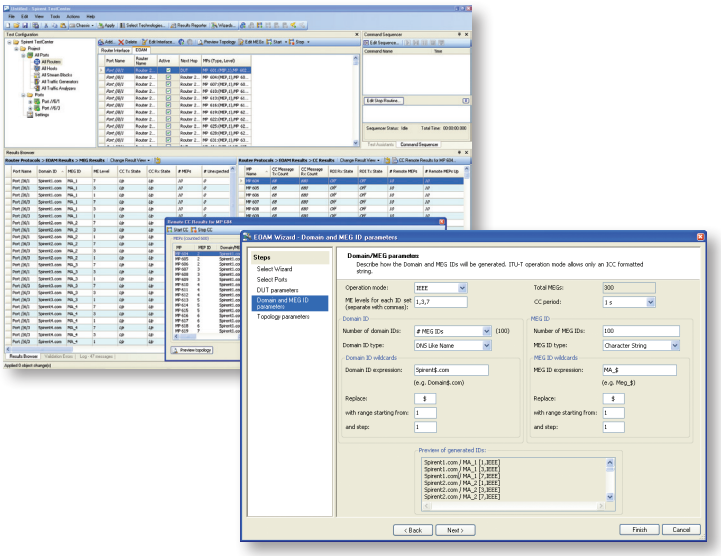
SPIRENT TESTCENTER

ETHERNET OAM FAULT MANAGEMENT & PERFORMANCE MONITORING DATA SHEET

Spirent TestCenter provides comprehensive support for the testing of Ethernet Operations, Administration and Maintenance (EOAM) procedures as specified in ITU-T Y.1731 and IEEE 802.1AG. Spirent TestCenter provides the protocol emulation necessary for functional, interoperability and performance testing of EOAM implementations in routers and switches. By combining Carrier Ethernet, MPLS and Mobile Backhaul test packages, the Spirent TestCenter system provides the industry's most complete solution for testing metro ethernet and converged mobile backhaul networks and devices.

GET IT DONE FASTER WITH SPIRENT TESTCENTER™

- **Easy test setup—**Test configuration wizard and parameter tables allow quick definition of multiple Maintenance Points, Maintenance Associations (MAs) and Levels with a few mouse clicks
- **Quickly assess functionality—**Easily send and receive ETH-CCs, ETH-LBs, ETH-LT, ETH-LMMs, ETH-LMRs, ETH DMMs, and ETH-DMRs from emulated nodes and monitor tracked statistics per node, port or MA to detect implementation errors and confirm proper operation
- **Build real world test scenarios—**Build complex multi-level topologies to simulate real world environments



The EOAM Fault Management base package allows users to create large emulated networks from a single test system. Each node in the emulated network can be used to generate and respond to EOAM messages to provide functional or performance testing in a controlled lab environment.

As well as performing the necessary message handling, this base package tracks comprehensive EOAM per port, MA and node statistics for quickly validating and troubleshooting devices or systems under test.

APPLICATIONS

- Verify EOAM Connectivity Fault Management (IEEE 802.1AG or ITU-T Y.1731) implementations over 1G, 10G, or 100G interfaces.
- Verify EOAM Performance Monitoring (ITU-T Y.1731) implementations over 1G, 10G, or 100G interfaces. 3.3 ms ETH-CC interval supported simultaneously on up to 300 MEPs on the same port.
- Test device under test (DUT) intermediate and endpoint behavior as message initiator or responder to Continuity Check, Link Trace, Loopback, Delay Measurement and Loss Measurement messages.
- Test DUT CCM database collection and reporting
- Validate DUT's ability to participate in large emulated maintenance associations with test system scale that supports thousands of emulated end points and MAs per port

Two levels of emulation are offered for the best value and best fit for specific test needs. For functional testing in a development test environment, Package A supports up to 10 nodes per port. For demanding system testing or proof of concept testing, Package B allows full-scale testing using thousands of nodes and MAs per port.

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KEY FEATURES

- Comprehensive, real time EOAM protocol counters for interactive testing and troubleshooting
- Generate and analyze EOAM messages for thousands of emulated MEPs
- Topology preview for visualizing emulated nodes and their connectivity to other nodes
- Summarized counters and information with drill-down statistics for problem identification and analysis
- Tracks message counts, timeouts and unexpected messages for all emulated nodes
- View detailed Link Trace path information
- Test configuration wizard for quick setup of multi-node, multi-MA/MEG topologies, including MAID/MEG ID stepping/iteration
- Supports EOAM messaging over single or stacked VLANs
- Easy to use Optional TLV editor
- Chain up to 254 MIPs for Link Trace testing
- Operates in IEEE or ITU-T mode

TECHNICAL SPECIFICATIONS

Supported Ports

- Supported on 10/100/1000 Mbps copper, 10/100/1000 Mbps fiber, and 10GbE

EOAM Configurable Parameters

- Test Mode Options
  - Test mode type—CC scale mode or Normal
- Layer 2 parameters
  - EtherType
  - C-VLAN EtherType
  - S-VLAN EtherType
  - CCM Multicast MAC address
  - Optional Link Trace Multicast MAC address
  - C-VLAN and S-VLAN ID
- Other parameters
  - Node active/inactive
  - Configured next hop
  - Operation mode: IEEE or ITU-T
  - Supported Functions and Parameters
- ETH-CC transmit and receive
  - CC Period: 3.3ms, 10ms, 100ms, 1s, 10s, 1min, 10min
  - Multicast or unicast CC
- ETH-LB transmit and respond
  - Initial transaction ID value
  - Fill with data pattern
  - Tx single or multiple messages
  - Disable LB response
  - Multicast or unicast LB (Y.1731 only)
- ETH-LT transmit and respond
  - Initial transaction ID value
  - TTL value
  - Tx single or multiple messages
  - IEEE 802.1ag CFM Configurable Parameters
  - Multicast or unicast Link Trace
- Configurable Optional TLVs
  - Sender ID
  - Port Status
  - Interface Status
  - Organization Specific
- Per Maintenance Association parameters
  - ME Level
  - CC Period
  - CC Priority
  - Domain ID type: none/DNS/MAC/string
  - Domain ID value
  - MAID type: VID/string/2 octet/VPN ID
  - MAID value
  - Expected MEPs
- Per MP parameters
  - AIS Period Override
  - AIS Rx Enable
  - LCK Period Override
  - LCK Rx Enable
  - MP name
  - Associated MA
  - Associated VLAN ID
  - MP type: MIP or MEP
  - MEP ID
  - LB response enable/disable
  - LT response enable/disable
  - Initial CC sequence number
  - Override CC period
  - Override Level value
  - RDI function: auto/on/off

ITU-T Y.1731 Configurable Parameters

- Global parameters
  - DM Common Time Source
  - LMR RxFCf Start
  - LMR RxFCf Step
  - LMR TxFcb Start
  - LMT Tx FCb Step
  - LMM TxFCf Offset
  - LMM RxFCf Offset
  - LMM TxFCb Offset
- Per Maintenance Entity Group parameters
  - AIS Period
  - AIS VLAN Priority
  - LCK Period
  - LCK VLAN Priority
  - MEG Level
  - CC Period
  - CC Priority
  - MEG ID string
  - Expected MEPs
  - DM VLAN Priority
  - LM VLAN Priority

- Per Maintenance Entity Group Parameters
  - DM Response Enable
  - LM Response Enable
  - LMR RxFCf Start/Step
  - LMR TxFCb Start/Step
  - LMM TxFCf Offset
  - LMM RxFCf Offset
  - LMM TxFCb Offset
- Per MP parameters
  - MP name
  - Associated MEG
  - Associated VLAN ID
  - MP type: MIP or MEP
  - MEP ID
  - LB response enable/disable
  - LT response enable/disable
  - Override CC period
  - Override Level value
  - RDI function: auto/on/off

Summarized EOAM Counters

- Port counters
  - AIS Tx count
  - AIS Rx count
  - LCK Tx count
  - TCK Rx count
  - CC Tx and Rx counts
  - LB Tx and Rx counts
  - LT Tx and Rx counts
  - # of MAs/MEGs
  - # of MEPs
  - Dropped packet count
- MA/MEG counters
  - MA/MEG ID
  - Domain ID (IEEE only)
  - Port name
  - ME level
  - CC Tx state
  - CC Rx state
  - # of MEPs
  - # of unexpected MA/MEG IDs
  - # of unexpected MA/MEG levels
  - # of timeouts
  - # of unexpected period values
  - Bad CC Rx count
  - Dropped packet count

ETH-CC Counters

- Per Local MEP counters
  - AIS Rx State
  - Lck Rx State
  - MP Name
  - CCM Tx count
  - CCM Rx count
  - RDI Rx state
  - RDI Tx state
  - # of remote MEPs
  - # of remote MEPs up
  - # of remote MEPs down
  - # of unexpected MEPs
  - # of unexpected MA/MEG IDs
  - # of unexpected MA/MEG levels
  - # of Timeouts
  - # of unexpected period values
  - Last sequence number in CCM
  - Dropped packet count
- Remote MEP counters
  - MEP ID
  - State
  - RDI state
  - MEP Ethernet address
  - CCM Rx count
  - Good CCM Rx count
  - Bad CCM Rx count
  - # of unexpected MEPs
  - # of unexpected MA/MEG IDs
  - # of unexpected MA/MEG levels
  - # of Timeouts
  - # of unexpected period values
  - Last sequence number in CCM
  - # out of sequence messages

ETH-DM Counters

- Per Port counters
  - DM Tx count
  - DM Rx count
- Per MEP counters
  - DMM Tx/RX count
  - DMR Tx/Rx count
- Detailed per MEP counters
  - DMM Rx counters
    - DMM Rx count
    - Tx Timestamp
    - Tx Timestamp Delts
    - Min/Max/Avg/Last DMM Backward Delievry
  - DMR Rx counters
    - DMR Rx count
    - Rx Timestamp
    - Rx Timestamp Delta
    - Tx Timestamp
    - Tx Timestamp Delta
    - Min/Max/Avg/Last Forward Delay
    - Min/Max/Avg/last Backward Delay

ETH-LB Counters

- Per MEP counters
  - MP Name
  - LBM Tx and Rx count
  - LBR Tx and Rx count
  - # of Timeouts
  - # of transaction ID mismatches
  - Dropped packet count
- Detailed Per MEP counters
  - Responder and requestor MAC address
  - LBM Tx and Rx counts
  - LBR Tx and Rx counts
  - Last transaction ID Tx and Rx
  - Requestor timeouts

ETH-LM Counters

- Per Port counters
  - LM Tx count
  - Lm Rx count
- Per MEP counters
  - LMM Tx count
  - LMM Rx count
  - LMR Tx count
  - LMR Rx count
  - TxFCf
- Detailed per MEP counters
  - LMM Rx counters
    - LMM Rx count
    - TxFCf
  - LMR Rx counters
    - LMR Rx count
    - TxFCf
    - RxFCf
    - TxFCb
    - Frame Loss Far end

ETH-LT Counters

- Per MEP counters
  - MP Name
  - LTM Tx count
  - LTM Rx count
  - LTR Tx count
  - LTR Rx count
  - # of Timeouts
  - # of transaction ID mismatches
  - Dropped packet count
- Detailed Per MEP counters
  - Responder and requestor MAC address
  - LTM Tx and Rx counts
  - LTR Tx and Rx counts
  - Last transaction ID Tx and Rx
  - Requestor timeouts
  - Link trace path results with list of MPs with: MP MAC address, Relay Action value, Last Transaction ID and TTL

ETH-AIS Counters

- Per MEP counters
  - AIS Tx count
  - AIS Tx State
  - AIS Rx count
  - AIS Rx State
  - AIS Rx Period

ETH-LCK Counters

- Per MEP counters
  - LCK Tx count
  - LCK Tx State
  - LCK Rx count
  - LCK Rx State
  - LCK Rx Period

APPLICABLE STANDARDS

- IEEE 802.1ag/D8.1 Connectivity Fault Management
- ITU-T Y.1731 OAM functions and mechanisms for Ethernet-based networks

REQUIREMENTS

- A SPT-2000A Spirent 2U Chassis and Controller, SPT-5000A Spirent 5U Chassis and Controller or SPT-9000A Spirent 9U Chassis and Controller, and one compatible Ethernet test module
- PC running Windows® with keyboard and mouse. Color monitor required for GUI operation. (Contact Spirent for current PC and Windows minimum requirements.)
- BPK-1001A Packet Generator and Analyzer Base Package required for data packet generation and analysis

ORDERING INFORMATION

- Ethernet OAM Fault management (IEEE 802.1ag & ITU-T Y.1731) Package A (low scale): (P/N BPK-1059A)
- Ethernet OAM Fault management (IEEE 802.1ag & ITU-T Y.1731) Package B (high scale): (P/N BPK-1059B)
- Packet Generator and Analyzer Base Package A:(P/N BPK-1001A)
- Ethernet OAM Performance Monitoring (ITU-T Y.1731) Package A: (P/N BPK-1150A)

AMERICAS 1-800-SPIRENT • +1-818-676-2683 • sales@spirent.com

EUROPE AND THE MIDDLE EAST +44 (0) 1293 767979 • emeainfo@spirent.com

ASIA AND THE PACIFIC +86-10-8518-2539 • salesasia@spirent.com

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