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Complimentary Reference Material

This PDF has been made available as a complimentary service for you to assist in evaluating this model for your testing requirements.

TMG offers a wide range of test equipment solutions, from renting short to long term, buying refurbished and purchasing new. Financing options, such as Financial Rental, and Leasing are also available on application.

TMG will assist if you are unsure whether this model will suit your requirements.

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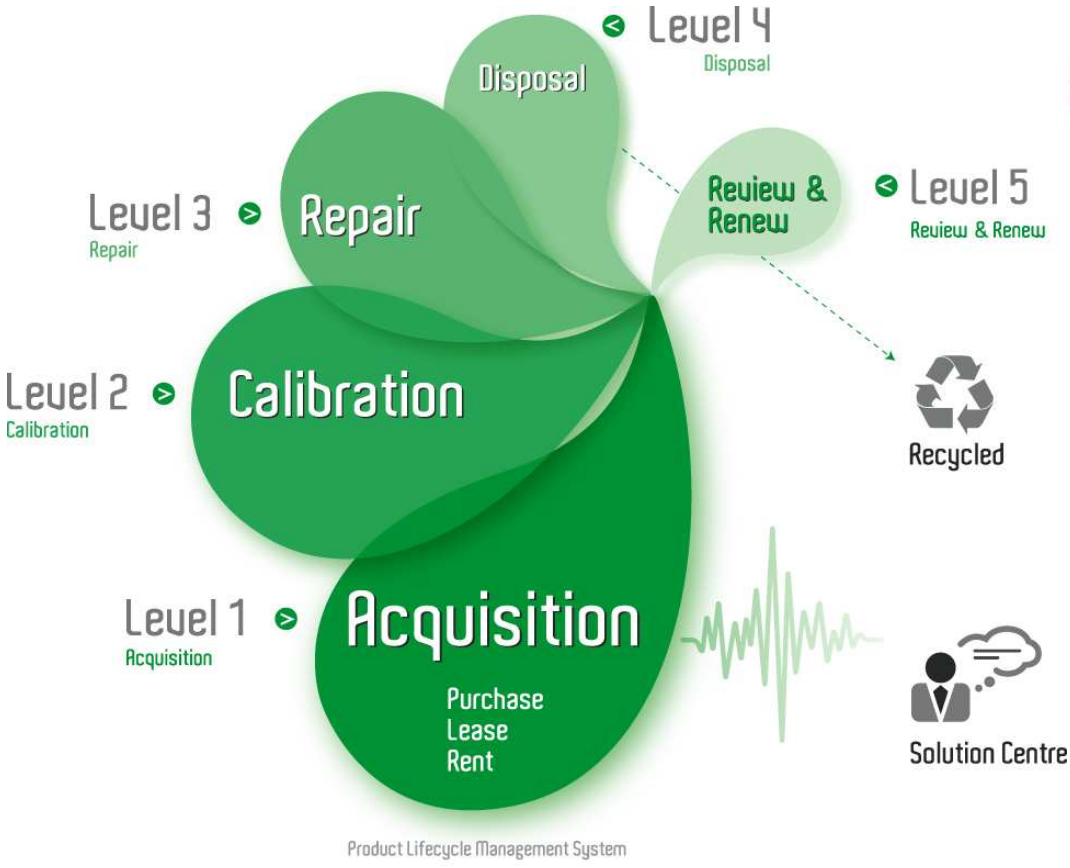


SPIRENT Communications

Inspired Innovation

Spirent TestCenter
PACKET GENERATOR AND ANALYZER BASE PACKAGE

Convergence is creating a new generation of integrated network devices and services that are much more complex than ever before. The resulting increased complexity, scarcity of testing skills and architectural shortcomings in current test systems is hurting the ability of manufacturers to ship products on time at escalating quality levels and slowing service providers' ability to deploy networks that get Quality of Experience (QoE) right the first time.

INCREASE PRODUCTIVITY: GET THERE FASTER WITH SPIRENT TESTCENTER

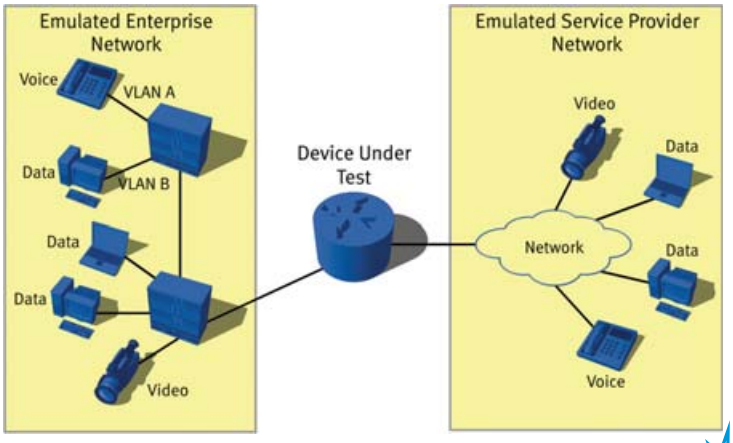
- Evaluate the stability of switches and routers under static or dynamic traffic load conditions for minutes, hours and days
- Characterize and troubleshoot functional behavior (including negative testing) of new network functionality in the development lab or before deployment into the operational network
- Evaluate key performance parameters such as per-flow QoS, fail-over time or Access Control List (ACL) filtering performance
- Perform comparative analysis of devices or services with deterministic traffic during product development cycles or vendor comparisons
- When used in conjunction with any of Spirent TestCenter's additional protocol packages, the package can emulate complex network topologies and traffic conditions

Spirent can help you address this challenge with Spirent TestCenter 2.0 with its innovative Inspire Architecture™. Now you can create and execute more complex test cases in less time with the same resources – and scale tests higher while debugging problems faster. The results: lower CAPEX and OPEX, faster time to market, greater market share and higher profitability.

The Packet Generator and Analyzer Base Package allows network equipment manufacturers, service providers and large enterprises to quickly evaluate and troubleshoot the functionality, scalability and performance of switching and routing devices and networks.

An interactive tool for customized Layer 2 and Layer 3 test creation and analysis, the Packet Generator and Analyzer Base Package provides the highest degree of control over system configuration, the widest variety of statistical results and broadest selection of real time troubleshooting tools.

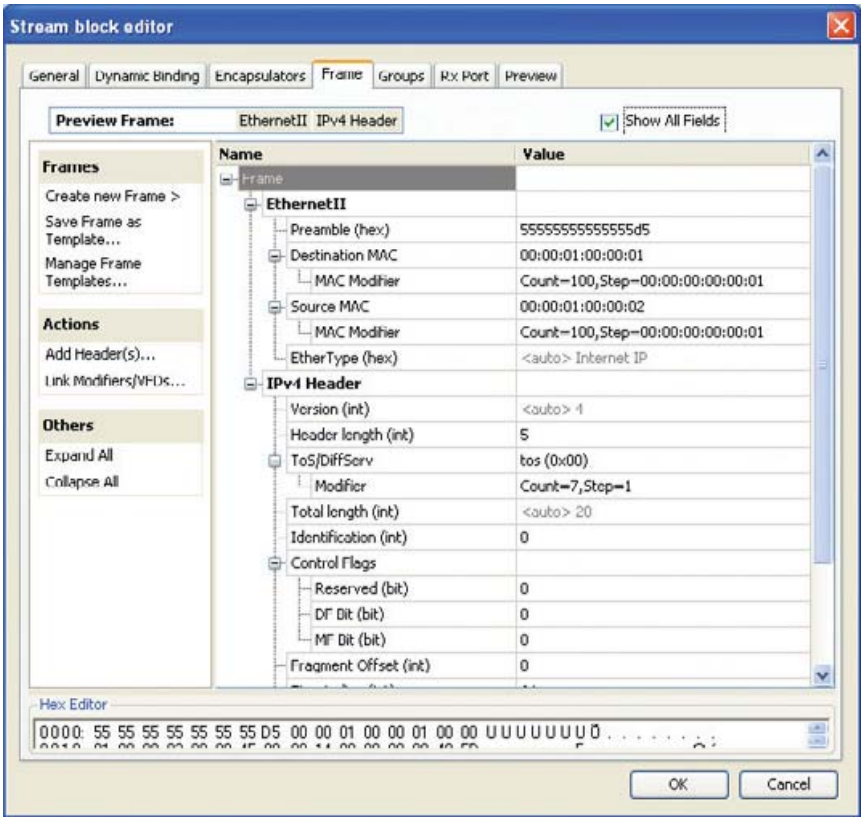
- Ethernet is supported from 10Gbps down to 10Mbps
- Packet over SONET (POS) is supported at OC-192c, OC-48c, OC-12c and OC-3c
- Comprehensive support is provided for Ethernet protocols
- Support for the TCP/IP suite includes IPv4 and IPv6 and well as tunneled and dual-stack configurations
- Critical protocols such as spanning tree, VLAN, DHCP, IGMP, PPP, MPLS, QoS and IPTV are integrated. The system supports a broad selection of unicast and multicast routing protocols.



Spirent TestCenter™

KEY FEATURES

- Incoming traffic can be segregated into 65,535 different categories based on user-defined combinations of five filters
- Prioritized scheduling mode allows users to mix constant and bursty traffic on the same port, as well as precisely scheduling high priority flows to minimize jitter and other performance parameters
- Users can define, save, and load their own results views (counters and charts) to display only the required statistics organized exactly as desired
- User-defined traffic groups allow flexible combinations of stream blocks for summary analysis
- Eight 4-byte pattern matching filters can be combined with AND, OR and NOT logic to create powerful criteria to start capture, filter frames in the capture buffer, or stop capture

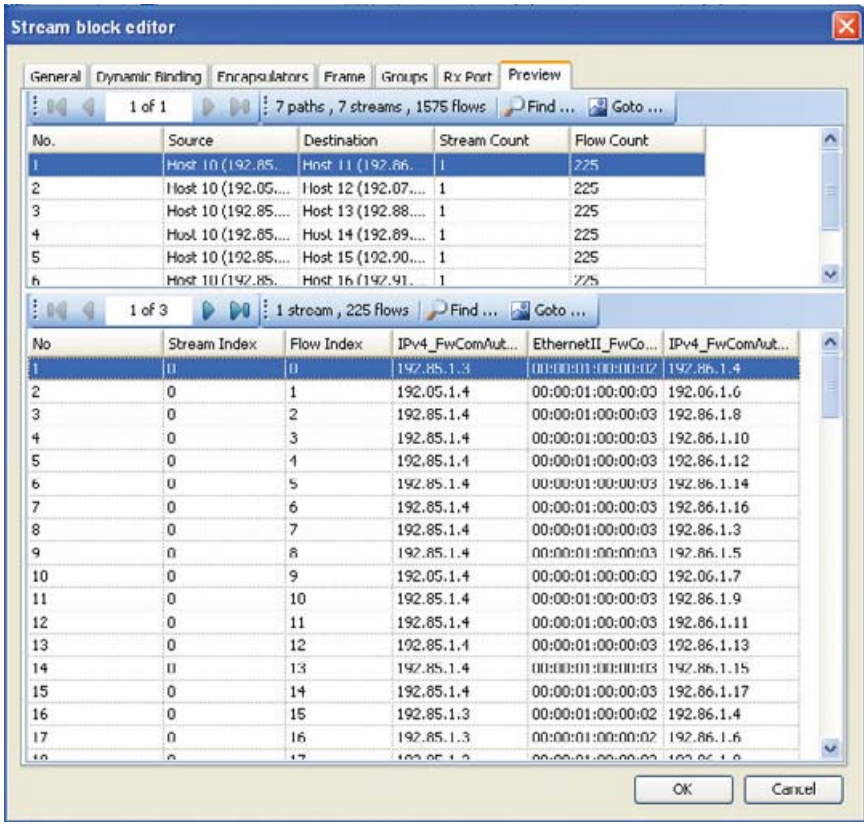


XML-based PDU Editor allows deep functional testing by making each field available for modification.

- Counters and charts for all stream and port statistics are available in real time as the test executes
- New stream blocks feature make configuration of thousands of streams across hundreds of ports as easy as configuring one stream on one port
- Frame template selection tool provides instant definitions of a wide range of realistic traffic patterns. XML-based PDU editor facilitates detailed construction of custom traffic patterns. With help from Spirent's Professional Services, testers can create and load their own custom frame templates and use them as easily as they use Ethernet.
- New software-based fields can be combined with six hardware-based ones to create complex traffic patterns involving billions of inter-related flows. Incrementing, decrementing and random patterns are supported as well as a user-defined list. Shuffle mode allows the user to enter a range of values and generate a random, non-repeating pattern within the range.
- Users can modify stream block rates and other frame parameters in real time without stopping generated traffic
- All GUI commands are now available in the command sequencer, giving testers a powerful tool to carefully plan routing and access events as well as controlling learning, counters, capture, generators and analyzers
- Once you configure your test in the GUI, you can export it to a script for automated execution

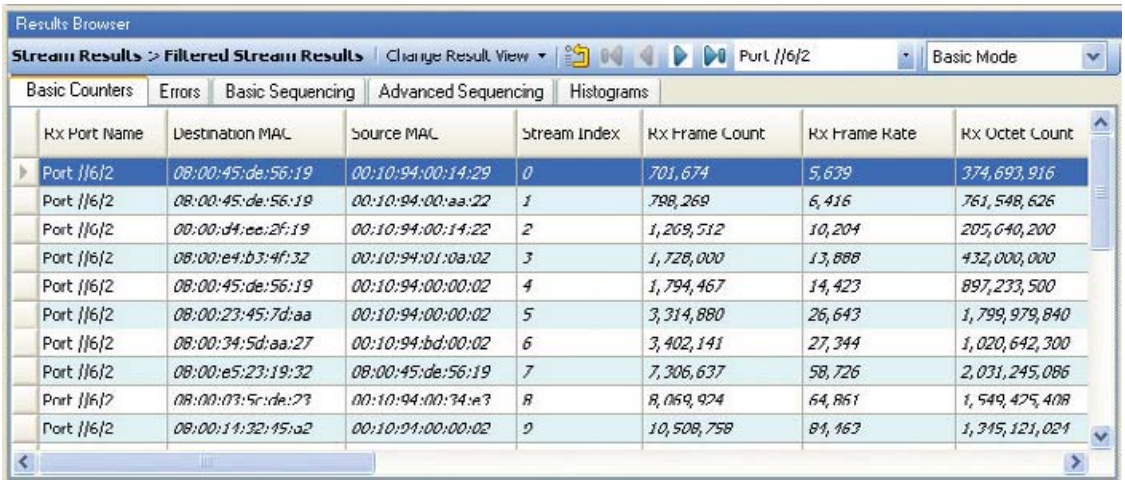
BENEFITS

- *Reduce time to test:* Using BPK-1001A, testers can dramatically decrease the time required to test their network devices and qualify their new network services
- Traffic generation tools streamline the configuration of large, complex customized test cases
- New Inspire Architecture radically reduces time required to download large-scale test configurations
- Real time control over generated traffic reduces test execution time
- Powerful and unique analysis capability including Spirent's HyperFilter technology accelerates interpretation of test results
- Packet library and PDU builder streamline functional test configurations and allow careful targeting of specific feature sets
- Integrated troubleshooting tools reduce time to identify and correct problems
- GUI-to-script simplifies and eliminates time and effort required to automate test cases
- Integrated reporting tools quickly produce summarized and detailed test reports
- Port, firmware and license management features reduce system administration time
- *Industry-leading scalability:* BPK-1001A helps testers capitalize on Spirent TestCenter's unmatched scalability
- Emulate large networks with thousands of hosts. Generate up to 32,767 streams per port and track up to 65,535 incoming streams per port.
- Manage large-scale test configurations involving hundreds of ports or 11 chained chassis. Test creation tools are optimized to create large scale test scenarios in just a few clicks.
- Spirent's Inspire Architecture is streamlined to facilitate large port and stream-count tests
- *Unparalleled analysis capability:* Increase test case throughput, reduce test time, and increase the productivity of engineers by taking advantage of BPK-1001A's rich set of test statistics



The Stream Block Editor preview shows the value for each variable field.

- Flexible classification of results based on any characteristic of the received traffic (QoS levels of service, protocols, source and destination addresses, VLAN tagging including VLAN stacking)
- Provides over 1.5 million user-selectable real time statistics per receive port
- Concurrently runs advanced measurements in real time such as jitter, packet loss, sequencing, latency, and data integrity using PRBS techniques



Rx Port Name	Destination MAC	Source MAC	Stream Index	Rx Frame Count	Rx Frame Rate	Rx Octet Count
Port //6/2	08:00:45:de:56:19	00:10:94:00:14:29	0	701,674	5,639	374,693,916
Port //6/2	08:00:45:de:56:19	00:10:94:00:aa:22	1	798,269	6,416	761,548,626
Port //6/2	00:00:d4:ee:2f:19	00:10:94:00:14:22	2	1,269,512	10,204	205,640,200
Port //6/2	08:00:e4:b3:4f:32	00:10:94:01:0a:02	3	1,728,000	13,888	432,000,000
Port //6/2	08:00:45:de:56:19	00:10:94:00:00:02	4	1,794,467	14,423	897,233,500
Port //6/2	08:00:23:45:7d:aa	00:10:94:00:00:02	5	3,314,880	26,643	1,799,979,840
Port //6/2	08:00:34:5d:aa:27	00:10:94:bd:00:02	6	3,402,141	27,344	1,020,642,300
Port //6/2	08:00:e5:23:19:32	08:00:45:de:56:19	7	7,306,637	58,726	2,031,245,086
Port //6/2	08:00:03:5c:de:23	00:10:94:00:34:e3	8	8,059,924	64,861	1,549,425,408
Port //6/2	08:00:14:32:45:a2	00:10:94:00:00:02	9	10,508,758	84,463	1,345,121,024

HyperFilters segregate each stream into different MAC addresses, IP addresses, ToS levels or any other user-defined characteristics of the received traffic.

TECHNICAL SPECIFICATIONS

HyperFilters™

- The analyzer supports a combination of 5 HyperFilters, 4 16-bit and 1 32-bit that operate on the incoming traffic stream
- HyperFilters separate traffic into as many as 65,535 sub-streams for detailed analysis
- Automatically identifies Layer 2 (including MPLS and VLANs), Layer 3 and Layer 4 encapsulations per templates

Analyzer – Port Measurements

- Up to 65,535 streams or sub-streams can be analyzed on a single port
- All port counters have associated rate counters
- All port counters are 64-bits wide, can be charted, and are available in real time
- Additional base and test packages add port counters to this set. See documentation for each software product to determine which counters are included.
- Generator and Total Port Counts: Tx and Rx Frames, Tx and Rx Octets, Generator Frames, Generator Octets, Generator Signature Frames, Generator Signature Octets, Rx FCS Error Frames, Generator CRC Error Frames, Generator L3 Checksum Errors, Generator L4 Checksum Errors, Rx IPv4 Checksum Errors, Rx TCP Checksum Errors, Rx UDP Checksum Errors, Rx PRBS Filled Octets, Rx PRBS Bit Errors, Rx FCS Error Frames, Total IPv4 Frames, Total IPv6 Frames, Total Tx MPLS Frames, Generator IPv4 Frames, Generator IPv4 Frames, Generator IPv6 Frames, Generator VLAN Frames, Generator MPLS Frames, Rx IPv4 Frames, Rx TCP Frames, Rx UDP Frames, Rx MPLS Frames, Rx ICMP Frames, Rx VLAN Frames, Generator Undersized Frames, Rx Undersized Frames, Generator Oversized Frames, Rx Oversized Frames, Generator Jumbo Frames, Rx Jumbo Frames
- CPU Port Counts: Tx and Rx CPU Frames, Tx and Rx CPU Octets, Tx and Rx CPU IPv4 Frames, Tx and Rx CPU IPv6 Frames, Tx and Rx CPU ARP Requests, Tx and Rx CPU ARP Reply, Tx and Rx CPU ICMP Echo Requests, Tx and Rx CPU ICMP Echo Replies
- QoS Counters: The Analyzer supports a counter set for each value of the ToS/Diffserv byte in an IPv4 or IPv6 frame. The user can choose to count for a single IP Destination or for all traffic received on the port. For each value of the ToS/Diffserv byte the analyzer tracks: Value of the byte, IPv4 Frames, IPv6 Frames and associated rates.
- SONET Counts: Abort Count, Drop Count, Line Count, Path Count, REIL Count, REIP Count, Section Count

Analyzer – Per Stream and Per Sub-stream Measurements

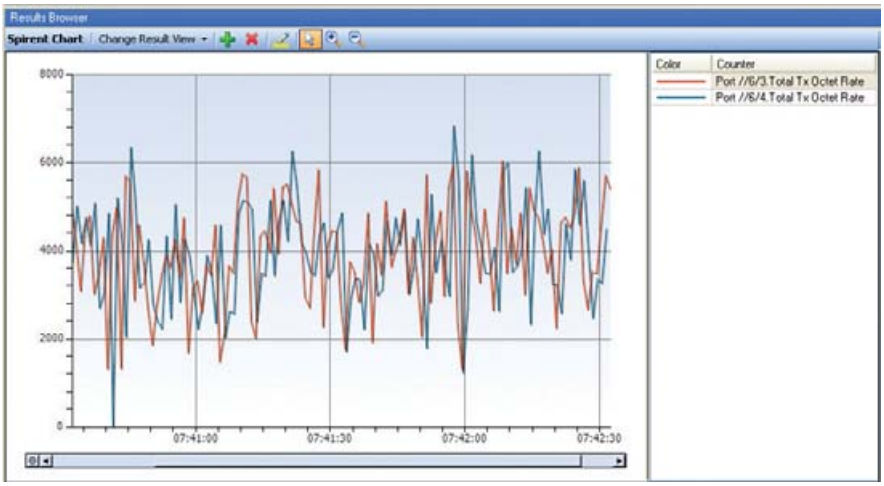
- The analyzer supports the same set of statistics whether they are gathered per stream or per sub-stream (with the exception of sequence-based statistics)
- All stream counters have associated rate counters (except where the rate is not defined)
- All stream counters are 64-bits, can be charted, and are available in real time for all streams defined on the system
- Per-stream Counts: Tx and Rx Frames, Tx and Rx Octets, Rx IPv4 Checksum Errors, Rx TCP/UDP Checksum Errors, PRBS Bit Errors, PRBS Filled Octets, Rx FCS Error Frames, Average Latency, Minimum Latency, Maximum Latency, Total Latency, Dropped Frames, In-order Frames, Re-ordered Frames, Duplicate Frames, Late Frames, In Sequence Frames, Out-of-sequence Frames, Average Jitter, Minimum Jitter, Maximum Jitter, Total Jitter, Average Inter-arrival Time, Minimum Inter-arrival Time, Maximum Inter-arrival Time, Total Inter-arrival Time
- Per-stream Histograms: Each stream has a set of histograms. Each histogram has 16 bins with user-defined criteria. Histograms are available for Inter-arrival Time, Latency, Jitter, Frame Length, Sequence Difference and Sequence Run Length.

Analyzer – Traffic Group Measurements

- Users can assign stream blocks to user-defined traffic groups for analysis of aggregated statistics
- All traffic group counters have associated rate counters
- All group counters are 64-bits, can be charted, and are available in real time for all traffic groups defined on the system
- For each traffic group the analyzer measures: Tx Frames, Rx Frames, Tx Octets, Rx octets

Analyzer – Capture

- Eight 4-byte pattern matching filters can be positioned anywhere in the frame and combined with AND, OR and NOT logic to form a combination trigger/counter to start capture, qualify frames in the capture buffer or stop capture
- Combination trigger can be combined with OR and NOT logic with a set of 17 different event triggers to start capture, qualify frames in the capture buffer, or stop capture. Supported events are: FCS Error, PRBS Error, Layer 1 Error, IPv4 Checksum Error, TCP/UDP/IGMP Checksum Error, Signature Sequence Error, Undersized Frame, Oversized Frame, Jumbo Frame, Signature Frame, IPv4 Packet, TCP Packet, UDP Packet, IPv6 Packet, IGMP Packet, a particular Frame Length or a particular stream ID.
- Captured packets can be filtered, decoded, examined and saved to a file
- When combined with BPK-1029A, Spirent TestCenter Enhanced Capture and Decode Base Package BPK-1001A supports real time decodes of captured traffic, full-resolution of the Spirent timestamp, decode of the Spirent signature, display of the captured preamble and ladder diagrams of routing protocols



Define real-time charts to monitor critical statistics while the test executes.

Generator – General Stream and Stream Block Parameters

- The number of supported streams varies by hardware. BPK-1001A supports the maximum of 32,767 configured streams per port.
- Each stream block can have a fixed, incrementing, decrementing or randomly-generated frame length. Frame length can be set automatically to the smallest size compatible with the headers defined in the PDU.
- Users can choose the following modes to set the load per stream block – percent of line rate, frames per second, inter-frame gap (in bytes, milliseconds or nanoseconds), bits per second, kbits per second or megabits per second
- For bursty traffic, the user can define the inter-burst and the inter-frame gap (in bytes)
- Staggered start for stream blocks on the same port is supported via a user-defined start offset
- Most stream block parameters (rates, PDUs, frame size, etc.) can be changed during the test without stopping the generator. Stream blocks can be created and enabled for transmission on the fly as well as disabled and deleted.
- Host, router, route, interface and traffic wizards allow users to create large test scenarios with the same effort it takes to create small ones. For example, using the host wizard you can quickly create thousands of hosts across hundreds of ports in just a few clicks of the mouse. Using the Traffic Wizard, thousands of streams can be created across a large-port test in the same amount of time it would take to create a single stream on one port.

Generator – Encapsulation Templates and PDU Editor

- The Frame Template selector contains hundreds of frame templates to simplify the rapid creation of realistic traffic
- Spirent TestCenter's integrated packet library streamlines deep functional testing targeted at specific device features
- With support from Spirent's Professional Services team, users can add customized templates to the Frame Template selector and use the defined PDUs in the PDU Editor
- Each field within the PDU (including the preamble of Ethernet frames) can be edited. Field validation can be turned off to allow for negative testing.
- Each field within the PDU can be the target of a stream modifier (a software-based modifier that increments the stream ID at the same time as it modifies the target field) or a hardware modifier
- Stream and hardware modifiers support incrementing, decrementing, random, list and shuffle mode
- Stream and hardware modifiers can be chained in any combination to support complex traffic patterns (although stream modifiers can not be chained to hardware modifiers and vice versa)

Generator – Schedule Modes and Port-based Parameters

- BPK-1001A supports three scheduling modes: Port-based (traffic rate and burst characteristics set per port), Rate-based (traffic characteristics set per stream using a rate-based algorithm), and Priority-based (traffic rate and burst characteristics set per stream using a user-defined priority level to govern stream scheduling)
- Users can mix bursty and constant rate traffic emanating from the same port using the Priority-based scheduling mode
- Traffic can be generated continuously, for a number of bursts, or for a user-defined time period
- Users can set the jumbo, undersized and oversized frame thresholds per port

Generator – Command Sequencer

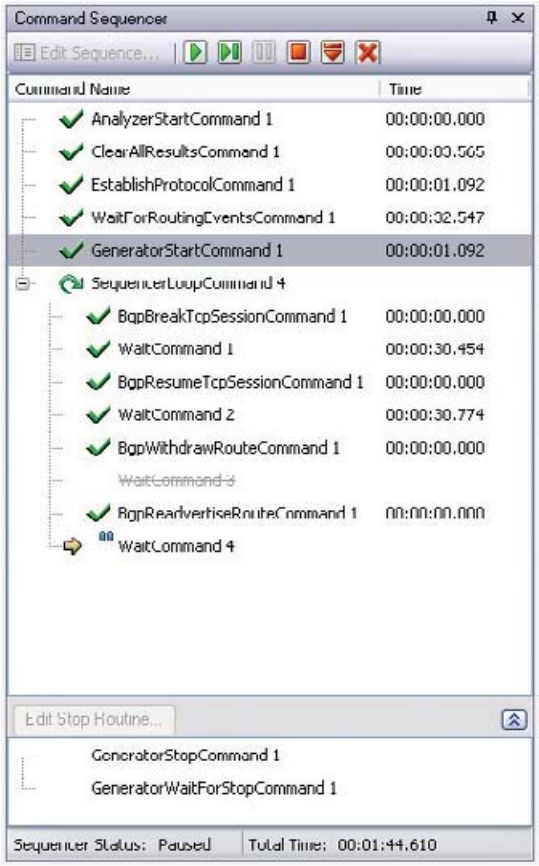
- All GUI commands in BPK-1001A can be placed in the command sequencer and included as part of a test timeline with hundreds of commands available
- Commands in the sequencer can be combined into a group. Each group can be the target of a loop to be executed until the user manually breaks it or for a fixed number of iterations.
- Each step can be individually enabled or disabled
- Configurable time delays can be inserted between each step
- Call an external script before, after or at any point during the schedule to configure, monitor and/or manage the DUT/SUT during the sequence execution
- Using the custom test command users can implement continuous tests, stepped tests, throughput tests with incrementing loads and frame sizes
- Users can create detailed and automated control over Layer 2 and Layer 3 learning sequences using sequencer commands

Generator – MII and MDIO Registers

- BPK-1001A provides an interface to MII and MDIO registers for Ethernet 10/100/1000 and 10G test modules
- Users can read the contents and write (when appropriate) new values to each register within the MII or MDIO register space
- Users can define register templates, save these in a file, and load saved templates into the application

Generator/Analyzer – Error Insertion and Analysis

- Users can inject FCS errors, IPv4 and IPv6 checksum errors, TCP checksum errors and UDP checksum errors
- Users can place errors in most fields within a PDU by turning off field validation and editing the field
- The analyzer provides counts and rates for all injected errors



Users can create detailed and automated control over test events using the command sequencer.

SUPPORTED MODULES

Series 2000 modules provide higher performance than Series 1000 modules; contact your Spirent representative for details.

BPK-1001A supports all Spirent TestCenter test modules and personality cards.

REQUIREMENTS

- Pentium® or greater PC running Windows® XP Professional SP2 with mouse/color monitor required for GUI operation
- One Ethernet cable and one 10/100/1000 Mbps Ethernet card installed in the PC
- For test automation system requirements refer to the Spirent TestCenter Automation data sheet (P/N 79-000037)
- Operating system languages supported: English, French, German, Italian, Japanese, Korean and Chinese (traditional and simplified)

Spirent TestCenter

PACKET GENERATOR AND ANALYZER BASE PACKAGE

MINIMUM PC REQUIREMENTS

- Small Port System: 1-25 ports
  - 2.4GHz Pentium 4 or equivalent with 512MB of free RAM and 10GB of free disk
- Medium Port System: 26-75 ports
  - 3GHz Pentium 4 or equivalent with 2GB of RAM and 15GB of free disk space
- Large Port (75+ ports)
  - E6400 Core 2 Duo or equivalent with 3GB of RAM and 100GB of free disk space

RECOMMENDED PC REQUIREMENTS

- Small Port System: 1-25 ports
  - E6300 Core 2 Duo or equivalent with 2GB RAM and 10GB free disk space
- Medium Port System: 26-75 ports
  - E6400 Core 2 Duo or equivalent with 3GB RAM and 100GB free disk space
- Large Port System: 75 ports and above
  - E6600 Core 2 Duo or equivalent with 4GB RAM and 100GB free disk space (disk should be 2 SATA 300 disks in a RAID 0 configuration)

ORDERING INFORMATION

Spirent TestCenter Packet Generator and Analyzer Base Package A: (P/N BPK-1001A)

Other Spirent TestCenter Software

Many of these software components add functionality that can be manipulated using the Packet Generator and Analyzer Base Package. Please consult the data sheet for each base and test package to determine its specific capabilities.

SPIRENT GLOBAL SERVICES

Spirent Global Services optimizes your productivity with Spirent TestCenter over a broad range of technologies:

Professional Services

- Test lab optimization: Test automation engineering services
- Service deployment and service-level optimization: Vendor acceptance testing, SLA benchmarking, infrastructure and security validation
- Device scalability optimization: POC high-scalability validation testing

Education Services

- Web-based training: 24 x 7 hardware and software training
- Instructor-led training: Hands-on methodology and product training
- Certifications: SCPA and SCPE certifications

Implementation Services

- Optimized new customer productivity with up to three days of on-site assistance

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