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DM2300
Carrier Access Switches

December 2016

DM2300 Family

The DM2300 Carrier Access Switch family offers a Carrier Grade solution to meet the growing needs of fixed and mobile Service Providers, which require stringent SLA (Service Level Agreement) for their Ethernet and TDM E1 services.

Offering six models the DM2300 products are 1U fanless compact metal enclosure Gigabit Carrier Ethernet Access and Demarcation Switch with an internal full-range universal AC/DC power supply with automatic selection. Up to two devices can be installed side-by-side on a 19-inch shelf.

RFC2544 and Y.1564

The DM2300 switches do not require any other external test equipment for verification, activation and deployment of Ethernet circuits. Implementing RFC2544 and Y.1564 test suites, they provide automated test reports and map the performance of each circuit before it goes into full operation. An intelligent loopback mode is also provided to allow operation with any remote tester.

By using this feature service providers can minimize truck rolls and OpEx (Operational Expenses) as all tests can be remotely triggered and collected.

OAM

Implementing an advanced set of OAM (Operations, Administration & Maintenance) functions accelerated by a dedicated hardware engine, the DM2300 switches are capable of detecting and reporting performance degradation and traffic interruptions in real time and in a proactive manner, dramatically reducing outage times and lowering OpEx (Operational Expenses). OAM functions are supported in multiple hierarchies, allowing interoperability between different service providers.

OAM functions for continuity check, latency and loss measurements are implemented by dedicated hardware, which can guarantee accuracy and predictability.

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Protection

Combined with a powerful OAM engine, the protection mechanisms available on the DM2300 product line provide resiliency and redundancy. DM2300 product line offer the ITU-T G.8032 ERPS (Ethernet Ring Protection Switching) which integrated to the processing capacity of the devices can assure a connection restoration time shorter than 50 ms for typical scenarios. For operation in legacy networks and keeping compatibility with other Datacom products the DM2300 product line also provide Ethernet Automatic Protection Switching Protocol (EAPS).

Additionally other protection schemes for mesh and linear network topologies such as Spanning Tree and Link Aggregation are also supported.

TDM Circuit Emulation Services

DM2300 family has models supporting TDM Circuit Emulation, which enable Service Providers to grow their networks while preserve the existing equipment and infrastructure of their customers. Offering both Ethernet and E1 service ports on the same box, the DM2300 products can simplify the network management as well as the service operation and maintenance. A flexible circuit emulation engine allows the transport of legacy TDM services over L2 or L3 networks, also supporting synchronization with ACR (adaptive recovery clock) mechanism.

QoS

Higher levels of SLA can be determined and differentiated according to each customer requirements through a dedicated QoS engine. A unique Ethernet service with diverse traffic classes can be prioritized through CoS (Class of Service) differentiation using a single VLAN. Multiple clients, services and classes of service are simultaneously supported, reducing the bandwidth usage and simplifying the network infrastructure.

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Synchronization

To address stringent network synchronization requirements the DM2300 family has versions which offer a stable Stratum-3 internal clock reference and dedicated synchronization ports on the front panel. Besides the support of direct connection of GPS equipment as a standard external reference the DM2300 products allow any Ethernet or E1 port to be part of the internal synchronization hierarchy.

G.8261 (Synchronous Ethernet) with ESMC (Ethernet Synchronization Message Channel) and IEEE 1588-2008 OC (Ordinary Clock) are supported, assuring that requirements for transporting frequency and phase on 3G and 4G LTE Mobile Backhaul networks are completely met.

Wire Speed

The DM2300 Series switches provides an internal switching capacity of up to 16 Gbit/s with all L2 packet forwarding implemented at hardware level in wire speed, ensuring reduced latency and low jitter (typically around microseconds). The filtering and QoS mechanisms are also performed in hardware, with no effect over CPU performance or packet forwarding.

Robustness

The DM2300 hardware is designed to allow a fanless operation, even in harsh environments. The total power dissipation puts this product line among one of the most efficient in its category.

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FEATURE	Description
Hardware	Dimensions (W x D x H): 188.8 x 190.6 x 43 mm
	Operation Temperature: 0 ~ 55ºC[4]
	Storage Temperature: -20 ~ 70ºC
	Transport Temperature: -20 ~ 70°C
	Relative Humidity: 10% ~ 90% non-condensing
	RAM Memory: 256MB / Flash Memory: 64MB
	DC Input: 48 ~ 60V / Nominal Power: 20W
	AC Input: 100 ~ 240V / 50-60 Hz / Nominal Power: 30W
Ethernet	4 ports 10/100/1000Base-T
	Up to 4 ports 100/1000Base-X
	Auto-MDIX and Auto-negotiation supported in all ports
L2	Switching capacity of up to 16 Gbit/s
	Forwarding rate of up to 12 Mpps
	MAC Address Table with up to 8,000 addresses
	Jumbo Frames of 10,240 bytes supported in all ports
TDM Circuit Emulation Services (CES)[1]	Structure-agnostic (SAToP) and Structure-aware (CESoP) modes
	UDP/IP and MEF 8 encapsulation modes
	Configurable jitter buffer to accommodate traffic bursts
	Adaptive Clock Recovery (ACR)
	E1 ports with configurable 75 or 120 ohms impedance through strap selection
VLAN	Up to 4,094 VLANs available based on IEEE 802.1q
	IEEE 802.1ad Provider Bridge (QinQ with native or translated VLAN)
	VLAN Translation
	Private static VLAN
	VLAN classification (port, MAC, IP/subnet, Ethertype)
	L2CP – Configurable tunneling and transparency for several protocols
	Ethernet Virtual Connection (EVC) abstraction implementation according to Metro Ethernet Forum (MEF)

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FEATURE	Description
Management	IPv4 and IPv6 management
	DHCPv4 client
	Command Line Interface (CLI)
	HTTPS
	Telnet, SSH and Web Interface
	Syslog
	SNMP v1, v2c, v3 Agent
	RMON Groups 1, 2, 3 and 9
	LLDP
	NTPv4 (Network Time Protocol)
	SFP diagnostics information available through SNMP
	Dying Gasp with trap forwarding
	Port Mirroring
	Up to 2 firmwares and 32 configuration files stored in non-volatile memory
	Firmware updates through TFTP or Web
	Download and Upload configuration files in clear text allowing external editing
OAM	Embedded RFC2544 traffic generator for Service Activation Test
	Embedded Y.1564 traffic generator[2]
	Traffic test loop per port and EVC with MAC Swap
	Link OAM based on IEEE 802.3ah
	CFM OAM based on IEEE 802.1ag with Continuity Check messages up to 3.3 ms
	ITU-T Y.1731 – extensions for Performance Monitoring (latency and frame loss)
	Up MEP[2] and DownMEP
	Traffic statistics available per port and EVC
	TWAMP Responder/Reflector (RFC5357)
Protection	IEEE 802.3ad Link Aggregation Static and LACP (Dynamic)
	ITU-T G.8032 (ERPS)
	STP, RSTP and MSTP
	EAPS - Ethernet Automatic Protection Switching (RFC3619)

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FEATURE	Description
QoS	Traffic manager implemented in hardware with 8 queues per port
	Packet buffer with 8 Mbit capacity
	Packet classification and assignment to queues according to:
	- IEEE 802.1p (PCP/P-bit) and DSCP - Ethertype - Source/Destination MAC - VLAN - IP protocol - Source/Destination IP - Source/Destination TCP/UDP port
	Traffic Policing with 100 kbit/s allowing configuration of CIR, EIR, CBS and EBS parameters
	Storm Control
	Deficit Weighted Round Robin (DWRR) and Strict Priority (SP) schemes
Multicast	IGMPv2 Snooping
Timing[3]	IEEE1588v2 Ordinary Clock Master/Slave
	ITU-T G.8261 (Synchronous Ethernet) with ESMC supported for all Ethernet ports
	ITU-T G.8265.1 - PTP telecom profile for frequency synchronization
	PTP packet timestamp performed at hardware level
	Stratum-3 OCXO Internal Reference
	Dedicated ports for interconnecting to external synchronization reference
	Clock hierarchy with automatic reference switchover in case of failures
Security	RADIUS and TACACS+
	DoS attacks prevention
	Rate-limiting for ingress and egress traffic on VLANs and ports
	MAC Address Learning Limit per port
	Static MAC assignment per port
	Access Control List (ACL) filters according to:
	- IEEE 802.1p (PCP/P-bit) - Source/Destination MAC - VLAN - IP protocol - Source/Destination IP - Source/Destination TCP/UDP port
	Up to 512 Access Control List (ACLs) entries check performed at hardware level

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Product comparison

MODELS	DM2301 4GT+2GX	DM2301 4GT+4GX	DM2301 4GT+2GX+8E1	DM2301 4GT+4GX+8E1	DM2302 4GT+4GX	DM2302 4GT+4GX+8E1
Switch Fabric	12 Gbit/s	16 Gbit/s	12 Gbit/s	16 Gbit/s	16 Gbit/s	16 Gbit/s
Forwarding Rate (approx.)	9 Mpps	12 Mpps	9 Mpps	12 Mpps	12 Mpps	12 Mpps
Console (RJ45)	√	√	√	√	√	√
MGMT 10/100Base-T (RJ45)	-	√	-	√	√	√
100/1000Base-X (SFP)	2	4	2	4	4	4
10/100/1000Base-T (RJ45)	4	4	4	4	4	4
G.703 2 Mbit/s E1 (RJ45)	-	-	8	8	-	8
BITS in 2 MHz / 2 Mbit/s (RJ45)	-	-	√	√	√	√
BITS out 2 MHz / 2 Mbit/s (RJ45)	-	-	-	-	√	√
1 PPS in/out (Mini BNC)[5]	-	-	-	-	√	√
Time of Day (RJ45)[5]	-	-	-	-	√	√
10 MHz in/out (Mini BNC)	-	-	-	-	√	√

(1)   Supported only on DM2301 4GT+2GX+8E1, DM2301 4GT+4GX+8E1 and DM2302 4GT+4GX+8E1 models.
(2)   Not supported on DM2301 4GT+2GX+8E1 model.
(3)   Supported only on DM2302 4GT+4GX and DM2302 4GT+4GX+8E1 models.
(4)   The operating temperature range of DM2302 4GT+4GX+8E1 model is 0 to 50°C.
(5)   To be supported in a future release. Please contact Support for further information.

Supported Accessories

- Optical unidirectional SFP modules 1000BASE-SX/LX/LX+/LH/LZ
- Optical unidirectional SFP modules 1000BASE-EX/ZX
- Optical bidirectional SFP modules 1000BASE-BX
- MA-01 adaptor
- MA-16 adaptor
- MA-17 adaptor

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Reference Standards

IEEE	Description
802.1d	Media Access Control (MAC) Bridge
802.1p	Priority Support
802.1q	Virtual LAN
802.1s	Multiple Spanning Tree (MSTP)
802.1w	Rapid Spanning Tree (RSTP)
802.1ab	Link Layer Discovery Protocol (LLDP)
802.1ad	Provider Bridges
802.1ag	Connectivity Fault Management (CFM)
802.3	10Base-T
802.3u	100Base-TX
802.3x	Flow Control
802.3z	1000BASE SX/LX
802.3ab	1000Base-T
802.3ad	Link Aggregation (LAG)
802.3ah	OAM Link-Fault Management Overview
1588-2008	Precision Clock Synchronization Protocol for Networked Measurement and Control Systems

IETF	Description
RFC791	Internet Protocol IP
RFC793	Transmission Control Protocol TCP
RFC826	An Ethernet Address Resolution Protocol
RFC854	Telnet Protocol Specification

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IETF	Description
RFC1157	Simple Network Management Protocol (SNMP)
RFC1212	Concise MIB Definitions
RFC1213	Management Information Base for Network Management of TCP/IP based internets: MIB-II
RFC1215	A Convention for Defining Traps for Use With the SNMP
RFC1441	SNMPv2 Protocol Framework
RFC1492	An Access Control Protocol, Sometimes Called TACACS
RFC1769	Simple Network Time Protocol SNMP
RFC1812	Requirements for IP Version 4 Routes (IPv4)
RFC1901	Introduction to Community-based SNMPv2
RFC1903	Textual Conventions for Version 2 of SNMPv2
RFC1904	Conformance Statements for Version 2 of SNMPv2
RFC1905	Protocol Operations for Version 2 of SNMPv2
RFC1907	Management Information Base (MIB) for SNMPv2
RFC1908	Coexistence between V1 and V2 of the Internet-standard NMF
RFC2131	Dynamic Host Configuration Protocol (DHCP)
RFC2309	Queue Management and Congestion Avoidance in the Internet
RFC2474	Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers
RFC2475	An Architecture for Differentiated Services
RFC2544	Benchmarking Methodology for Network Interconnect Devices
RFC2578	Structure of Management Information Version 2 (SMIv2)
RFC2597	Assured Forwarding PHB Group
RFC2697	A Single Rate Three Color Marker
RFC2698	A Two Rate Three Color Marker

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IETF	Description
RFC2819	Remote Network Monitoring Management Information Base
RFC2863	The Interfaces Group MIB
RFC2865	Remote Authentication Dial in User Server (RADIUS)
RFC3140	Per Hop Behavior Identification Codes
RFC3246	An Expedited Forwarding PHB
RFC3410	Introduction and Applicability Statements for Internet Standard Management Framework
RFC3418	Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)
RFC3584	Coexistence between Version 1, Version 2, and Version 3 of the Internet-standard Network Management Framework
RFC3619	Extreme Networks' Ethernet Automatic Protection Switching (EAPS) Version 1
RFC3635	Definitions of Managed Objects for the Ethernet-like Interface Types
RFC4188	Definitions of Managed Objects for Bridges
RFC4250	The Secure Shell (SSH) Protocol Assigned Numbers
RFC4251	The Secure Shell (SSH) Protocol Architecture
RFC4252	The Secure Shell (SSH) Authentication Protocol
RFC4253	The Secure Shell (SSH) Transport Layer Protocol
RFC4254	The Secure Shell (SSH) Connection Protocol
RFC4553	Structure-Agnostic Time Division Multiplexing (TDM) over Packet (SAToP)
RFC5086	Structure-Aware Time Division Multiplexed (TDM) Circuit Emulation Service over Packet Switched Network (CESoPSN)
RFC5357	A Two-Way Active Measurement Protocol (TWAMP)
RFC5424	The Syslog Protocol
RFC5905	Network Time Protocol Version 4: Protocol and Algorithms Specification

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ITU-T	Description
G.703	Physical/electrical characteristics of hierarchical digital interfaces
G.704	Synchronous frame structures used at 1544, 6312, 2048, 8448 and 44 736 kbit/s hierarchical levels
G.8012	Ethernet UNI and Ethernet NNI
G.8021	Characteristics of Ethernet transport network equipment functional blocks
G.8032	Ethernet ring protection switching
G.823	The control of jitter and wander within digital networks which are based on the 2048 kbit/s hierarchy
G.8261	Timing and synchronization aspects in packet networks
G.8261.1	Packet delay variation network limits applicable to packet-based methods (Frequency synchronization)
G.8262	Timing characteristics of a synchronous Ethernet equipment slave clock
G.8263	Timing characteristics of packet-based equipment clocks
G.8264	Distribution of timing information through packet networks
G.8265	Architecture and requirements for packet-based frequency delivery
G.8265.1	Precision time protocol telecom profile for frequency synchronization
Y.1453	TDM-IP interworking - User plane interworking
Y.1564	Ethernet service activation test methodology
Y.1730	Requirements for OAM functions in Ethernet-based networks and Ethernet services
Y.1731	OAM Functions and Mechanisms for Ethernet Based Networks

MEF	Description
MEF 6.1	Metro Ethernet Services Definitions Phase 2
MEF 8	Implementation Agreement for the Emulation of PDH Circuits over Metro Ethernet Networks
MEF 9	Abstract Test Suite for Ethernet Services at the UNI

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MEF	Description
MEF 10.2	Metro Ethernet Services Attributes Phase 2
MEF 14	Abstract Test Suite for Traffic Management Phase 1
MEF 17	Service OAM Framework and Requirements
MEF 18	Abstract Test Suite for Circuit Emulation Services
MEF 20	UNI Type 2 Implementation Agreement
MEF 22.1	Mobile Backhaul Phase 2
MEF 23.1	Class of Service Phase 2 Implementation Agreement
MEF 26.1	External Network Network Interface (ENNI) Phase 2
MEF 30.1	Service OAM Fault Management Implementation Agreement Phase 2
MEF 33	Ethernet Access Services Definition

EMI, EMC, Environmental and Safety Compliances

Anatel Resolutions 442, 242 e 323
CE-Mark Compliance
EMC Directive 2014/30/EU
RoHS Directive 2014/30/EU
WEEE – The Directive on Waste Electrical and Electronic Equipment 2012/19/EU
ETSI EN 55022 – Information Technology Equipment. Radio Disturbance Characteristics (Class A)
ETSI EN 300 132-2 - Power Supply Interface at the Input to Telecommunications Equipment Part 2: Operated by Direct Current (dc)
ETSI ES 201 468 - Electromagnetic Compatibility and Radio Spectrum Matters (ERM) - Additional Electromagnetic Compatibility (EMC) Telecommunications Equipment for Enhanced Availability of Service in Specific Applications
EN 300 386 V1.6.1 (2012-09) – Electromagnetic Compatibility and Radio Spectrum Matters (ERM)
ETS 300 253 - Earthing and Bonding of Telecommunication Equipment in Telecommunication Centers

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EN 300 019 V2.4.1 (2014-04) - Part 1-3: Classification of environmental conditions; Stationary use at weather protected locations (Class 3.2 - Partly temperature-controlled locations)

IEC/EN 60950-1 – Safety

IEC 60825-1 – Laser Safety Class

IEC 61000-4-2 – Electrostatic Discharge Immunity Test

IEC 61000-4-3 – Radiated, Radio-frequency, Electromagnetic Field Immunity Test

IEC 61000-4-4 – Electrical Fast Transient/Burst Immunity Test

IEC 61000-4-5 – Surge Immunity Test

IEC 61000-4-6 – Immunity to Conducted Disturbances, Induced by Radio-frequency Fields

IEC 61000-4-29 – Testing and measurement Techniques - Voltage dips, Short Interruptions and Voltage Variations on d.c. Input Power Port Immunity Tests

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