



DmSwitch 3000 – Series

DmSwitch 3000 Metro Ethernet Series

The DATACOM DmSwitch 3000 Switches Series offers reliable and high performance solutions for Metro Ethernet LANs and Corporate Networks.

It is composed by wire speed commutation devices, with a fix ports number in Fast and Gigabit Ethernet.

Through advanced QoS functionalities is possible to prioritize the traffic and control the bandwidth offered to each user end.

The DmSwitch 3200 Series provide packets commutation in L2, while the DmSwitch 3300 have L3 routing. As L2 protection mechanisms, are available the Spanning Tree Protocol (STP) in the following modes: Classic STP, Rapid STP and Multiple STP. It is also possible to aggregate physical ports assembling logical ports, enabling this way the bandwidth increasing and automatic protection in case of failure.

The Metro Ethernet Series can be managed in centralized mode via DATACOM DmView management platform, widely used to manage the many DATACOM products.

The DATACOM devices have Command Line Interface (CLI) via SSH, Telnet and Console RS-232, as well as Web Interface. The devices also have multiples firmware and configuration archives, easing the upgrade and the modifications management.

The DmSwitch 3000 devices are assembled with 1U height, allow its installation in 19-inch racks, provide hot-swap redundant power sources AC/DC full range and alarms input/output connections. The available SFP ports enable the usage of mini-GBIC with different reaches and fiber types. The mini-GBIC modules must be purchased separately.

Therefore, DmSwitch 3000 offers the maximum functionalities available for its switches category, which can be used in Metro Ethernet networks, as well as high reliability and performance Enterprise applications.

Through advanced characteristics of switching L2 and L3, it is possible to create topologies in compliance with new services over Ethernet networks.

This product is homologated by ANATEL in accordance with the procedures regulated by Resolution Nº 242/2000, and meets the technical requirements applied, including exposure limits of Specific Absorption Rate related to electric fields, magnetic and electromagnetic radio frequency, according to Resolution Nº 303/2002.



DATACOM DmSwitch 3000 Series is in accordance with many international standard norms, such as MEF CE2.0* and IEC 60950.

For further information, access the website www.anatel.gov.br.

** MEF 2.0 certified for E-Line (EPL), E-LAN (EP-LAN) and E-Tree (EP-Tree) services*

Main Features

Wire Speed L2 and L3

The commutation of packets in layer 2 and 3 is performed in silicon (ASIC), with a switch fabric of 12,8Gbit/s, and with a capacity of 9.5 million packets per second. In software are assembled the L2 and L3 protocols, in order to mount the MAC Address Table and IP Routing Tables, but the L2 switching or L3 routing is performed in hardware. The L2 tables handles up to 16,000 MAC addresses, while the routing L3 tables handles 4,000 host entries and 16,000 Longest-Prefix Match routes.

IP Routing

DmSwitch 3000 Series have up to 256 virtual router interfaces, represented by the VLANs, which will be used for L3 commutation (interVLAN routing). Besides that, are available the dynamic routing protocols RIPv2, OSPFv2 and BGPv4. The high availability can be implemented using VRRP protocol.

Management Facilities

A complete centralized FCAPS management available through the DATACOM's management too, the DmView, I over Windows and Solaris platform. The DmSwitch provides Command Line Interface (CLI) with automatic assistance in the syntax of commands and parameters, and is accessible through SSH, Telnet, and RS-232 Console. An internal Web Server with SSL, SNMPv1, v2c and v3 and 4 RMON groups are also available.

DmSwitch 3000 allow the creation of complex Access Control Lists (ACLs), with multiple parameters of comparisons and actions, which enables the swap, forwarding, drop or packets prioritization.

Tools are available for network and cabling infrastructure and connectivity diagnostics. It is possible to test discontinuities in the cable or cabling short cuts, informing the problem approximately distance.

There is also available the Monitoring function of Ports or Packet Flow, redirecting the traffic to a specific port.

DmSwitch 3000 Series stores up to 4 different configurations and 2 firmware versions in the memory. Through the flash configuration is possible to choose which configuration and firmware version will be loaded in the equipment initialization.

The 3000 Series provides the possibility to improve "inband" management, where the data traffic shares the same Ethernet port, used for management. It also provides the possibility to use one of Ethernet ports of the equipment to exclusively for the "outband" management.

QoS Implementation Facilities

DmSwitch 3000 Series has eight queues per port, with prioritization algorithms, which defines that a certain data flow will always be prioritized, configure weights to each queue, or define minimum forwarding rates, or even a mix of these methods. The classification can be performed in many different ways, such as by using VLANs, input ports, IEEE 802.1p, MAC Addresses, IP Addresses, the IP Precedence or DSCP fields, protocol, TCP/UDP source/destination ports, among other possibilities, allowing the data comparison up to L7.

The bandwidth control has a granularity of 64kbit/s on the definition of CIR (Committed Information Rate) and PIR (Peak Information Rate). This bandwidth can be applied to the input or the output port traffic, or even to a specific packet flow using hardware filters. These functions are implemented in hardware, thus it does not interfere in the normal operation of switch's CPU.

The filters are quite flexible features, allowing multiple matches and actions on the packets. Some of filter options supported are listed below:

- **Match:** 802.1p, all, destination-ip, destination-mac, destination-port, dscp, ethertype, protocol, source-ip, source-mac, source-port, tos-bits, tos-precedence, vlan, etc.
- **Action:** Permit, deny, 802.1p, 802.1p-from-tos, counter, drop-precedence, dscp, egress-block, int-802.1p, monitor, tos, vlan, etc.

Security

In order to guarantee a secure operation and maintenance of the installed devices, DmSwitch 3000 Family provide mechanisms that can be used to improve this security. Communication protocols use cryptography and it is possible to specify, through hardware filters, which units of the network may have management access to other devices.

A highly secure and trustworthy management structure may be built through local and remote Syslog, user authentication, authorization and accounting (AAA) through RADIUS and TACACS+, email alarm notification, single clock via SNTP and protection against Denial of Service (DoS) attacks.

The equipment has the capacity to store up to 4000 log lines locally, and 192kB in the Flash memory.

For Metro Ethernet applications, is available the limitation of MAC Address per port and per VLAN, protection mechanisms to L2 and L3 protocols against network attacks and bandwidth limitation for broadcast, multicast and Destination Lookup Failure (DLF) traffic.

VLANs

Virtual LANs may be built on DmSwitch 3000 Series, using all of the 4,094 VLANs defined in IEEE 802.1q standard simultaneously, offering double tagging (Q-in-Q) functionality and enabling the creation of Transparent LAN Services (TLS). Ports may also be overlapped on port-based VLANs.

It is also possible to include or not the VLAN field in the Ethernet Frames, in accordance with the specific configuration used in equipment ports. Besides that, it is possible to rewrite the VLAN of the Ethernet Frame, providing flexibility to the demands of VLAN mapping.

Protection Mechanisms

In layer 2, Spanning Tree protocols are available, including Rapid Spanning Tree (RSTP), which has shorter conversion times. DmSwitch 3000 also display 16 domains Per-VLAN Spanning Tree and the Multiple Spanning Tree (MSTP) for better resource allocation and greater scalability. It also provides the Ethernet Automatic Protection Switching (EAPS) protocol, which is specific for sub-50ms protection in Ethernet rings.

Through Link Aggregation functionality (LAG), it is possible to group physical ports into logic ports, with automatic load balancing and typical sub-200ms recovering times. It enables the design of Metro Ethernet application topologies with protection and short failure recovery times.

Multicast L2 e L3

Designed for multicast applications, DmSwitch 3000 handles multicast L2 and L3 packets on hardware. It supports protocols IGMP v1/v2/v3, PIM-SM according to RFC4601 (not supporting encapsulation of PIM-Register messages and PIM-SSM function, according to RFC4607). Support the election of Designated Router (DR) in static mode or via Bootstrap.

FTTx Applications

All ports of the switch support SFP connectors. In accordance to that, the line of DmSwitch 3000 Series (3224F3 and 3324F3) provides the possibility of assembling "Fiber-to-whenever" services. Thus, it is possible to use different types of optical modules, occupying up the interfaces according the needs of the project.

Hardware

| | <i>DmSwitch 3224F2</i> | <i>DmSwitch 3224F3</i> | <i>DmSwitch 3324F2</i> | <i>DmSwitch 3324F3</i> |
|---------------------|---|---|---|---|
| Switch L2 | Wire Speed | Wire Speed | Wire Speed | Wire Speed |
| Router L3 | NA | NA | Wire Speed | Wire Speed |
| QoS | L2-L4 | L2-L4 | L2-L4 | L2-L4 |
| FE Ports | 24 x 10/100Base-TX | 24 x 100Base-FX (optical or electrical SFP) | 24 x 10/100Base-TX | 24 x 100Base-FX (optical or electrical SFP) |
| GBE Ports (SFP) | 4 x Combo (1000Base-X or 10/100/1000Base-T) |
| Packet Buffer | 32 MB | 32 MB | 32 MB | 32 MB |
| Switch Fabric | 12,8 Gbit/s | 12,8 Gbit/s | 12,8 Gbit/s | 12,8 Gbit/s |
| Flash | 32 MB | 32 MB | 32 MB | 32 MB |
| SDRAM | 128 MB | 128 MB | 128 MB | 128 MB |
| Alarms | 1 output 3 inputs | 1 output 3 inputs | 1 output 3 inputs | 1 output 3 inputs |
| MAC Address Table | 16K | 16K | 16k | 16k |
| L3 Hosts | NA | NA | 4k | 4k |
| L3 Routes | NA | NA | 16k | 16k |
| L2 Multicast Groups | 256 | 256 | 256 | 256 |
| L3 Multicast Groups | NA | NA | 256 | 256 |
| Filter Rules | 1k | 1k | 1k | 1k |
| Power | 2 power sources AC/DC full range, hot- swap redundant |

Software

| Characteristics | Details |
|---|---|
| Auto-negotiation | Speed, duplex mode, flow control and MDI/MDIX |
| Flow Control | Backpressure in half duplex; PAUSE (IEEE 802.3x) in full duplex |
| Management | Command Line Interface (CLI), via SSH, Telnet and Console |
| | Web Server with SSLv3 |
| | SNMP v1/v2c/v3 |
| | RMON groups 1, 2, 3 and 9 |
| | ACL configuration with multiples comparisons and actions |
| | Diagnostic Network Tools (telnet, traceroute, ping) |
| | Diagnostic Cabling Tool |
| | Up to 2 firmwares in flash, with upgrade via TFTP or HTTP/HTTPS |
| | Up to 4 XML compacted configuration in flash, with upload or download via TFTP or HTTP/HTTPS |
| | Actions Scheduling |
| | Ethernert OAM (EFM – IEEE 802.3ah, CFM – IEEE 802.1ag and ITU-T Y.1731) |
| | Interface Index Persistence |
| | Link Layer Discovery Protocol (LLDP) |
| | Static or Dynamic IP Address (DHCP/BOOTP) |
| | Access via SNMP to QoS Counters |
| DHCP Relay with option 82 | |

| Characteristics | Details |
|-----------------|---|
| Security | Filters to access control SNMP, Web, Telnet and SSH |
| | Configurable MAC Addresses Limit per port and per VLAN |
| | Local and Remote Syslog for multiple servers |
| | Authentication, authorization and accounting of end-users via RADIUS or TACACS+ . |
| | e-mail notification (SMTP) |
| | Protection Mechanisms against Denial of Service (DoS) attacks |
| VLAN | Tagging with up to 4096 simultaneous VIDs (IEEE 802.1Q) |
| | Port-based with port overlap possibility |
| | Q-in-Q double tagging (IEEE 802.1ad) |
| | InterVLANs Routing for DmSwitch 3324 models |
| Protection | Classic Spanning Tree (IEEE 802.1D) |
| | Rapid Spanning Tree (IEEE 802.1w) |
| | Per-VLAN Rapid Spanning Tree |
| | Multiple Spanning Tree (IEEE 802.1s) |
| | BPDU Guard |
| | EAPsv1 (RFC 3619) |
| | Link Flap detection |
| | Loopback detection |

| Characteristics | Details |
|--|---|
| QoS (marking, classification and prioritization) | 8 queues per port |
| | TCI tagging (IEEE 802.1p), VLAN (IEEE 802.1Q) |
| | IP Precedence/TOS, DSCP/TOS |
| | Source/Destination IP, Source/Destination MAC |
| | TCP ports, UDP ports |
| | Filters |
| | Rate Shapping (Ingress and Egress), with granularity of 64 kbit/s per port and per flow in the CIR and PIR definition |
| | Weighted Round Robin, Weighted Fair Queuing, Strict Priority or a combination of these techniques |
| | WRED support |
| Link Aggregation | 32 logical groups , with up to 8 active ports in each group |
| | Static or Dynamic Configuration via LACP (IEEE 802.3ad) |
| | Configurable Load Balance Criteria |
| Other L2 Functionalities | Maximum Rate of Broadcast, Multicast and DLF controled per port |
| | 16k MAC addresses per unit |
| | Head of Line Blocking Protection |
| | Jumbo Frame support of up to 9KB |
| | IGMP (v1/v2/v3). Snooping and Query option can be used |
| | Global or per VLAN Aging L2 |
| | L2 Protocol Tunneling |
| | Traffic Monitor for ports and/or packets flow |
| L3 Routing* | Static Routing |
| | RIP, OSPF and BGP |
| | Redundancy via VRRP |
| | PIM |
| | Proxy ARP |

**Only available in hardware version with support to L3 (DmSwitch 3000 model 3324)*

| <i>Entity</i> | <i>Norms</i> | <i>Description</i> |
|---------------|---|---|
| IEEE | 802.3/802.3u/802.3z | 10Base-T, 100Base-TX, 1000Base-SX |
| | 802.3ab | 1000Base-T |
| | 802.3x | Flow Control |
| | 802.3ac | Extension for VLAN Tagging |
| | 802.1D | Bridging |
| | 802.1Q | Virtual LAN |
| | 802.1w | Rapid Spanning Tree |
| | 802.1s | Multiple Spanning Tree |
| | 802.3ad | Link Aggregation |
| | 802.1p | Priority Support |
| | 802.3ah | Ethernet First Mile (EFM) |
| | 802.3ag | Connectivity Fault Management (CFM) |
| | 802.3i | 10 BASE T 10Mbit/s |
| | 802.1AB | LLDP |
| 802.1ad | Provider Bridges | |
| IETF | RFC1812 | IPv4 |
| | RFC1157/1441/1905/1906/1907/ 2571/2572/2573/2574/2575/2576 3411/3412/3413/3414/3415/3416/ 3417/3418/3584 | SNMP, SNMPv2 and SNMPv3 Protocol, Framework, Architecture, Applications, MIBs |
| | RFC1215 | SMiv2 |
| | RFC1902/2578/2579/2580 | RMON I e RMON II |
| | RFC2819/2021/1757 | RADIUS Authentication and Authorization |
| | RFC2865/2138/2058 | Simple Network Time Protocol (SNTP) v4 |
| | RFC2030 | EAPsv1 |
| | RFC3619 | Syslog Protocol |
| | RFC3164 | An Access Control Protocol -TACACS |
| | RFC1492 | RIP/RIPv2 |
| | RFC1058/1723 | OSPFv2 |
| | RFC1583/2328 | OSPF Standardization Report |
| | RFC2329 | OSPF with Digital Signatures |
| | RFC2154 | IGMPv1/IGMPv2/IGMPv3 |
| | RFC1112/2236/3376 | DiffService |
| | RFC2474/2475 | SSH Protocol (v2) |
| | RFC4250/4251/4252/4253/4254 | Virtual Router Redundancy Protocol (VRRP) |
| | RFC3768 | Protocol Independent Multicast – Sparse Mode (PIM-SM) |
| RFC4601 | | |
| MIBs | Bridge MIB | RFC1493 |
| | Entity MIB | RFC2037 |
| | Interface MIB | RFC1229/1573/2233/2863 |
| | MIB-II, MIB for SNMP | RFC1158/1213/3418 |
| | ETHERLIKE-MIB | RFC1398/1623/1643/2665 |
| | Extended Bridge MIB | RFC2674 (Q-Bridge-MIB, P-Bridge-MIB) |
| | RMON-MIB | RFC1757 |
| | RS-232-MIB | |
| | SNMPv2-MIB | |
| | SNMPv2-SMI | |
| | SNMPv2-TC | |
| | TCP-MIB | |
| UDP-MIB | | |

Accessories

| | |
|----------------------------|---|
| PSU 85 | Modular power source AC/DC, full range, hot-swap, redundant |
| DmSwitch SFP-SX | MM, 850nm, reaches 550m, DD optional, LC connector |
| DmSwitch SFP-LX | SM, 1310nm, reaches 10Km, DD optional, LC connector |
| DmSwitch SFP-LX+ | SM, 1310nm, reaches 30Km, DD optional, LC connector |
| DmSwitch SFP-LH | SM, 1550nm, reaches 70Km, DD optional, LC connector |
| DmSwitch SFP-LZ | SM, 1550nm, reaches 110Km, DD optional, LC connector |
| DmSwitch SFP-1000Base-BX-D | SM, TX in 1550nm, reaches 60Km, DD optional, SC connector |
| DmSwitch SFP-1000Base-BX-U | SM, TX in 1310nm, reaches 60KM, DD optional, SC connector |
| DmSwitch SFP-100Base-BX-D | SM, TX in 1550nm, reaches 60KM, DD optional, SC connector |
| DmSwitch SFP-100Base-BX-U | SM, TX in 1310nm, reaches 60KM, DD optional, SC connector |
| DmSwitch SFP-100Base-TX | electrical, RJ-45 |

Specifications and products may vary without notice.