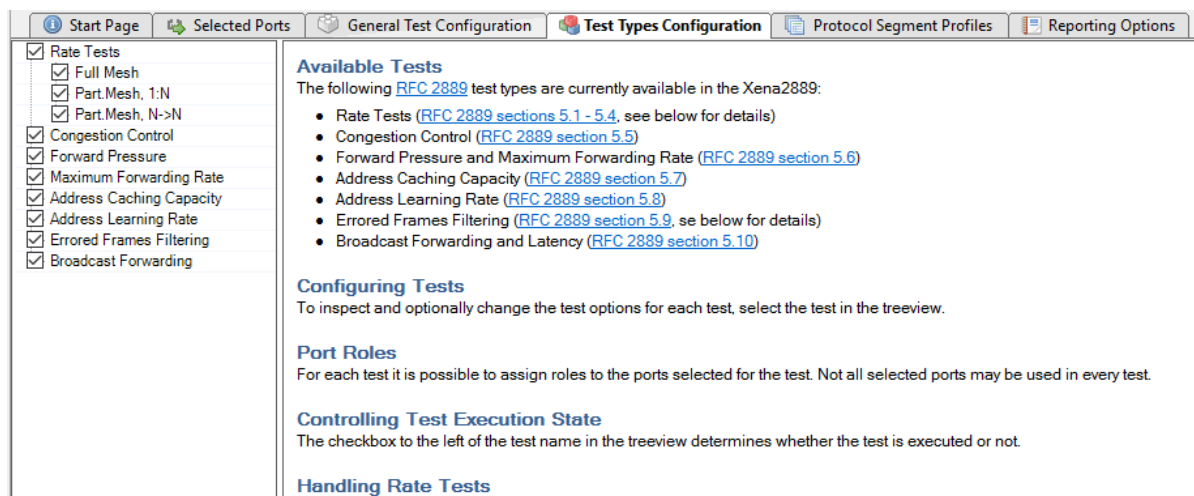
Stop on LOS:	If enabled, Valkyrie2889 will abort the test if a port loses the sync state during test.
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Delay
After
Reset:

When a Valkyrie2889 test is started, the selected ports will be reset to ensure a known starting point for the test. This parameter defines how long time Valkyrie2889 will wait after the reset before it continues with the test

TEST TYPES CONFIGURATION PANEL

This panel allow you to select which tests are executed and configure their parameters.



Selecting Tests for Execution

All available tests are shown in the treeview to the left. You can select if a test is executed by using the checkbox to the left of the test name. You can also use the two small buttons in the toolbar at the lower part of the treeview to quickly enable or disable all tests.

Configuring Test Options

To inspect and optionally change the test options for a test, select the test in the treeview. The associated test options will then be displayed in the configuration panel to the right.

Each test contains a port role configuration control at the bottom of the associated configuration panel. This control enables you to select which of the selected ports should actually be used in the test and also to configure the role that each port should play in the test.

Handling Rate Tests

The RFC 2889 defines several types of rate tests, but these are typically not possible to execute using the same test setup as the required cabling and equipment will typically differ quite substantially. Instead the Valkyrie2889 allow you to create and define the number of rate tests relevant for the actual DUT.

Each rate test consist of two possible subtests:

- The **Throughput test**, which attempts to measure the maximum zero-loss rate for the DUT. This test is an iterative test and will provide exactly one test result.
- The **Forwarding test**, which performs a rate sweep and measures the loss at each rate. This test provides one test result for each tested rate in the rate sweep.

You can enable either both these subtests or just one of them.

To create a new rate test press the **Add** button located at the bottom of the test treeview. You can configure both the topology and the direction for the rate test, and also set the port roles for the test.

To delete a rate test select the test and press the **Remove** button located at the bottom of the test treeview.

Test-specific Options

This section describes the options available for the various test types.

Common Test Options

This section describes the test options found in all or most tests.

Option	Explanation
Duration:	The duration of each test trial in seconds.
Iterations:	The number of times to repeat each test trial with the same set of test parameters.

Rate Test Options

Option	Explanation
<i>Common Test Options</i>	
Test Label:	A text label for this rate test. Use this to assign a short description of the purpose of the test.
<i>Traffic Setup</i>	

Topology:	<p>The topology of the test traffic:</p> <p><i>Mesh:</i> All testports send traffic to all other testports. The Direction option is ignored as Mesh traffic is always bidirectional.</p> <p><i>Blocks:</i> Each testport is placed in either the East or the West block. Every port in the transmitting block sends traffic to every port in the other block. The Direction option determines if only one block or both will be transmitting.</p> <p><i>Pairs:</i> Each testport is placed in either the East or the West block. Then the ports are paired together two and two. Traffic is only flowing between paired ports. The Direction option determines which ports will be transmitting.</p>
Direction:	Determines the direction of the test traffic.
<i>Throughput Test Options</i>	
Enable Throughput Test:	If checked the Throughput test will be executed. This is an iterative test that will find the largest throughput rate with zero loss for the DUT.
Initial Rate:	The starting rate to use. This is specified as a percentage of the overall port rate defined in the general test options panel.
Maximum Rate:	The maximum rate to use. This is specified as a percentage of the overall port rate.
Minimum Rate:	The minimum rate to use. This is specified as a percentage of the overall port rate. If the iteration reaches this value the test is stopped and the result will be FAILED.
Resolution	The trial stops when the difference between the current and the

Rate:	last successful trial is less than the Resolution.
<i>Forwarding Test Options</i>	
Enable Forwarding Test	If checked the Forwarding test will be executed. This is a rate sweep test that will measure the forwarding rate and the loss for the DUT at various transmit rates.
Start Rate:	The starting rate percentage used in the test.
End Rate:	The ending rate percentage used in the test.
Step Rate:	The rate step increment.
<i>Port Role Configuration</i>	
Used?	If checked the port will be used in this test.
Port Role	Used to place the port in either the “East” or the “West” block. Only available when Topology is either “Blocks” and “Pairs”
Port Peer	Used to pair the port with another port. Only available when Topology is “Pairs”.

Congestion Control Test Options

This test does not use specific test options apart from the common test options described above.

Forward Pressure Test Options

Option	Explanation
Interframe Gap Delta	The difference between the default Interframe Gap (IFG) value of 20 bytes and the reduced value used on the source port.
Accept. Rx Util. Delta:	The acceptable receive rate utilization delta, i.e. the value with which the receive rate is allowed to exceed 100.0%.

Maximum Forwarding Rate Test Options

Option	Explanation
<i>Rate Sweep Options</i>	
Start Rate:	The starting rate percentage used in the test.
End Rate:	The ending rate percentage used in the test.
Step Rate:	The rate step increment.

Address Caching Capacity Test Options

Option	Explanation
<i>MAC Address Settings</i>	
Initial Count:	The starting address count to use.
Maximum Count:	The maximum address count to use.
Minimum Count:	The minimum address count to use. If the trial reaches this value the test is stopped and the result will be FAILED.
Resolution Count:	The trial stops when the difference between the current and the last successful trial is less than the Resolution.
<i>Learning Rate Settings</i>	
Learning Rate:	The learning rate in frames/second to use.
<i>DUT Address Learning Reset</i>	
Toggle Sync States:	If checked the sync state of the test ports will be toggled off and on between test trials. Enabling this may help clearing the MAC learning tables in the DUT and speed up the test.
Sync State Off Period:	The amount of seconds the port sync states will be off.

Switch Test Port Roles:	If checked the port with the Test and Learning roles will be swapped between test trials. Enabling this may help clearing the MAC learning tables in the DUT and speed up the test.
DUT Aging Time:	If none of the two options above are checked the test will wait for the specified seconds between trials to ensure that the MAC table in the DUT has been cleared.
<i>Misc. Options</i>	
Fast Run Resolution:	Enable this option to perform fast resolution of a testrun based on polled data – the testrun will stop when a packet is received on monitoring port.

Address Learning Rate Test Options

Option	Explanation
<i>MAC Address Settings</i>	
Learning Base Address:	The first 3 bytes of the MAC addresses used for the learning test. It is necessary to use a different base address than the default Xena base address (04.F4.BC) when running a test using multiple addresses to avoid conflicts with other unused ports on the Xena tester.
Start Count:	The starting number of addresses used in the test.
End Count:	The ending number of addresses used in the test.
Step Count:	The address count step increment.

<p>Only Use Max. Capacity:</p>	<p>If checked the test will ignore the start, end and step options and only run the test at the max. capacity. This option is only used if an Address Caching Capacity test has previously been run as part of the same test and a capacity test result has been found for the frame size in question. Otherwise the test will default to use the start, end and step options.</p>
<p>Set End = Max. Capacity</p>	<p>If checked the test will ignore the end count option value and use the max. capacity value instead. This option is only used if an Address Caching Capacity test has previously been run as part of the same test and a capacity test result has been found for the frame size in question. Otherwise the test will default to use the end option value.</p>
<p><i>Learning Rate Settings</i></p>	
<p>Base Learning Rate:</p>	<p>The basic (i.e. maximum) learning rate used in frames/second. Note that the general port rate defined for the test configuration is ignored for this test.</p>
<p>Initial Rate:</p>	<p>The starting rate to use. This is specified as a percentage of the base learning rate.</p>
<p>Maximum Rate:</p>	<p>The maximum rate to use. This is specified as a percentage of the base learning rate and will typically be 100%.</p>
<p>Minimum Rate:</p>	<p>The minimum rate to use. This is specified as a percentage of the base learning rate. If the trial reaches this value the test is stopped and the result will be FAILED.</p>
<p>Resolution Rate:</p>	<p>The trial stops when the difference between the current and the last successful trial is less than the Resolution.</p>
<p><i>DUT Address Learning Reset</i></p>	
<p>Refer to the description for the equivalent options in the Address Caching Capacity test.</p>	

Errored Frames Filtering Test Options

Option	Explanation
<i>Rate Sweep Options</i>	
Start Rate:	The start rate to use in percent of the overall port rate defined.
End Rate:	The end rate to use in percent of the overall port rate defined.
Step Rate:	The step rate to use in percent of the overall port rate defined.
<i>Test Frame Options</i>	
Enable Oversize Test:	If checked the oversize frames test will be performed. You can disable this if your DUT generally supports very large frame sizes and you don't want to bother testing this.
Max. Valid Frame Size:	The maximum valid frame size you believe your DUT should support.
Oversize Test Span:	The number of oversize frame sizes to use in the test. The frame sizes used will be in the range [max. valid size + 1, max. valid size + span].
Min. Valid Frame Size:	The minimum valid frame size you believe your DUT should support. This value should typically be 64.

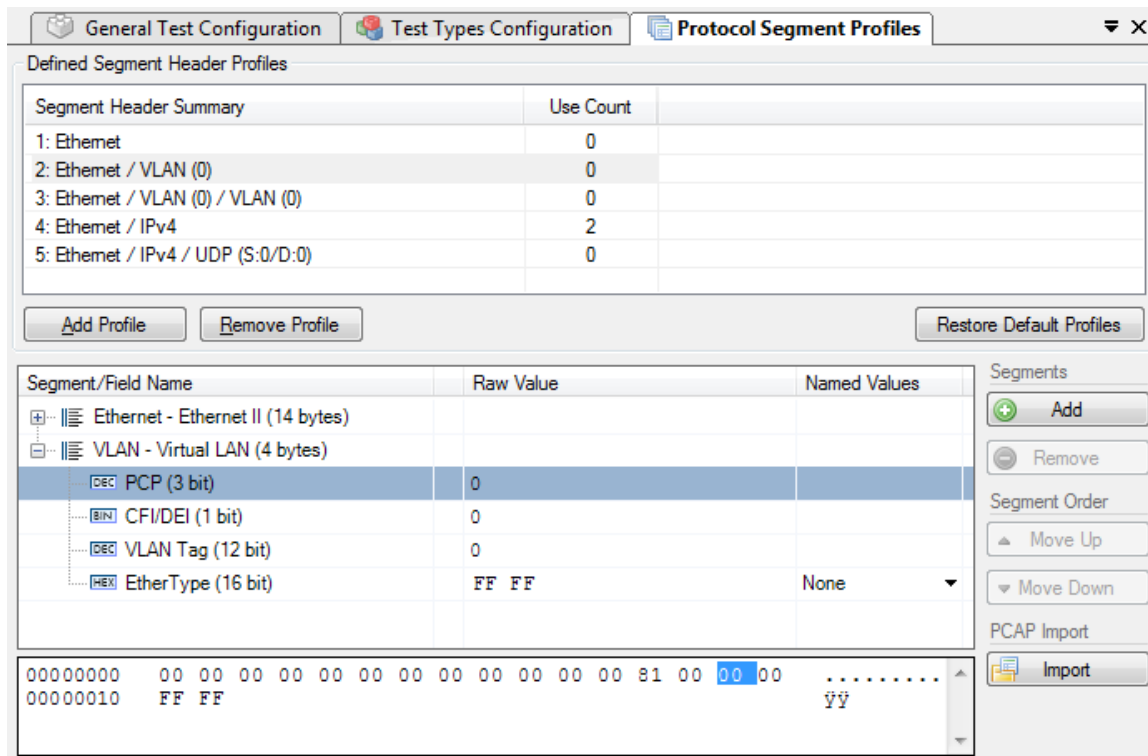
Undersize Test Span:	The number of undersize frame sizes to use in the test. The frame sizes used will be in the range [min. valid size – 1, min. valid size – span].
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Broadcast Forwarding Test Options

Option	Explanation
<i>Throughput Test Options</i>	
Initial Rate:	The starting rate to use. This is specified as a percentage of the overall port rate defined in the general test options panel.
Maximum Rate:	The maximum rate to use. This is specified as a percentage of the overall port rate.
Minimum Rate:	The minimum rate to use. This is specified as a percentage of the overall port rate. If the iteration reaches this value the test is stopped and the result will be FAILED.
Resolution Rate:	The trial stops when the difference between the current and the last successful trial is less than the Resolution.

PROTOCOL SEGMENT PROFILES

This panel allow you to manage the protocol segment profiles used for the test ports. The Valkyrie2889 enables you to define an asymmetric traffic setup so that each port potentially can be configured using a separate profile.



Managing Profiles

You can create and delete profiles to match the need of the current test scenario. To create a new profile press the **Add Profile** button. To delete a profile select it in the listview and press the **Remove Profile** button.

You can however not delete a profile that is currently being used by a testport. You can see the number of testports currently using a profile in the "Use Count" column in the listview at the top. To delete a profile that is in use you will first have to reassign all ports currently using that profile to another profile.

Default Profiles

When you create a new Valkyrie2889 configuration it will be populated with a number of default profiles. You can however freely modify and even delete one or more of the default profiles.

If for some reason, you want to restore the default profiles you can press the **Restore Default Profiles** button. This will unconditionally remove all current profiles (also those that are in use) and restore the default set. All test ports will be associated with the first default "Ethernet-only" profile.

Configuring Profiles

You can edit each profile by selecting it in the top listview and using the treeview control below.

Add and Remove Segment Headers

To add a new segment header, press the **Add** button in the **Segments** section to the right. You will then be presented with a dialog listing all built-in segment types from which you can select one or more types to be included. If you want to use a segment not currently supported by the Valkyrie2889 you can add a **raw segment** and specify the length in bytes. You can then afterwards edit the values in the resulting segment using the hex editor at the bottom.

You can remove one or more segments by selecting them and pressing the **Remove** button in the **Segments** section. You can change the order in which the segment headers appear by using the **Move Up/Down** buttons.

The Valkyrie2889 will automatically adjust the value of any standard "next-protocol" field (such as the **EtherType** field) in the segment headers when other segments are added, removed or moved.

Editing Field Values

The segment editor provides a treeview similar to the one found in the Wireshark protocol analyzer. You can thus expand each segment branch to view and optionally modify the various field values. Each field title is preceded with a small icon indicating the type of field value (decimal, hexadecimal, binary or IPv4/IPv6 address).

Certain fields, such as the EtherType, are associated with a set of commonly used named values. These can be selected in the Named Values column. You are however free to enter any value you want in the **Raw Value** column.

You can also edit the hex value of the segment headers directly using the hex editor at the bottom if you are so inclined.

MAC and IP Addresses

The address fields in the Ethernet and IP section headers will usually be overridden by the Valkyrie2889 when the teststreams are created:

- The Source MAC (SMAC) address field in the first Ethernet segment will be set to the MAC address of the source port.
- The Destination MAC (DMAC) address field in the first Ethernet segment will be set to the MAC address of the destination port. If an IP segment has been defined and a gateway IP address is defined for a source port, the Valkyrie2889 will however attempt to resolve the MAC address of the gateway using ARP or NDP and will then use this MAC address as the DMAC.

- The IP Source/Destination Address fields in the IP segment header will be set to the values configured on the ports, as explained in the **Selected Ports** panel section above.

This replacement will however only be performed if you leave the fields at their default (all-zeros) value. If you specify anything else this value will be used instead.

PCAP Import

You can import the protocol segment structure from a PCAP file captured using Wireshark or any other capture application capable of generating a standard PCAP file. If the file contains multiple packets Valkyrie2889 will display a list allowing you to select the desired packet.

Valkyrie2889 will attempt to decode the packet and display the known protocol headers and their fields. Any unknown fields will be displayed as a raw segment. As there are limitations in the max.size of a custom segment the import may not be possible in some cases. The import dialog will inform you about this if the situation arises.

REPORTING OPTIONS PANEL

The Reporting Options panel contains a number of options that affect the way reports are generated for the test.

Identification

This section contains a number of options that can help identify the test context.

- **Customer Name:** The name of the customer for which the test is performed.
- **Customer Service/Access Id:** These two options allow you to provide details about the network circuits you are testing.
- **Comments:** Allows you to provide any multi-line comments for the test configuration.

Report Generation

This section contains options that affect the way reports are generated.

- **Report Filename Prefix:** Specifies the prefix for the report filename.
- **Append Timestamp to Filename:** If checked a timestamp on the form <YYYYMMDD-HHMMSS> is appended to the filename prefix.
- **Include Detailed Port Information in Report:** If checked the report will also contain detailed results for each port. If unchecked only the totals will be reported.
- **Include Charts in Report:** If checked the report will include bar charts showing the test results. This is only applicable for PDF type reports.
- **Throughput Unit for Charts:** Use this to select whether to use frames/second or bits/second as the unit for throughput charts.

Report Formats

This section allows you to select which types of reports will be generated. You can enable several types. The generated report files will be given a file extension that matches the selected type, i.e. ".pdf" for PDF files and so forth.

XML Report Specification

You can find the [specification for the XML Report here](#).

In the Report formats section you can also activate the "Also Log Intermediate Results" option. It will log intermediate results for each test type to separate CSV logfiles (one for each enabled test type) located in the "ResultLog" subdirectory in the main Valkyrie2889 Reports directory.

RESULT DATA PANEL

The Result Data panel will display both polled progress data and result data for the tests being executed in a grid view. Each result will be shown in a single line in the grid.

The polled progress data is updated periodically while the current test trial is executing and will be shown with an *italics* font. After the test trial has completed the result data for that trial will be calculated and shown with a normal font.

The Result State column will show the state of the current trial run. While the test trial is in progress the state will always be "(pending)". A trial result may be final in which case the column will show either **PASS** or **FAIL**, depending on the test outcome. If the test needs to perform another iteration the state will again be "(pending)".


Result Data												Port: P-0-11-0				
Throughput: Full Mesh												Forwarding: Full Mesh				
Totals																
Frame Size	Result State	Iter. #	Tx Rate (Percent)	Tx Rate (L1) (Bps)	Tx Rate (Pps)	Rx Rate (Percent)	Rx Rate (L1) (Bps)	Rx Rate (Pps)	Loss Rate (Percent)	Loss (Packets)	Tx (Packets)	Tx Rate (L1) (Bps)	Tx Rate (Pps)	Rx (Packets)	Rx Rate (Pps)	
512	(pending)	1	53,172 %	15,95 M	3,75 K	53,17 %	15,95 M	3,75 K	0 %	0	18.740	7,98 M	1,87 K	18.740	1,87 K	
512	(pending)	1	54,733 %	16,42 M	3,86 K	54,73 %	16,42 M	3,86 K	0 %	0	19.290	8,21 M	1,93 K	19.290	1,93 K	
512	(pending)	1	55,513 %	16,65 M	3,91 K	55,51 %	16,65 M	3,91 K	0 %	0	19.565	8,33 M	1,96 K	19.565	1,96 K	
512	PASS	1	55,904 %	16,77 M	3,94 K	55,9 %	16,77 M	3,94 K	0 %	0	19.702	8,39 M	1,97 K	19.702	1,97 K	

The columns used will depend of the test being performed. Most tests will provide a set of "totals" values and a set of per-port values but as stated this depends on the test.

Most cell values will be displayed using the normal font color. Values that indicate an error, such as a non-zero loss value, will be displayed with a red font color.

CONFIGURATION ERRORS PANEL

This panel will show any configuration errors detected by the program when you attempt to execute a configuration. If any such errors are found the panel will be shown and the execution attempt will be aborted. You will have to correct any reported errors before the program will allow you to execute the configuration.

Configuration Errors	
 Please correct the errors listed below before starting the test.	
Error Message	Resource ID
You must enable exactly two ports for use!	Errored Frames Filtering
You must specify exactly one destination port!	Errored Frames Filtering

Each error will be shown in a separate line in the panel. If you double-click on an error message you will be taken to the relevant configuration panel that will allow you to correct the error.

This panel is by default found in the lower auto-hiding panel group. By "auto-hiding" we mean that the panel is initially hidden but will popup either if the panel tab is clicked or if the Valkyrie2889 program decides that it is necessary to direct the attention of the user to the panel. You can make the panel visible always by clicking the little "pin" icon in the top-right of the panel header.

APPLICATION SETTINGS

The Valkyrie3918 application features a number of application-level settings which are valid for all test configurations. These can be accessed in the **Options** menu item as shown in the figure below.

- **Set Username:** Allows you to specify the username used when logging in to the Xena testers. The default value will be your Windows username (shortened to 8 characters if longer).
- **Ask to Relinquish Ports:** If checked the Valkyrie3918 will prompt you when you try to use a port which is currently reserved by someone else. If unchecked the Valkyrie3918 will unceremoniously relinquish the port and reserve it in your name.
- **Open Last Configuration On Start:** If checked the configuration you had open when you last closed the application will automatically be opened the next time you start the application.
- **Set Reports Path:** Allows you to specify a different location for the generated reports. The default location is <ProgramData>XenaNetworksValkyrie3918Reports. The location of <ProgramData> varies between versions of Windows but can be obtained by inspecting the environment variable "ProgramData".
- **Set Tester Company Name:** Allows you to set the name of the company performing the tests. The default value is "Xena Networks ApS"
- **Set Tester Company Logo File:** Allows you to specify the path to an image file which will be used as the logo in the reports. The default logo is the Xena Networks logo. The image can be in PNG or JPG format. It should have the approximate dimensions of 150 x 60 pixels and be set to a DPI of 96.

- **Open Report in Associated Viewer:** If checked the Valkyrie3918 will attempt to open the generated report in the associated viewer. This is currently only applicable for PDF reports. This requires that a suitable PDF viewer (such as the Adobe Acrobat Reader) is installed on your PC.

COMMAND LINE INVOCATION

The Valkyrie2889 supports a number of command line options which can be used to automate the execution of a predefined configuration file.

INVOCATION DETAILS

Valkyrie2889 is part of a new series of Xena test tools series that does not require a separate executable file to perform the command line functionality. The same executable (*Valkyrie2889_<version>.exe*) is used for both the GUI and the command line functions.

COMMAND LINE OPTIONS

The valid command line options are as follows:

Command option	Explanation
-c, -config	Load a test configuration file with the specified path.
-e, -execute	Execute the specified test configuration file (requires -c <file>). If this option is used the program will not show the GUI but will run in command line mode.
-u, -user	Set the username used when logging on to Xena testers (default: xenarun).
-r, -reportpath	Set the path where reports are saved.
-o, -company	Set the company name used in reports.

-l, -logo	Set the path to the report logo file.
-h, -help	Display this help screen.

TROUBLESHOOTING

This section contains some guidelines when you encounter a problem with one of the Xena test applications, such as [ValkyrieManager](#), [Valkyrie2544](#), [Valkyrie1564](#), [Valkyrie3918](#) or [Valkyrie2889](#) and want to obtain help from your support representative.

BASIC INSTRUCTIONS

This section explains how you should report a problem to your support representative.

Describe the Problem

To enable fast resolution of your problem we request that your support request contains the following information:

- Name and version of the Xena test software used (the version can be seen in the main title bar)
- A description of what you are trying to do with the software.
- If the software misbehaved please describe what you actually encountered and you expected instead.
- Screenshots of any error situation.
- The test configuration file for the application (contained in the support archive).
- Any debug log files for the application (contained in the support archive).

Create a Support Information Archive

The Xena test applications include a menu entry called **Create Support Information Archive** which will create a compressed ZIP archive containing both the currently loaded configuration file and the content of the **Logs** and **Settings** directories. This file can then be emailed to your support representative.

For the Valkyrie2889 and similar test applications this menu entry is located in the **Help** menu. For the ValkyrieManager application it is located in the **Tools** ribbon menu.

Please note: For the Valkyrie2889 and similar test applications it is important that the configuration file used when the problem was detected is loaded when the support archive is generated. Otherwise the configuration file will not be part of the archive.

Attach Screenshots

Screenshots are a great and easy way of communicating what you see on the screen. To obtain a screenshot of a running program and send it to Xena support perform the following actions:

1. Point your mouse inside the program window.
2. Press the <Alt-PrintScr> keys simultaneously.
3. Switch to your email program and start a new email message.
4. Press <Ctrl-V> or select “Paste” from the menu (most likely the “Edit” menu) to insert the screenshot into the email.

ADDITIONAL DETAILS

This section goes into a bit more detail about the various items contained in the Xena Support Archive mentioned above.

Configuration Files

The Xena test applications keeps their configurations in special files with an application-specific extension. The extensions used are as follows:

<i>Valkyrie2544:</i>	*.v2544
<i>Valkyrie1564:</i>	*.v1564
<i>Valkyrie3918:</i>	*.v3918
<i>ValkyrieManager:</i>	*.vmcfg

The configuration files will be located in a common Xena data directory on your PC. More specifically they will be located in the following path: **C:<UserAppDataDir>Xena<XenaTestApplication>**. The <UserAppDataDir> directory depends on your Windows version:

<i>Windows Vista, 7 and 8:</i>	C:Users<username>AppDataRoaming
<i>Windows XP:</i>	C:Documents and Settings<username>}Application Data

The <username> is the name of the currently logged-in user.

The Xena test applications include a menu entry called **Explore Xena Data Directory** in the **File** menu that will open a Windows Explorer in the correct directory, regardless of the Windows version.

Debug Log Files

The Xena test applications logs certain events and errors to a series of debug log file located in the Logs subdirectory under the above mentioned main application data directory. If you encounter errors it may help the support if you include these files in your support request.