

DM4100 Series

DATACOM

DM4100 Series

PRODUCT MANUAL

WARRANTY

This product has warranty against manufactured materials and its coverage is specified on the sales invoice.

The warranty only includes the repair and the replacement of components or defect parts without any charge for the customer. The following defects are not covered: equipment use under inadequate conditions; faults on electric supply; nature phenomenon (e.g. lightning discharge), equipment faults connected to this product; inadequate grounding installations or repair executed by a person who is not authorized by DATACOM.

This warranty does not cover the repair at the customer's facilities. The equipment must be sent to DATACOM for repair.



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With ISO9001

Register N° (287097 QM)



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CONVENTIONS

The following conventions were adopted along this manual, in order to better understanding

[Hyperlink](#) - indicates an address on Internet or an e-mail address.

Command or Button – when a when a command, button or software's menu is referred; this indication will be always in italic.

Commands and terminal screen messages are showed as texts without any form, preceded by # (sharp).



The note better explains some of details showed in the text.



This form indicates the text that has great importance and indicates risks of damages or hazards. The text must be read more carefully. It can avoid great difficulty.



It indicates an existing risk of electric shock, in case all procedures are not correctly applied.



It indicates a laser radiation presence. It can cause damages to the skin or the vision if the instructions are not applied and if direct exposure to the skin and to the eyes is not avoided.



It indicates equipment or parts sensibility to EMI (static electricity). It should not be manipulated without care, such as grounding bracelet or equivalent.



It indicates non-ionized radiation and emission.



WEEE Directive Symbol (Applicable in the European Union and other European countries with separate collection systems). This symbol on the product or its packaging indicates that this product must not be disposed of with other waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your consumer waste equipment for recycling, please contact your local city recycling office or the dealer from whom you originally purchased the product

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1. INTRODUCTION



Figure 1. DM4100 Series

This manual can be used for all DATACOM DM4100 Metro and Enterprise Ethernet Switches Series, providing information about installation of DM4100 family.

The document focuses on the physical, electrical, status indications and installation portion of the hardware. It is assumed that the individual or individuals managing any aspect of this product have basic understanding of Switching, Routing, Ethernet, and general Telecommunications.

1.1. Overview

The DM4100 product line is made up of high-capacity switches at wire-speed to provide DATACOM customer applications with increasingly greater speeds, always with high performance and reliability.

The DM4100 Switches provide layer 2 packet switching. Spanning Tree – Classic, Rapid and Multiple – as well as ERPS and EAPS protocols are available as L2 protection mechanisms. It is also possible to aggregate physical ports, thus forming logical ports and allowing increased bandwidth and automatic protection in the event of a failure.

The stacking capability with speeds starting at 52Gbit/s allows the stacking of up to eight pieces of equipment for easy expansion of the applications within the same physical environment, also providing a lower-cost alternative to buying a chassis.

DM4100 supports the facility of stacking, which enables a quick and low cost expansion.

The equipment features a Command Line Interface (CLI) via SSHv2, Telnet and RS-232 console and also a web-based interface with SSL. It also has an Out-of-band Ethernet port and a USB port. It is possible to have multiple firmware versions and set-up files for an easier upgrade and change control.

The DM4100 units are 1U high for an easy installation in 19" racks and can work on AC/DC inputs with redundant hot-swappable power supplies.



2. PRODUCT CHARACTERISTICS

2.1. Wire Speed L2 and L3 and MPLS

The DM4100 line has a commutation matrix of up to 224Gbit/s in the 48-ports model and 152Gbit/s in the 24-ports model. The entire L2, L3 (IPv4/v6) and MPLS packet switching is always performed in hardware at wire speed, in order to ensure low switch latency. The filter/meter/ACL functions are performed by the ASIC, without affecting the performance of the CPU unit or packet forwarding.

In software are implemented level 2 and level 3 protocols in order to assemble the MAC Addresses Table, IP route and MPLS push/pop/swap tables.



Not all DM4100 models support L3 and MPLS functionalities. Check for further information in chapters 3 and 4 of this manual or get contact with DATACOM Technical Support.

2.2. IP/MPLS Networks

The DM4100 line supports IP routing (IPv4/IPv6) and both static and dynamic routing - RIP, RIPng, OSPF, IS-IS BGPv4. DM4100 can perform in a MPLS network as a label edge router (LER) or a label switch router (LSR).

For the MPLS infrastructure, it is possible to establish LSP or MPLS tunnels by means of the LDP and RSVP-TE signaling protocols with FRR2 support. The LDP tunnel function on RSVP is also supported. The implementation of TLS (Transparent LAN Services) is possible by building L2 VPN over MPLS. It is possible to use VPN in Point-to-Point (VPWS) and Point-to-Multipoint (VPLS) configurations. For VPLS, the DM4100 supports meshed (split-horizon) and hub-spoken (H-VPLS) modes.

2.3. Stacking

It is possible to stack up to eight pieces of equipment so that, from the management point of view, the units behave as a single switch with more ports. The feature is available among different units in a transparent manner, such as VLANs, logic ports and port monitoring.

In order to ensure a high availability for the solution, the stacking may be implemented by forming a ring with the elements, providing protection in the event of a failure, since any unit can operate as the master (1:N protection). The equipment may be stacked with dedicated ports or 10Gbit/s ports configured to operate in stacking.

For specific details about stacking, read chapter 8 in this manual.



Not all DM4100 models support stacking functionality. Check for further information in chapters 3, 4 and 8 of this manual or get contact with DATACOM Technical Support.

2.4. XFP and SFP+ Modules

The XFP and SFP+ modules are transceivers specified by MSA Standard (Multi-Sourcing Agreement), and supports among themselves the same optical fibers and interfaces standards. The usage of XFP or SFP+ in Ethernet networks is indifferent from a technical point of view.

2.5. Power over Ethernet (PoE)

An option for electrical port versions, it complies with the IEEE 802.3at standard and may provide up to 34.2W per port (Class 4), allowing power and data transmissions through the same Cat.5e and Cat.6 cable. This application is recommended to provide power and network connection to: Access points, IP telephones, IP cameras, and so on.

For a better understanding about PoE working mode and its application in DM4100 Series equipment, read chapter 10.2.1 of this manual.

2.6. Management Facilities

The DM4100 Series provide full-centralized FCAPS management via DmView on Windows or Solaris platforms.

The equipment has a command line interface (CLI) with automatic syntax help and self-completing statements, accessible via SSHv2, Telnet and RS-232 console. An internal Web Server with SSL, a SNMPv1 agent, v2 and v3 over both IPv4 and IPv6, and four RMON groups are also available.

The DM4100 allows the creation of complex Access Control Lists (ACLs) in hardware, with multiple comparison and action parameters that allows the modification, routing, discard and/or prioritization of packets.

There are also tools for network and cabling infrastructure diagnosis – including Digital Diagnostic (SFF-8472). It is possible to test any cable discontinuity or short circuit, showing the problem's approximate distance. A monitoring feature in all ports or in a packets flow is also available in hardware, redirecting the packet flow to a specified port.

It is possible to store up to two different firmware versions and ten different configurations in the equipment, choosing which one will be used at startup, for easier firmware and setup management. All of the presets saved can be applied at any time.

2.7. QoS Implementation Facilities

The DM4100 has eight queues per port, assembled in hardware, with prioritization algorithms that enable to define some methods, such as, the priority of a certain data flow, assign priority level for each queue, define minimum rates for forwarding or even a combination of all these methods.

The classification can be performed via VLANs, input ports, IEEE 802.1p fields, IP Precedence or DSCP fields, TCP and UDP ports, among others, comparing up to Layer 7 data. The QoS politics may be attributed to physical or logical interfaces.

The bandwidth control has an 8kbit/s granularity at the CIR (Committed Information Rate) and PIR (Peak Information Rate), and may be applied to the incoming or outgoing traffic of ports or to a certain packet flow by means of filters.

The filters are quite flexible features, allowing multiple matches and actions on the packets.

Some of the filter options supported are listed below, and in the Figure 2 is illustrated an example of configuration of these filters.

- Match: 802.1p, all, destination-ip, destination-mac, destination-port, dscp, ethertype, protocol, source-ip, source-mac, source-port, tos-bits, tos-precedence, vlan, flow label IPv6, etc.
- Action: Permit, deny, 802.1p, 802.1p-from-tos, meter, counter, drop-precedence, dscp, egress-block, int-802.1p, pkt-802.1p, pkt-802.1p-from-tos, tos, tos-from-802.1p, etc.

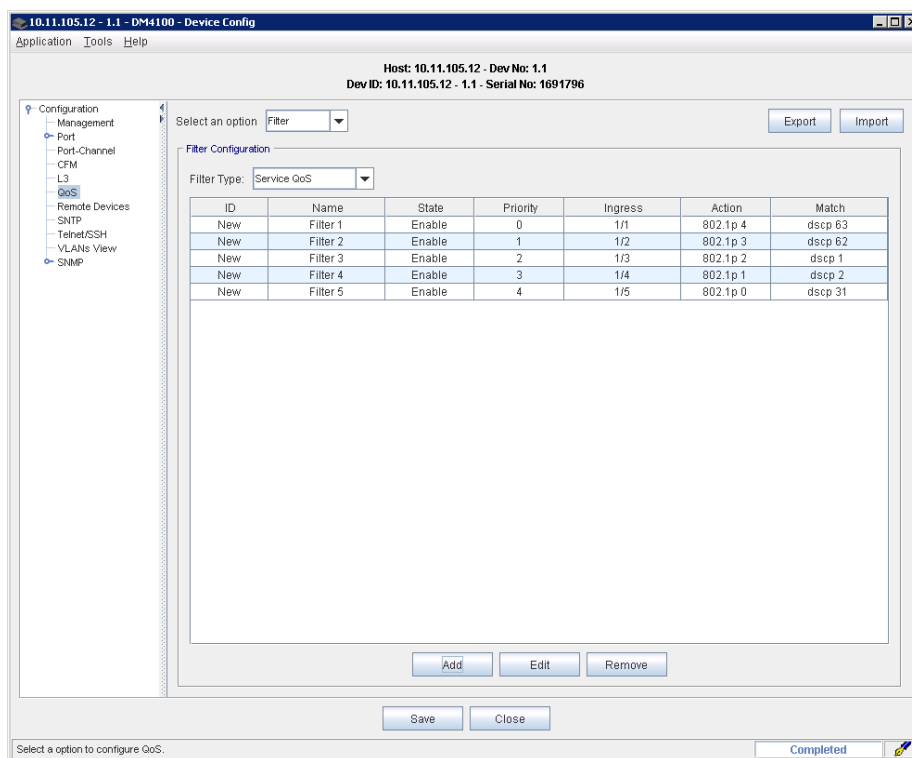


Figure 2. Configured Filters in DM4100

2.8. Security

The DM4100 line has mechanisms to ensure operation and maintenance security on the installed plant. In addition to using encryption in the communication protocols, it is possible to specify, through filters, which machines in the network may access the equipment on an administrative level.

Using local and remote Syslog, user authentication, authorization and accounting via RADIUS and TACACS+ (AAA), alarm notice by e-mail, single clock via SNTP, protection against Denial of Service (DoS/DDoS) attacks and port authentication via 802.1x, it is possible to build a reliable management framework with different access level for each user group.

For Metro Ethernet applications there are also: limitation to the quantity of MAC numbers per port and per VLAN, protection mechanisms on L2 and L3 protocols against network attack, bandwidth limitation for broadcast and multicast traffic and Destination Lookup Failure (DLF).

2.9. VLANs

The construction of Virtual LANs in the DM4100 can use all the 4,096 available VLANs simultaneously, according IEEE 802.1Q standard, with double tagging (Q-in-Q) functionality, as well as define VLANs per protocol, MAC address and IP-subnet, or use GVRP protocol for dynamic configuration.

2.10. Access Control Lists (Filters)

The DM4100 allows the creation of Access Control Lists (ACLs) / Filters in hardware, with multiples comparison parameters and action. It enables the modification, forwarding, discard or prioritization of packages in logical and physical interfaces.

The interface cards has entry filters which performs matches, such as: source IPv4/IPv6, destination IPv4/IPv6, TCP/UDP source port, TCP/UDP destination port, protocol, source and destination MAC address, DSCP mark, etc.

The filters are capable to associate executed actions in hardware. For example: discard of packages, remark of priority 802.1q, bandwidth limitation, etc.

2.11. Protection Mechanisms

The Spanning Tree protocol is available, including RSTP (which offers shorter convergence times), Per-VLAN STP and MSTP (for better utilization of resources and greater scalability), as well as EAPS, which is specific for sub-50ms protections in Ethernet ring topologies.

Using the Link Aggregation features, is possible to group physical ports to form logical ports, with automatic load balancing and time recovery in up to 200ms. So it becomes possible to build topologies featuring protection and quick failure recovery for Metro Ethernet applications.

2.12. L2 and L3 Multicast

Designed to multicast applications, the DM4100 forward the multicast packages of L2 and L3 in hardware. It supports the protocols IGMP v1/v2/v3, MLD v1/v2, PIM-SM with support in hardware for encapsulation of messages PIM-Register, in accordance with RFC4607. It also supports DR election and RP configuration by static mode or via BootStrap.

L2 and L3 multicast applications are supported through 1,024 L2 groups and other 4,096 L3 IPv4 groups, IGMP protocol snooping and query and PIM protocol.

2.13. Ethernet OAM

DM4100 Series supports OAM (CFM) end-to-end through the IEEE 802.3ag and ITU-T Y.1731 standards.

This support enables the proactive monitoring connectivity (Continuity Check) and failure isolation via Loopback Messages (ping L2) and Linktrace Message (tracerout L2).

It is even possible the performance monitoring by the Frame Delay and Frame Delay Variation tools, in unidirectional or bidirectional mode.

The feature supports, in advance, the OAM (EFM) end-to-end, according the IEEE 802.3ah standard. This way is possible the failure indication, including Dying Gasp, Unidirectional Link and Critical Event. The EFM works with a settable gap between PDUs, ensuring interoperability with other manufacturers.

2.14. FTTx Applications

The DM4100 models feature the provision of Fiber-to-whenever services, since the equipment ports have SFP interfaces, allowing the usage of different types of optical modules, according to the fiber type, speed and distance chosen. All SFP ports support using the SFP models listed on accessories, allowing the combination of different models and greater application flexibility.

3. DM4100 FAMILY NOMENCLATURE

To the assembling of the many possible models of DM4100 family equipments, is displayed in the Figure 3 an example of assemble of an equipment and its corresponding parameters of each item.

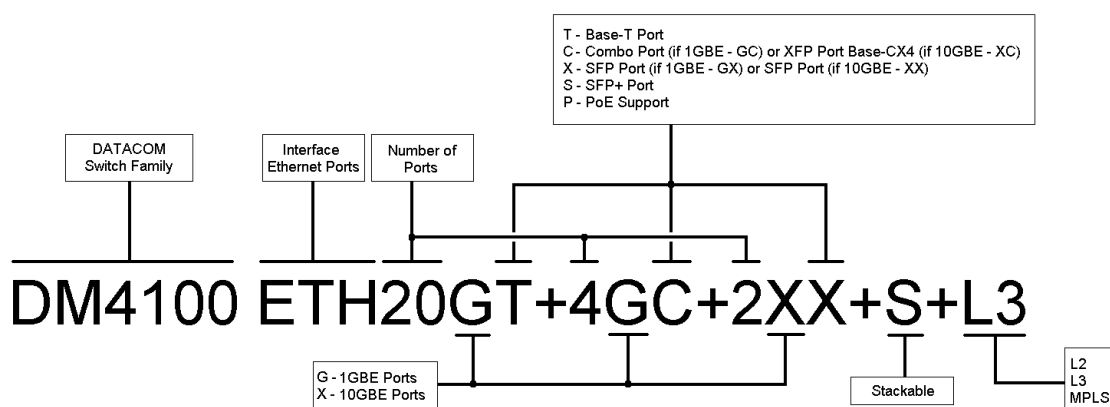


Figure 3. DM4100 Family Nomenclature

4. DM4100 SERIES MODELS

The DM4100 Series contains many models, with different hardware configurations, in order to comply with the market demands.

Will be explained in the following, the basic configurations, and the assemble possibilities of models which composes the DM4100 Series.

4.1. DM4100 24GX + 2XX

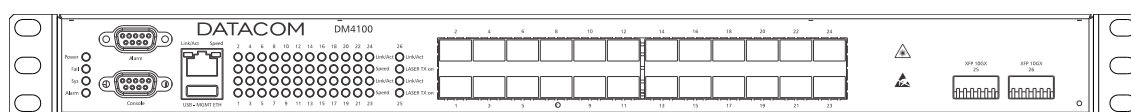


Figure 4. DM4100 24GX + 2XX Bayface



Figure 5. DM4100 24GX + 2XX Rear Panel

DM4100 24GX + 2XX is a standalone switch, Gigabit Ethernet, 1U height and designed to be installed in 19-inch racks. Provide wire speed switching and models oriented to L2/L3/L4 and MPLS applications.

All packet switching L2/L3 (IPv4 and IPv6) and MPLS is executed always in hardware, in wire speed, with a switch matrix up to 152Gbit/s.

Provides 24 ports 1000Base-X SFP, two 10Gigabit ports Ethernet XFP and two inlets for satellite card, one in the front panel and another in the rear panel of the equipment. For this model of equipment, there are two available options for satellite cards:

- 2 10Gbit/s Ethernet ports XFP
- 2 stacking ports

DM4100 supports the stacking capacity of up to eight pieces through the stacking interfaces.

The MAC Addresses Table supports up to 32k entries. It also supports the creation of 4,096 simultaneous VLANs.

The DM4100 24GX + 2XX has a microprocessor of 800MHz, with 1GB of RAM and 256MB of Flash.

Perform the switch of 113,095,238 packets per second (pps), supporting also jumbo-frames.

4.1.1. DM4100 24GX + 2XX Available Models

Device name	Device Description
DM4100 ETH24GX+4XX+L3	(24x GbE + 4x 10GbE XFP)
DM4100 ETH24GX+2XX+S+L3	(24x GbE + 2x 10GbE XFP + Stacking)
DM4100 ETH24GX+4XX+MPLS	(24x GbE + 4x 10GbE XFP)
DM4100 ETH24GX+2XX+S+MPLS	(24x GbE + 2x 10GbE XFP + Stacking)
DM4100 ETH24GX+4XS+MPLS	(24x GbE + 4x 10GbE SFP+)

Table 1. DM4100 24GX + 2XX Available Models

4.2. DM4100 24GX + 4GX

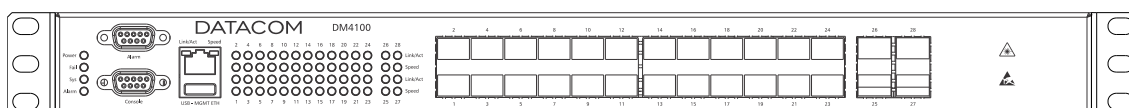


Figure 6. DM4100 24GX + 4GX Bayface



Figure 7. DM4100 24GX + 4GX Rear Panel

DM4100 24GX + 4GX is a standalone switch, Gigabit Ethernet, 1U height and designed to be installed in 19-inch racks. Provide wire speed switching and models oriented to L2/L3/L4 and MPLS applications.

All packet switching L2/L3 (IPv4 and IPv6) and MPLS is executed always in hardware, in wire speed, with a switch matrix up to 152Gbit/s.

DM4100 ETH24GX + 4GX model have 24 ports which can be electrical (100/1000Base-T SFP) or optical (100/1000Base-X SFP), besides four optical ports 1Gbit/s 1000Base-X SFP (25, 26, 27 and 28).

The storage capability of MAC Addresses table is up to 32k entries and is possible to configure up to 4,096 VLANs simultaneously.

With an 800MHz processor, it has 1GB of RAM memory and 256MB of Flash.

Performs the switch of 113,095,238 packets per second (pps) and supports jumbo frames.

4.2.1. DM4100 24GX + 4GX Available Models

Device name	Device Description
DM4100 ETH24GX+4GX+L3	(24x GbE + 4x 1GbE/2.5GbE)
DM4100 ETH24GX+4GX+MPLS	(24x GbE + 4x 1GbE/2.5GbE)

Table 2. DM4100 24GX + 2XX Available Models

4.3. DM4100 44GP + 4GC

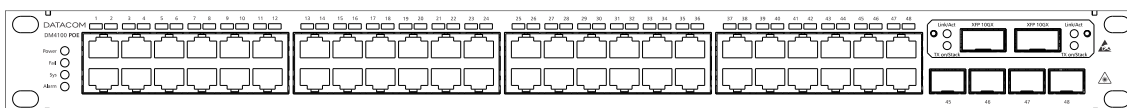


Figure 8. DM4100 44GP + 4GC Bayface

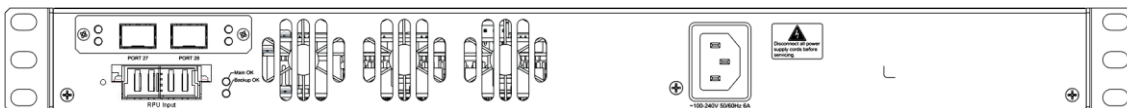


Figure 9. DM4100 44GP + 4GC Rear Panel

Switch standalone model, the DM4100 44GP + 4GC provides Gigabit Ethernet capacity, 1U height and it's designed to be installed in 19-inch racks. Provide wire speed switching and models oriented to L2/L3/L4 applications.

All packet switching L2/L3 (IPv4 and IPv6) is executed always in hardware, in wire speed, with a switch matrix up to 224Gbit/s.

DM4100 provides 44 10/100/1000Base-T ports, four combo ports 10/100/1000Base-T CAT5 or 1000Base-X SFP, besides two inlets for satellite cards.

For this model of equipment, there are two available options for satellite cards:

- 2 10Gbit/s Ethernet ports XFP
- 2 stacking ports

The satellite card with stacking ports can only be coupled in the equipment's rear panel, while the satellite card with 2x10Gbit/s Ethernet ports XFP can be used in both front and rear panel.

The equipment provides in its electrical ports the feature of Power over Ethernet Plus (PoE+). For further information about PoE and PoE+, read the item 10.2.1.

It supplies the stacking of up to eight pieces in line or ring topologies on its stacking connections.

The storage capability of MAC Addresses table is up to 32k entries and is possible to configure up to 4,096 VLANs simultaneously

With an 800MHz processor, it has 1GB of RAM memory and 256MB of Flash.

Performs the switch of 166,666,667 packets per second (pps) and supports jumbo frames.

4.3.1. DM4100 44GP + 4GC Available Models

Device name	Device Description
DM4100 ETH44GP+4GC+2XX+S+L3	(44x GbE + 4x Combo GbE + 2x 10GbE XFP + Stacking + PoE)
DM4100 ETH44GP+4GC+2XS+S+L3	(44x GbE + 4x Combo GbE + 2x 10GbE SFP plus + Stacking + PoE)
DM4100 ETH44GP+4GC+S+L3	(44x GbE + 4x Combo GbE + Stacking + PoE)
DM4100 ETH44GP+4GC+4XX+L3	(44x GbE + 4x Combo GbE + 4x 10GbE XFP + PoE)
DM4100 ETH44GP+4GC+4XS+L3	(44x GbE + 4x Combo GbE + 4x 10GbE SFP plus + PoE)

Table 3. DM4100 44GP + 4GC Available Models

4.4. DM4100 44GT + 4GC

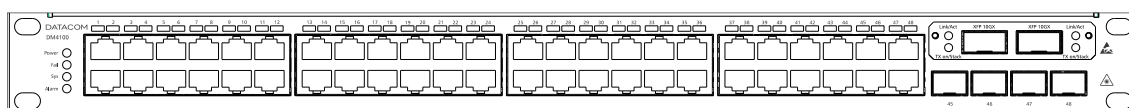


Figure 10. DM4100 44GT + 4GC Bayface

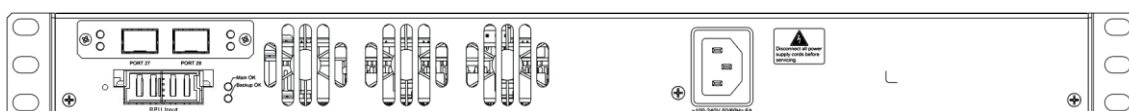


Figure 11. DM4100 44GT + 4GC Rear Panel

O DM4100 44GT + 4GC is a standalone Switch, Gigabit Ethernet, with 1U height and designed to be installed in 19-inch racks.

With wire speed switching, it is oriented to L2/L3/L4 and MPLS applications.

All packet switching L2/L3 (IPv4 and IPv6) and MPLS is executed always in hardware, in wire speed, with a switch matrix up to 224Gbit/s.

DM4100 provides 44 10/100/1000Base-T ports, four combo ports 10/100/1000Base-T CAT5 or 1000Base-X SFP, besides two inlets for satellite cards.

For this model of equipment, there are two available options for satellite cards:

- 2 - 10Gbit/s Ethernet ports XFP
- 2 stacking ports

The satellite card with stacking ports can only be coupled in the equipment's rear panel, while the satellite card with 2x10Gbit/s Ethernet ports XFP can be used in both front and rear panel.

It supports the stacking capacity of up to eight pieces through the stacking interfaces.

The MAC Addresses Table supports up to 32k entries. DM4100 also supports the creation of 4,096 simultaneous VLANs.

With an 800MHz processor, it has 1GB of RAM memory and 256MB of Flash.

Performs the switch of 166,666,667 packets per second (pps) and supports jumbo frames.

4.4.1. DM4100 44GT + 4GC Available Models

Device name	Device Description
DM4100 ETH44GT+4GC+2XX+S+L3	(44x GbE + 4x Combo GbE + 2x 10GbE XFP + Stacking)
DM4100 ETH44GT+4GC+2XS+S+L3	(44x GbE + 4x Combo GbE + 2x 10GbE SFP plus + Stacking)
DM4100 ETH44GT+4GC+2XX+S+MPLS	(44x GbE + 4x Combo GbE + 2x 10GbE XFP + Stacking)
DM4100 ETH44GT+4GC+2XX+S+MPLS (DC)	(44x GbE + 4x Combo GbE + 2x 10GbE XFP + Stacking) (DC)
DM4100 ETH44GT+4GC+4XX+L3	(44x GbE + 4x Combo GbE + 4x 10GbE XFP)
DM4100 ETH44GT+4GC+4XS+L3	(44x GbE + 4x Combo GbE + 4x 10GbE SFP plus)
DM4100 ETH44GT+4GC+S+MPLS	(44x GbE + 4x Combo GbE + Stacking)
DM4100 ETH44GT+4GC+S+MPLS (DC)	(44x GbE + 4x Combo GbE + Stacking) (DC)
DM4100 ETH44GT+4GC+S+L3	(44x GbE + 4x Combo GbE + Stacking)
DM4100 ETH44GT+4GC+4XX+MPLS	(44x GbE + 4x Combo GbE + 4x 10GbE XFP)
DM4100 ETH44GT+4GC+4XX+MPLS (DC)	(44x GbE + 4x Combo GbE + 4x 10GbE XFP) (DC)

Table 4. DM4100 44GT + 4GC Available Models



The stacking capability depends on the acquired DM4100 model. Get contact with DATACOM Technical Support for information about stacking capacity.

4.5. DM4100 20GP + 4GC

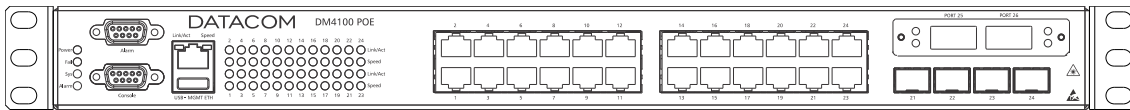


Figure 12. DM4100 20GP + 4GC Front Panel



Figure 13. DM4100 20GP + 4GC Rear Panel

DM4100 20GP + 4GC is a standalone switch, Gigabit Ethernet, 1U height and designed to be installed in 19-inch racks. Provide wire speed switching and models oriented to L2/L3/L4 applications.

All packet switching L2/L3 (IPv4 and IPv6) is executed always in hardware, in wire speed, with a switch matrix up to 152Gbit/s.

DM4100 provides 20 10/100/1000Base-T ports, four combo ports 10/100/1000Base-T CAT5 or 1000Base-X SFP, besides two inlets for satellite cards.

For this model of equipment, there are two available options for satellite cards:

- 2 - 10Gbit/s Ethernet ports XFP
- 2 stacking ports

The satellite card with stacking ports can only be coupled in the equipment's rear panel, while the satellite card with 2x10Gbit/s Ethernet ports XFP can be used in both front and rear panel.

The equipment provides in its electrical ports the feature of Power over Ethernet Plus (PoE+). For further information about PoE and PoE+, read the item 10.2.1.

DM4100 supports the stacking capacity of up to eight pieces through the stacking interfaces.

The MAC Addresses Table supports up to 32k entries. It also supports the creation of 4,096 simultaneous VLANs.

The DM4100 20GP + 4GC has a microprocessor of 800MHz, with 1GB of RAM and 256MB of Flash.

Perform the switch of 113,095,238 packets per second (pps), supporting also jumbo-frames.

4.5.1. DM4100 20GP + 4GC Available Models

Device name	Device Description
DM4100 ETH20GP+4GC+2XX+S+L3	(20x GbE + 4x Combo GbE + 2x 10GbE XFP + Stacking + PoE)
DM4100 ETH20GP+4GC+2XS+S+L3	(20x GbE + 4x Combo GbE + 2x 10GbE SFP plus + Stacking + PoE)
DM4100 ETH20GP+4GC+4XX+L3	(20x GbE + 4x Combo GbE + 4x 10GbE XFP + PoE)
DM4100 ETH20GP+4GC+4XS+L3	(20x GbE + 4x Combo GbE + 4x 10GbE SFP plus + PoE)
DM4100 ETH20GP+4GC+S+L3	(20x GbE + 4x Combo GbE + Stacking + PoE)

Table 5. DM4100 20GP + 4GC Available Models

4.6. DM4100 20GT + 4GC

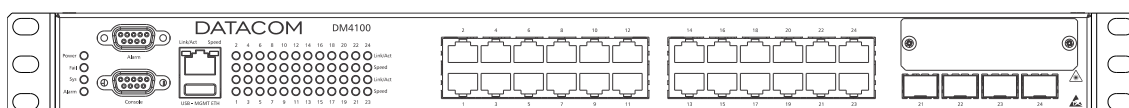


Figure 14. DM4100 20GT + 4GC Bayface



Figure 15. DM4100 20GT + 4GC Rear Panel

DM4100 20GT + 4GC is a standalone switch, Gigabit Ethernet, 1U height and designed to be installed in 19-inch racks. Provide wire speed switching and models oriented to L2/L3/L4 and MPLS applications.

All packet switching L2/L3 (IPv4 and IPv6) and MPLS is executed always in hardware, in wire speed, with a switch matrix up to 152Gbit/s.

DM4100 provides 20 10/100/1000Base-T ports, four combo ports 10/100/1000Base-T CAT5 or 1000Base-X SFP, besides two inlets for satellite cards.

For this model of equipment, there are two available options for satellite cards:

- 2 - 10Gbit/s Ethernet ports XFP
- 2 stacking ports

The satellite card with stacking ports can only be coupled in the equipment's rear panel, while the satellite card with 2x10Gbit/s Ethernet ports XFP can be used in both front and rear panel.

DM4100 supports the stacking capacity of up to eight pieces through the stacking interfaces.

The MAC Addresses Table supports up to 32k entries. It also supports the creation of 4,096 simultaneous VLANs.

The DM4100 24GT + 4GC has a microprocessor of 800MHz, with 1GB of RAM and 256MB of Flash.

Perform the switch of 113,095,238 packets per second (pps), supporting also jumbo-frames.

4.6.1. DM4100 20GT + 4GC Available Models

Device name	Device Description
DM4100 ETH20GT+4GC+2XX+S+L3	(20x GbE + 4x Combo GbE + 2x 10GbE XFP + Stacking)
DM4100 ETH20GT+4GC+2XS+S+L3	(20x GbE + 4x Combo GbE + 2x 10GbE SFP plus + Stacking)
DM4100 ETH20GT+4GC+2XX+S+MPLS	(20x GbE + 4x Combo GbE + 2x 10GbE XFP + Stacking)
DM4100 ETH20GT+4GC+4XX+L3	(20x GbE + 4x Combo GbE + 4x 10GbE XFP)
DM4100 ETH20GT+4GC+4XS+L3	(20x GbE + 4x Combo GbE + 4x 10GbE SFP plus)
DM4100 ETH20GT+4GC+4XX+MPLS	(20x GbE + 4x Combo GbE + 4x 10GbE XFP)
DM4100 ETH20GT+4GC+L3	(20x GbE + 4x Combo GbE)
DM4100 ETH20GT+4GC+S+L3	(20x GbE + 4x Combo GbE + Stacking)
DM4100 ETH20GT+4GC+S+MPLS	(20x GbE + 4x Combo GbE + Stacking)

Table 6. DM4100 20GT + 4GC Available Models

5. INSTALLATION SPECIFICATIONS

The DM4100 Series equipment must be installed in 19-inch racks. The support brackets used to fix the 24-ports model in the rack comes already attached in the equipment. The 48-ports models require the usage of additional strengthening support to install the devices in the rack. In the following items will be described the right procedures to install them both models in the rack.

5.1. Installation of DM4100 24-Ports Models

As previously mentioned, the 24-ports model does not require any additional reinforcement device. The fixing bracket already comes attached in the equipment's side, remaining only screw the equipment in the rack, as shown in Figure 16. The screw used to fix the equipment in the rack is M5 standard.

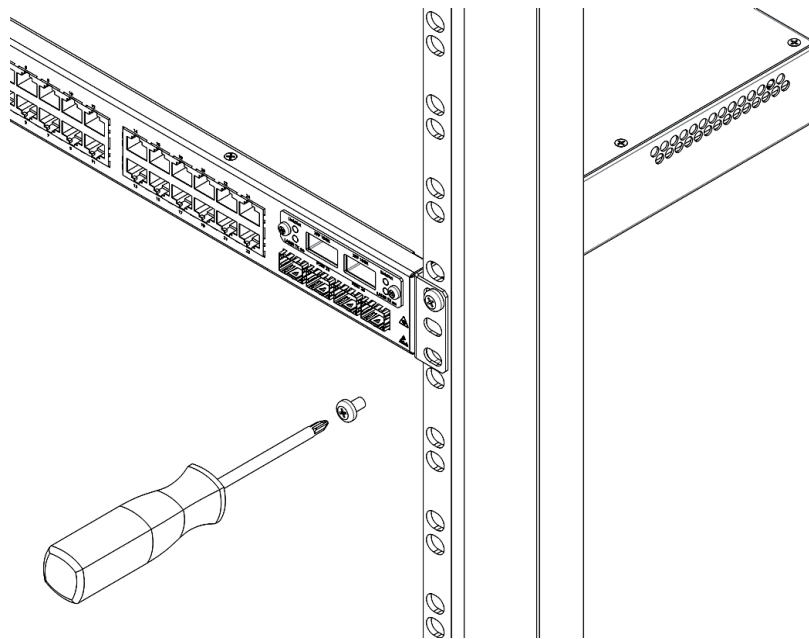


Figure 16. Installation of DM4100 24-Ports Model

5.2. Installation of DM4100 48-Ports Models

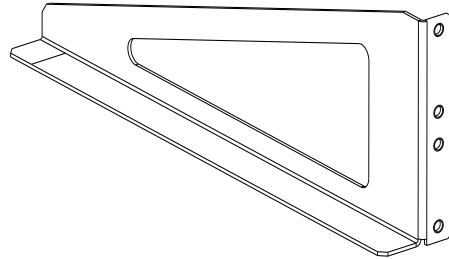
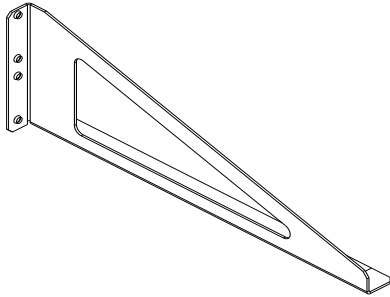
To perform the correct installation of DM4100 48-Ports model in the rack, is required the installation of additional strengthening supports to ensure the properly fixing of the equipment in the rack

These strengthening supports provides the correct sustaining of the 48-ports models in the rack, ensuring even support for two DM4100 48-ports model over the same additional support.

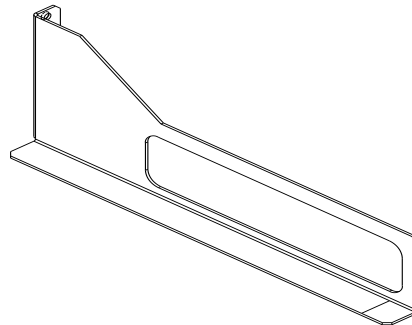
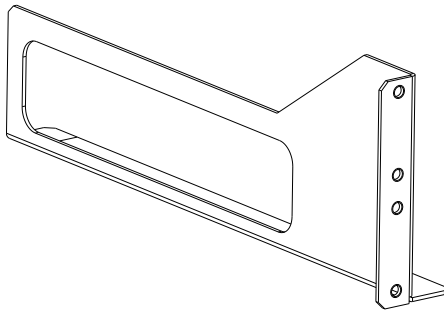
The strengthening supports are illustrated in the following figures. The methods to install the supports, as well as the installation of the switches over the strengthening supports are described in the following items.

5.2.1. Strengthening Supports

- **Strengthening Right Support**



- **Strengthening Left Support**



These strengthening supports must be installed in the frontal face of the rack and is fixed by M5 standard screws, which are sent already screwed in the supports, inside the equipment package.

These strengthening supports does not require the usage of nut-cages, because it has his holes threaded, remaining only to choose the height unit in the rack, place the supports in the internal position inside the rack and fasten its screws.

For further information about the correct installation of the strengthening supports in the rack, read the DM4100 Series Installation Manual (204.4261.xx).

The following figure display two pieces installed in a 19-inch rack using the strengthening support.

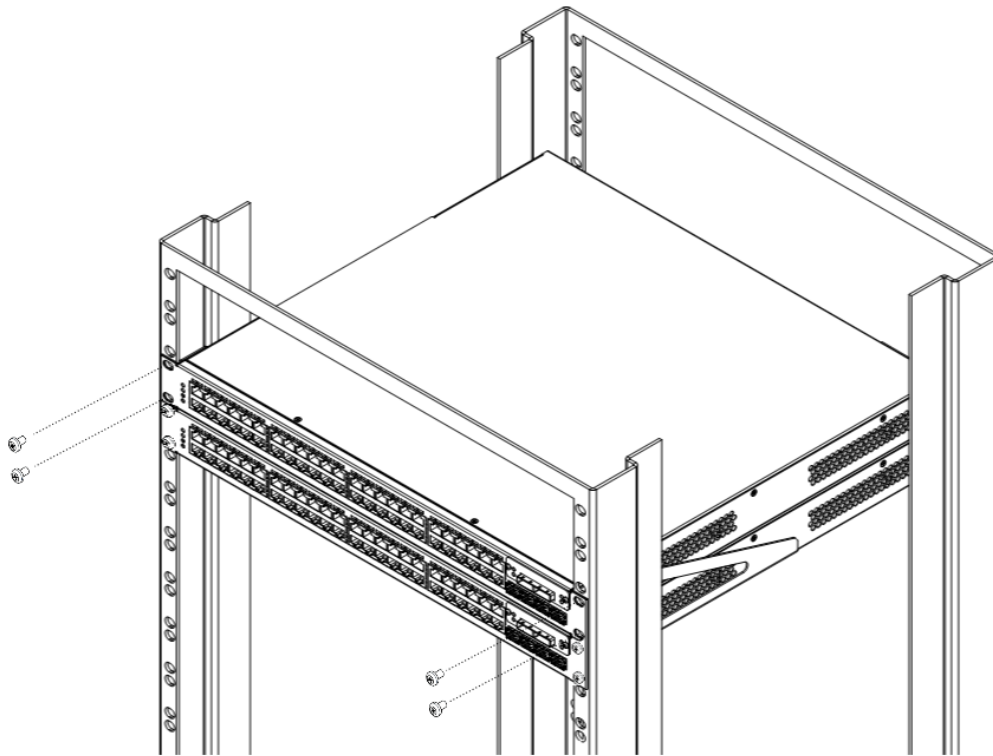


Figure 17. Two DM4100 Chassis Installed with Strengthening Support

6. INTERFACE SPECIFICATIONS

6.1. System Status LEDs

The System Status LEDs on the front panel are used to monitor system activity. Following figure shows where the LEDs are located and the next table indicates the system status according to each LEDs condition.

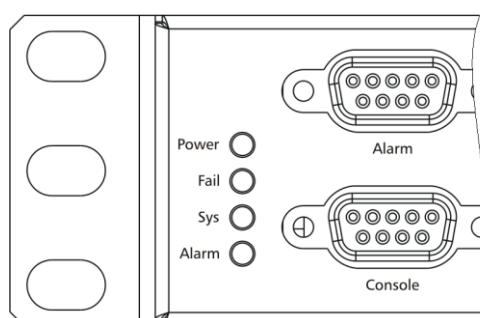


Figure 18. System LEDs

LED	Condition	Status
Power	On	System is powered on
	Off	System is powered off
Fail	On	Indicates hardware failure
	Off	System is operating normally
Sys	On	System is ready
	Off	System is booting
Alarm	On	System Alarm is active
	Off	System Alarm is inactive

Table 7. System Status LEDs

6.2. Gigabit Port LEDs

Port LEDs indicate data activity and speed on each port. Their location is shown in the next figure and their status on the Table 8.

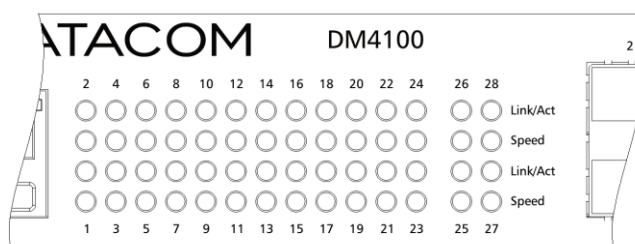


Figure 19. Port LEDs Location in DM4100 24-Ports Model

LED	Condition	Port Status
Link/Act	On	Connection established
	Blinking	Port TX or RX activity
	Off	No connection established
Speed	On	Connection established at 10Mbit/s or 100Mbit/s
	Off	Connection established at 1000Mbit/s (Link ON)

Table 8. DM4100 24-Ports Model LEDs

In the 48-ports models, the LEDs are located up on the ports of the equipment, containing the number of the port which each one represents. The behavior of these LEDs is described in Table 9.

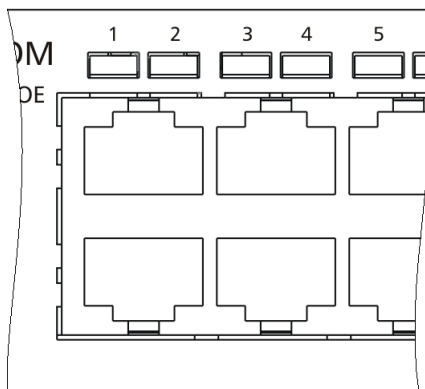


Figure 20. Port LEDs Location in DM4100 48-Ports Model

LED	Condition	Port Status
Link / Act / Speed	On / Green	Connection established at 1000Mbit/s
	On / Yellow	Connection established at 10Mbit/s or 100Mbit/s
	Blinking	Port TX or RX activity
	Off	No connection established

Table 9. DM4100 48-Ports Model LEDs Behavior

6.3. 10 Gigabit Port LEDs

Port LEDs indicate link, data activity and LASER TX ON in each port.

6.3.1. DM4100 with Two 10 Gigabit Ports Model (2XX)

In the DM4100 Series which contains two 10 Gigabit ports, its location is at the equipment's front panel, as shown in Figure 21.

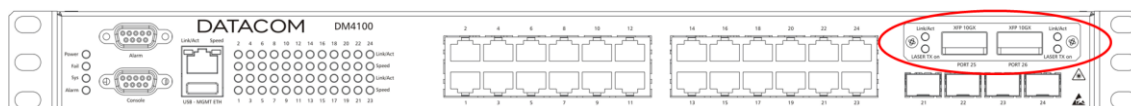


Figure 21. DM4100 with Two 10 Gigabit Ports Model

6.3.2. DM4100 with Four 10 Gigabit Ports Model (4XX)

In the DM4100 Series with four 10 Gigabit ports for Ethernet traffic, two of them are displayed in the front panel, in the same way as shown in the item above. The remaining two 10 Gigabit ports are located in the rear panel of the equipment. The Figure 22 displays this hardware configuration and the equipment ports location.

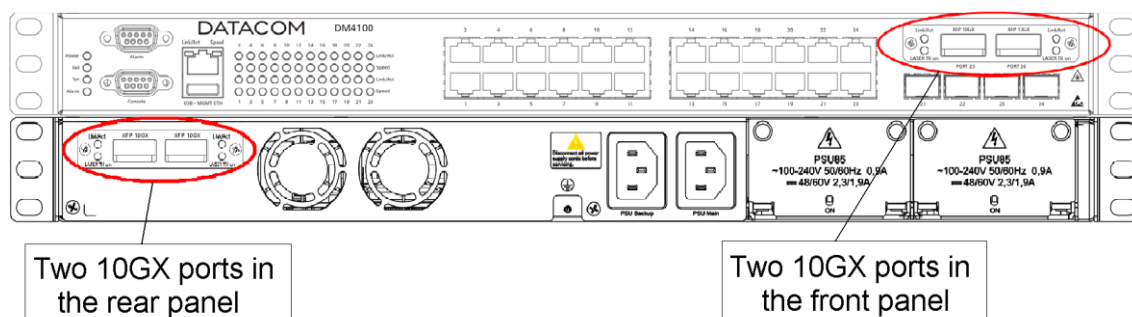


Figure 22. 10 Gigabit Ports Location in DM4100 4XX Models

6.3.3. 10 Gigabit Usage Ports for Stacking

The DM4100 2XX+S indicates that this switch model supports stacking operation (see item 8 about Equipment Stacking). Thus, two 10 Gigabit ports for Ethernet traffic are available in the front panel and two stacking ports in the rear panel.



There is a possibility of use the 10 Gigabit ports in the rear panel of DM4100 4XX models, according Figure 22 for stacking application. Contact Datacom Support for assistance about availability of usage of 10Gigabit ports in the rear panel for stacking.

The Figure 23 shows the Ethernet and Stacking ports location in the equipment.

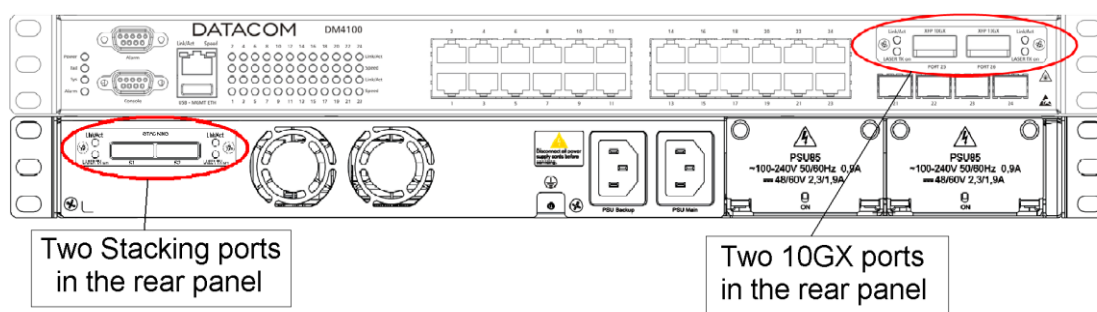


Figure 23. DM4100 2XX+S Model

The LEDs behavior is displayed in the Table 10.

LED	Condition	Port Status
Link/Act	On	Connection established
	Blinking	Port TX or RX activity
	Off	No connection established
LASER TX on	On	XFP Module LASER is ON
	Off	XFP Module LASER is OFF

Table 10. 10 Gigabit Ports LEDs Behavior

6.4. Stacking Port LEDs

Port LEDs indicate link, data activity and stacking on each port. The stacking ports are located in the rear panel of the equipment, as shown in Figure 24, and their status in the Table 11.

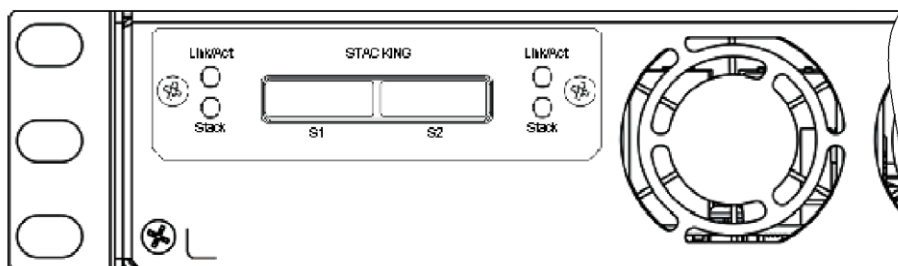


Figure 24. Stacking Ports Location

LED	Condition	Port Status
Link/Act	On	Connection established
	Blinking	Port TX or RX activity
	Off	No connection established
Stack	On	Stacking protocol is established
	Off	Stacking protocol is not established

Table 11. Stacking Port LEDs Behavior

6.5. Console Port in DM4100 24-Ports Model

The DM4100 24-Ports model contains a console port that can be used to directly manage the equipment. The console port follows RS232 (EIA/TIA 574) standard in a DB9 connector. Use a DB9 Male/Female Straight through Serial Cable to connect to a computer.

The pin out console RS232 are shown in the next figure, followed by its pin out table.

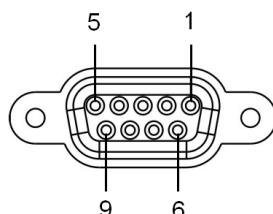


Figure 25. Console Pin Order

Serial Port Pin Name	Pin Number
RX	3
TX	2
GND	4 and 5

Table 12. Console Port Pins Assignments

6.6. Console Port in DM4100 48-Ports Model

The DM4100 48-Port model contains a console port that can be used to directly manage the equipment. The console uses an RJ45 connector. Must be used an RJ45 male to DB9 female cable to connect it to a computer.

The DM4100 console cable is described in the Figure 26, and the pin out of the RJ45 is illustrated in the Figure 27. The corresponding pin out of RJ45 and DB9 connectors is described in Table 13.



Figure 26. DM4100 Console Cable

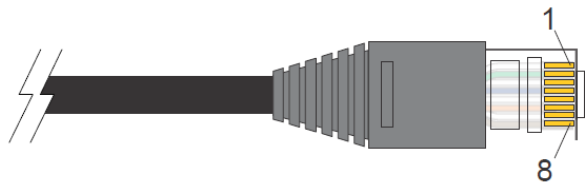


Figure 27. RJ45 Connector Pins

Signal	RJ45 Male	DB9 Female
CTS/RTS	1	8
DSR/DTR	2	6
RXD/TXD	3	2
GND	4	5
GND	5	5
TXD/RXD	6	3
DTR/DSR	7	4
RTS/CTS	8	7

Table 13. Console Port Pins Assignments

6.7. Alarm Ports DM4100 24-Port Models

The DM4100 24-Ports model contains a DB9 connector on its front panel for Alarm Inputs and Output. This alarm port contains three alarm inputs and one alarm output.

The pin order of Alarm DB9 is shown in the next figure, followed by its pin out table.

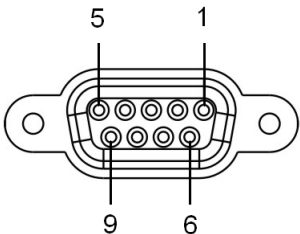


Figure 28. Alarm Port Pin Order

Input/Output	Pin Name	DB9 Pin Number
Alarm Input #1	IN-	6
	IN+	1
Alarm Input #2	IN-	7
	IN+	2
Alarm Input #3	IN-	8
	IN+	3
Alarm Output #1	Common	4
	NA	5
	NF	9

Table 14. Alarm Port Pins Assignments

The Alarm output works as follows. In an alarm situation, or when the device is turned off, pin 4 (common) is short-circuited with pin 9 (NF). When alarm is off, the pin 4 turns to a short circuit with pin 5 (NA), while pin 9 keeps isolated.

IN+ Pin	IN- Pin	Alarm State
0V	0V to -3V	No Alarm
0V	-12V to -60V	Alarm Active

Table 15. Voltages and States for Alarm Inputs

6.8. Alarm Ports in DM4100 48-Ports Model

The DM4100 48-Ports model contains an RJ45 connector on its rear panel for Alarm Inputs and Output. The Alarm port contains two alarm inputs and one alarm output.

The pin order of Alarm RJ45 is shown in the next figure, followed by its pin out table.

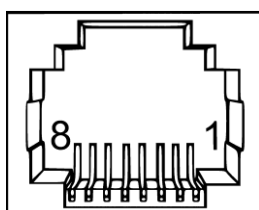


Figure 29. Alarm Port Pin Order

Input/Output	Pin Name	RJ45 Pin Number
Alarm Input #1	IN-	2
	IN+	1
Alarm Input #2	IN-	4
	IN+	3
Alarm Output #1	Common	7
	NA	6
	NF	8

Table 16. Alarm Port Pins Assignments

The Alarm Output works as follows. In an alarm situation, or when the device is turned off, pin 7 (common) is short-circuited with pin 8 (NF). When alarm is off, the pin 7 turns to a short circuit with pin 6 (NA), while pin 8 keeps isolated.

IN+ Pin	IN- Pin	Alarm State
0V	0V to -3V	No Alarm
0V	-12V to -60V	Alarm Active

Table 17. Voltages and States for Alarm Inputs

6.9. USB and Management Ethernet Ports

The DM4100 Series contains a USB 1.1 port for firmware's download, upload, and download of configurations. It also provides a 100Base-TX out band management Ethernet for manage of equipment.

6.9.1. USB Port Support

In order to have the USB Port activated in the equipment, the equipment must have a hardware version equal or greater than 6.

It is possible to display information about the hardware version of the equipment, and if it supports the USB port by using the following command, observing the **bold font** line:

```
DM4100#show system
```

```
Unit 1
Product
  Model:          DM4100 - ETH24GX+2XX+S+MPLS
  OID:            1.3.6.1.4.1.3709.1.2.89
Factory
  Mainboard ID:   1111111
  MAC Address:    00:04:DF:DF:DF:DF
  Product ID:     1111111
System Capabilities
  Bridge:         yes
  Router:         yes
  MPLS:           yes
  USB-console:  yes
  PoE:            no
Rear Expansion Board
  Board Name:     2xStacking
  Serial Number:  1111111
User configurable
  Name:           DM4100
  Location:
  Contact:
```



The access to the USB Console Port can be made by a USB – USB or a USB - RS232 Serial converter. In both cases, for computers with Windows Operation System is required the installation of a Driver in order to support the connection of the computer to the switch (via TeraTerm, Putty, etc.) properly, and recognize the switch in a COM port. The Driver is available for download in DATACOM's page (www.datacom.ind.br). Get contact with DATACOM Technical Support to obtain further information about the Driver installation.

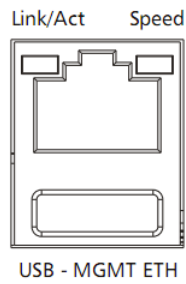


Figure 30. USB and Management Ethernet Ports

LED	Condition	Port Status
Link/Act	On	Connection established
	Blinking	Port TX or RX activity
	Off	No connection established
Speed	On	Connection established at 10Mbit/s
	Off	Connection established at 100Mbit/s (Link ON)

Table 18. Management Ethernet Port LEDs Behavior

7. TECHNICAL SPECIFICATION

7.1. Environmental Conditions

- Operation temperature: 0 to 55 degrees Celsius;
- Storage Temperature: -30 to 70 degrees Celsius;
- Relative Humidity: 10% to 90%, non-condensing.

7.2. Power Supply

Power is supplied to the equipment through a power cord terminated with a three-prong plug. This cable can be connected to any type of AC outlet, within the necessary specifications, within the current and voltage and limits mentioned in the item 7.2.2. If the equipment is using a DC power supply, the power cable should be cut off near the AC sockets connection plug. Must be identified the ground wire which corresponds to the connector central pin. This wire must be connected as ground (GND) in the power supply system, and the two other wires will provide the power supply to the equipment.

The power supply values variation does not require any manual adjustment. This is automatically performed by the equipment, for both the main supply and the optional back-up power supply. Two supplies can be installed for redundant operation and it provides a hot-swappable maintenance.

7.2.1. Power Supply Location

In the DM4100 models ETH24GX and ETH20GT+4GC Series, are provided two PSU slots in the rear panel, and each one is related to each power supply. The order of correspondence between PSUs and power supply units is illustrated in the Figure 31.

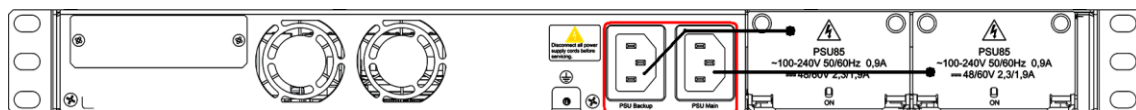


Figure 31. ETH24GX and ETH20GT+4GC with Power Supplies Connectors

In the DM4100 models ETH20GP+4GC, ETH44GP+4GC and ETH44GT+4GC, the equipment provides, besides the AC full range inlet, one extra inlet for External RPU, as shown Figure 32 and Figure 33.

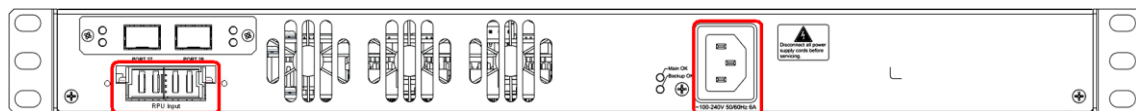


Figure 32. ETH20GP+4GC with Power Supply Connector

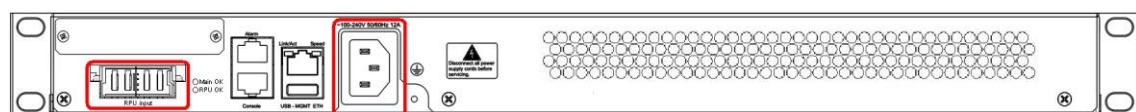


Figure 33. ETH44GP+4GC with Power Supply Connector

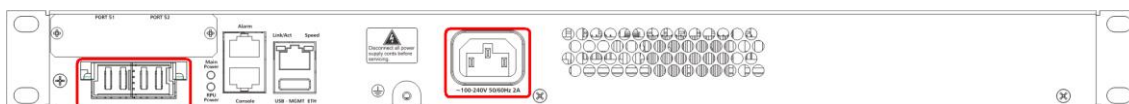


Figure 34. ETH44GT+4GC with Power Supply Connector



The ETH20GP+4GC and DM4100 48-Ports model have internal AC power supplies, and a DC input for external RPU supply. Specifications about DM4100 RPU power supplies in the chapter 10 in this manual.

7.2.2. Recommended Power Limits

Recommended Voltage Limits		Power Type	Freq.	Max. Power	Max. Current
Min.	Max.				
-48V	-60V	DC	-	85W	1.77A
100V	240V	AC	50/60Hz	85W	0.85A

Table 19. Recommended Power Limits for ETH24GX and ETH20GT+4GC Series

Recommended Voltage Limits		Power Type	Freq.	Max. Power	Max. Current
Min.	Max.				
100V	240V	AC	50/60Hz	555W	5.6A

Table 20. Recommended Power Limits for ETH20GP+4GC Series

Recommended Voltage Limits		Power Type	Freq.	Max. Power	Max. Current
Min.	Max.				
100V	240V	AC	50/60Hz	170W	1.7A

Table 21. Recommended Power Limits for ETH44GT+4GC Series

Recommended Voltage Limits		Power Type	Freq.	Max. Power	Max. Current
Min.	Max.				
100V	240V	AC	50/60Hz	1100W	11A

Table 22. Recommended Power Limits for ETH44GP+4GC Series

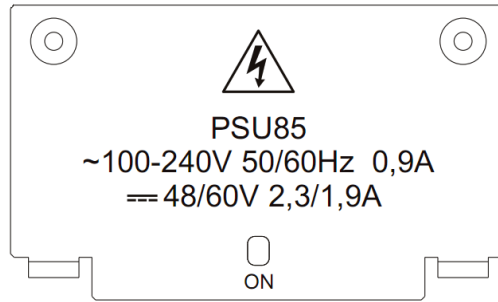


Figure 35. PSU85 Power Supply Rear Panel



The plug is the disconnection device on the equipment. The socket outlet, where the supply cable is connected, must be positioned near the equipment and have easy access.



In case of using DC voltage, be careful so that the equipment protection ground cable (green cable with yellow line related to the central socket pin) matches the system protection ground cable. This cable must be connected before any other connection. The metallic structure of the equipment is connected to the protection ground cable.



The fuse F4 supports a 3.15A fuse, type T (delay), 250V. If necessary, replace it only for another one of the same type and value.



The fuse F3 supports a 10A fuse, type Fast Acting, 125V. If necessary, replace it only for another one of the same type and value.



The power supply PSU85 is able to handle up to 125V_{DC}.

7.3. Consumption

Model	Equipment Consumption (W)	Maximum Consumption PoE (W)
DM4100 ETH24GX+2XX+S+L3	85	NA
DM4100 ETH24GX+2XX+S+MPLS	85	NA
DM4100 ETH24GX+4GX+L3	85	NA
DM4100 ETH24GX+4GX+MPLS	85	NA
DM4100 ETH24GX+4XX+L3	85	NA
DM4100 ETH24GX+4XX+MPLS	85	NA
DM4100 ETH20GP+4GC+2XS+S+L3	90	821
DM4100 ETH20GP+4GC+2XX+S+L3	90	821
DM4100 ETH20GP+4GC+4XS+L3	90	821
DM4100 ETH20GP+4GC+4XX+L3	90	821
DM4100 ETH20GP+4GC+S+L3	90	821
DM4100 ETH20GT+4GC+2XS+S+L3	90	NA
DM4100 ETH20GT+4GC+2XX+S+L3	85	NA
DM4100 ETH20GT+4GC+2XX+S+MPLS	85	NA
DM4100 ETH20GT+4GC+4XS+L3	90	NA
DM4100 ETH20GT+4GC+4XX+L3	85	NA
DM4100 ETH20GT+4GC+4XX+MPLS	85	NA
DM4100 ETH20GT+4GC+L3	80	NA
DM4100 ETH20GT+4GC+S+L3	80	NA
DM4100 ETH20GT+4GC+S+MPLS	85	NA
DM4100 ETH44GP+4GC+2XS+S+L3	120	1642
DM4100 ETH44GP+4GC+2XX+S+L3	170	1642
DM4100 ETH44GP+4GC+4XS+L3	120	1642
DM4100 ETH44GP+4GC+4XX+L3	170	1642
DM4100 ETH44GP+4GC+S+L3	170	1642
DM4100 ETH44GT+4GC+2XS+S+L3	120	NA
DM4100 ETH44GT+4GC+2XX+S+L3	170	NA
DM4100 ETH44GT+4GC+2XX+S+MPLS	170	NA
DM4100 ETH44GT+4GC+2XX+S+MPLS (DC)	120	NA
DM4100 ETH44GT+4GC+4XS+L3	120	NA
DM4100 ETH44GT+4GC+4XX+L3	170	NA
DM4100 ETH44GT+4GC+4XX+MPLS	170	NA
DM4100 ETH44GT+4GC+4XX+MPLS (DC)	120	NA
DM4100 ETH44GT+4GC+S+L3	170	NA
DM4100 ETH44GT+4GC+S+MPLS	170	NA
DM4100 ETH44GT+4GC+S+MPLS (DC)	120	NA

Table 23. Maximum Power Consumption of Different Models



The Maximum Consumption PoE (W) column is considering the maximum power used on a highest load case and using an RPU, providing 34,2W in all 48 ports of this switch model.

7.4. Weight

The specified weights in the Table 24 are not considering the weight of PSU Power Sources.

Models	Weight (Kg)
ETH24GX Series	3.4
ETH20GT+4GC Series	2.96
ETH20GP+4GC Series	3.34
ETH44GT+4GC Series	3.58
ETH44GP+4GC Series	3.68

Table 24. Weight of Different Models

7.5. Dimensions

All DM4100 Series equipment are 1U height and are sent with the side brackets for installation in 19-inch racks. In the 24-Ports model, these supports are removable, but in the 48-ports model, it is not possible to remove these supports.

Models	Without Mouting Brackets			With Mouting Brackets		
	Height	Width	Depth	Height	Width	Depth
ETH24GX Series	43.5mm	440mm	249.6mm	43.5mm	480.8mm	249.6mm
ETH20GT+4GC Series	43.5mm	440mm	251.6mm	43.5mm	480.8mm	251.6mm
ETH20GP+4GC Series	43.8mm	440mm	326.6mm	43.8mm	480.8mm	326.6mm
ETH44GT+4GC Series	NA	NA	NA	43.5mm	482.5mm	415mm
ETH44GP+4GC Series	NA	NA	NA	43.5mm	482.5mm	415mm

Table 25. DM4100 Dimensions

7.6. Applicable Standards - Specification and Description

Specification	Description
Immunity	EN 61000-4-2 Electrostatic Discharge
	EN 61000-4-3 Radio Frequency Electromagnetic Field Amplitude Modulated
	EN 61000-4-4 Fast Transients (burst)
	EN 61000-4-5 Surges
	EN 61000-4-6 Radio Frequency Conducted Continuos
	EN 300386 Radiated Immunity
EMC	CISPR-22 Class A
	FCC Class A
	EN 61000-3-3 Voltage Fluctuation and Flicker
EMI	CISPR-22 Class A
	FCC Class A
Safety	IEC 90050

Table 26. DM4100 Immunity Information

8. STACKING

The DM4100 Series products are able to work in stacking mode. Thus, the stacked switches become to work as one single switch, with additional ports. The usage of this method facilitates the expansion of Metro Ethernet Network with low costs and easier implementation. It enables the stacking of up to eight pieces in two different topologies: ring and line.

In the ring topology, an additional 1m cable is used to enable the connection between the devices that are placed in the top and in the bottom of the stack. This topology can be assembled between the devices to warranty protection against failures, because any equipment can be configured as “master” if one device fails (1:N protection).

If only the stacking configuration is enabled, the switch of the topology that contains the lowest MAC Address number will assume the Master condition, and if a fail occurs at this Master equipment, the next lowest MAC Address number will becomes the new Master. It is also possible to configure a priority value to any equipment in the topology, forcing, this way, the scalability into the topology.

The devices can be stacked through dedicated ports or via 10Gbit/s ports, configured to operate in stacking mode*.

The existing functionalities of the equipment become available in between different units in a transparent mode, such as: VLANs, logical ports and monitoring ports.

The pass-through between the stacked switches, through the Datacom stacking cable is up to 52Gbit/s. In the DM4100 model, which provides XFP ports in the rear panel, the stacking connections must be performed by XFP transceivers and optical fiber cables. At this stacking mode, the wire speed will be limited in 40Gbit/s in any equipment.

The Figure 36 illustrates a line topology, and the Figure 37 shows an example of ring topology with the redundant cable.

*Contact Datacom Support about availability of usage of 10Gbit/s ports as Stacking ports.

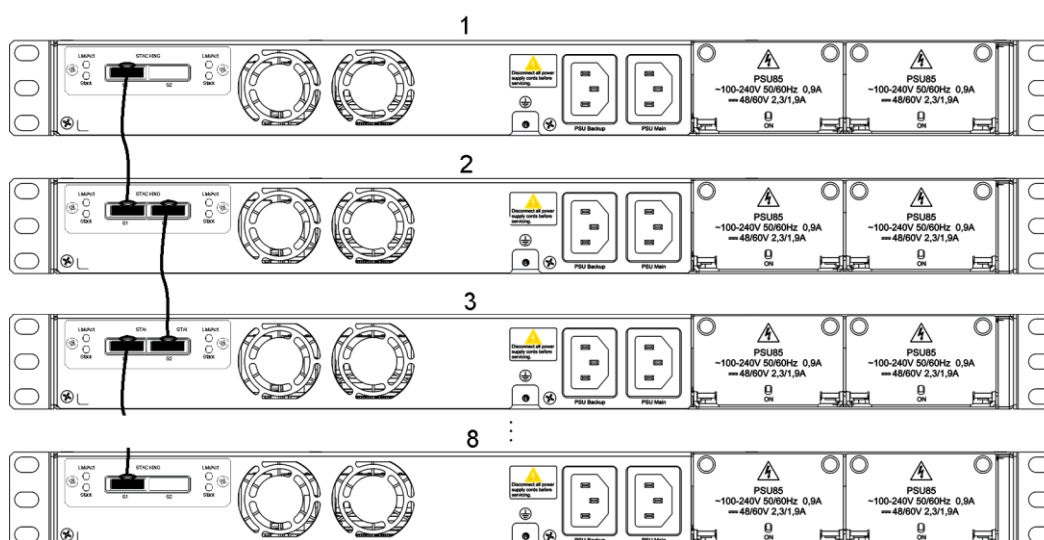
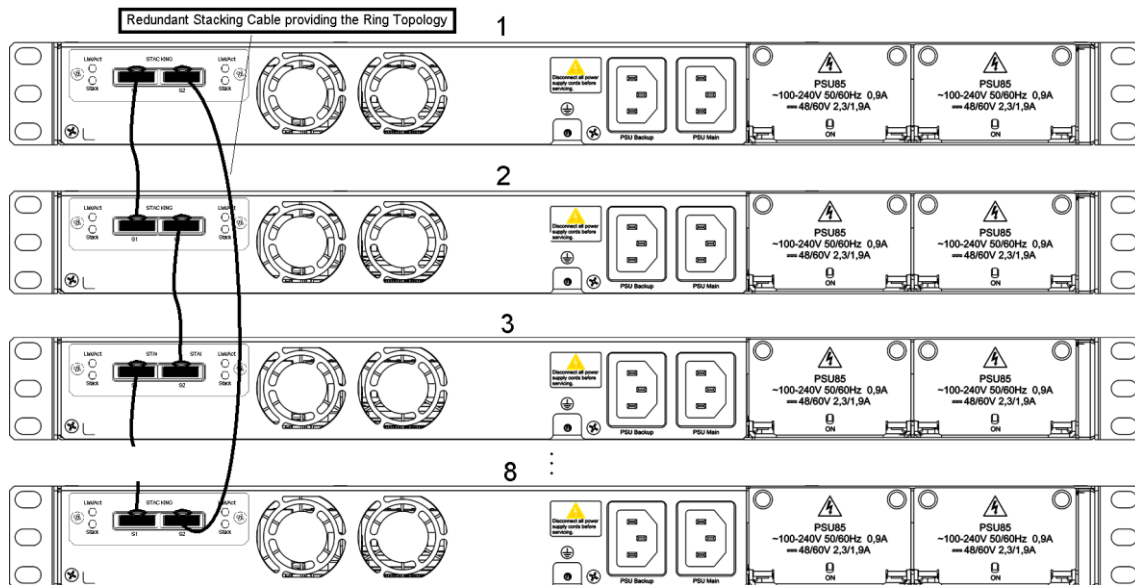
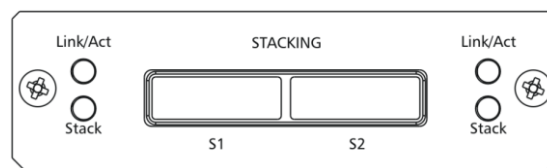


Figure 36. Line Topology Switches



In DM4100 models, which provide stacking ports, the connections must be performed using only Datacom cables.



9. MAKING CONNECTIONS

This chapter describes how SFP modules should be installed and removed. It also informs about DATACOM recommendations on cleanness and storing optical modules and fibers.

The SFP (Small Form-factor Pluggable) modules are applied in the equipment's SFP ports, operating as transceivers between the equipment and the selected optical communication path.

In order to ensure a good health and high performance of the equipment is very important to follow the next guidelines that Datacom recommends.

- **Optical Cords Care**

- Keep the unused optical cords always with the protection covers. The nucleus of the optical cords may get dirty and provoke loss of performance just by being kept uncovered, even placed inside appropriated cabinet;
- Perform the cleanness of the optical cord nucleus before use them. To perform the cleanness procedure, must be used specific material only. Any other used material for the optical cord nucleus cleanness may cause loss of performance of the equipment or even irreparable damage in the optical cords.

- **Optical Modules Care**

- To handle the optical modules, it must be performed always using a grounded wrist strap;
- For transporting and storing the optical modules, always must be used the original packing box in order to prevent any physical or electrostatic damage in the module.
- The unused modules must always be stored with its protection cover cage inserted in order to avoid the ingress of dirt, which may cause loss of performance of the link.



Signals over fiber optic cables are transmitted via LASERs. Although the LASERs are compliant with the requirements of Class 1 LASER Products and are eye safe in normal conditions, never look directly at a transmission port when it is in operation.



During any work execution in the equipment, certify that the technician responsible for the modification is using the appropriate protections. The grounding (and use of grounded wrist strap) can avoid damages for the technician's health as well as for the equipment.



The DATACOM SFP and XFP modules are tested to fulfill the INF-8074i and IEC60825-1 Specification. Non-approved modules do not guarantee the correct operation of the equipment and can damage the interface cards. From Firmware version 12.4 onwards, the DATACOM equipment will allow the usage of non-homologated SFPs. However, in previous firmware versions the Datacom equipment will check if the SFP is homologated and if not, it will perform the lockout of the module. Contact the technical support of DATACOM to further information about the risks of usage of non-homologated SFP and the possibility of unlock them.

9.1. SFP Module Installation

Insertion or removal of SFP transceivers can be performed without turning off the switch. The modules are hot-swappable, but make sure there are no network optical cords connected to the module before removing it.

The installation of SFP modules is simply executed by fitting the module into the equipment's SFP slot and by pushing it until it will be fixed. The right position to fit it can be checked on Figure 39.

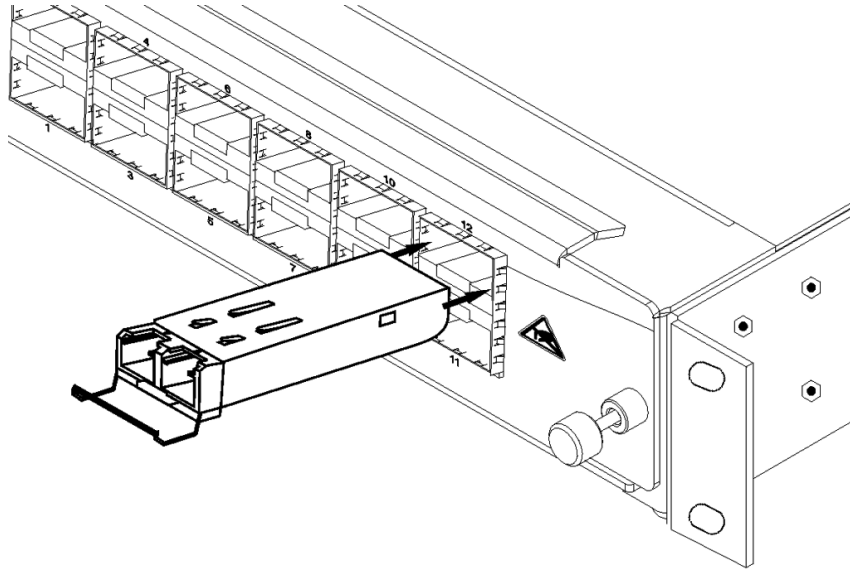


Figure 39. SFP Modules Installation

After the module fitting, fasten the security latch according to Figure 40. It will work as a safety catch for the optical fibers, whenever they will be connected.

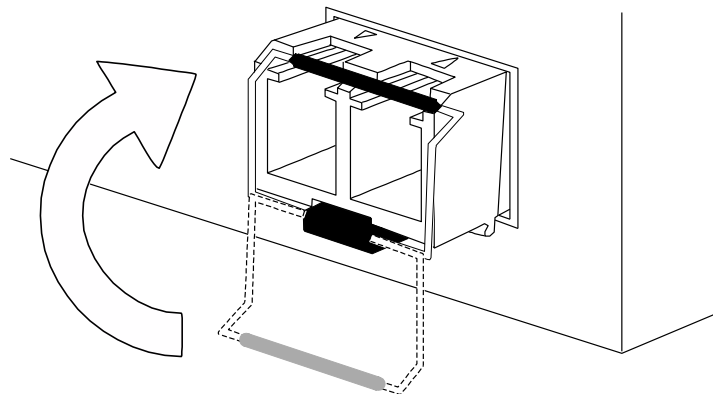


Figure 40. Security Latch

As soon as the latch is positioned, connect the optical fibers.

9.2. SFP Modules Removal



Before removing the optical fibers it is recommended to verify if there is any mark/instruction, indicating which fiber should be connected to which module.

Follow the installation's inverse order for modules removal:

- Remove the fiber optical.
- Drop the security latch.
- Pull the module by the latch, according to Figure 41.

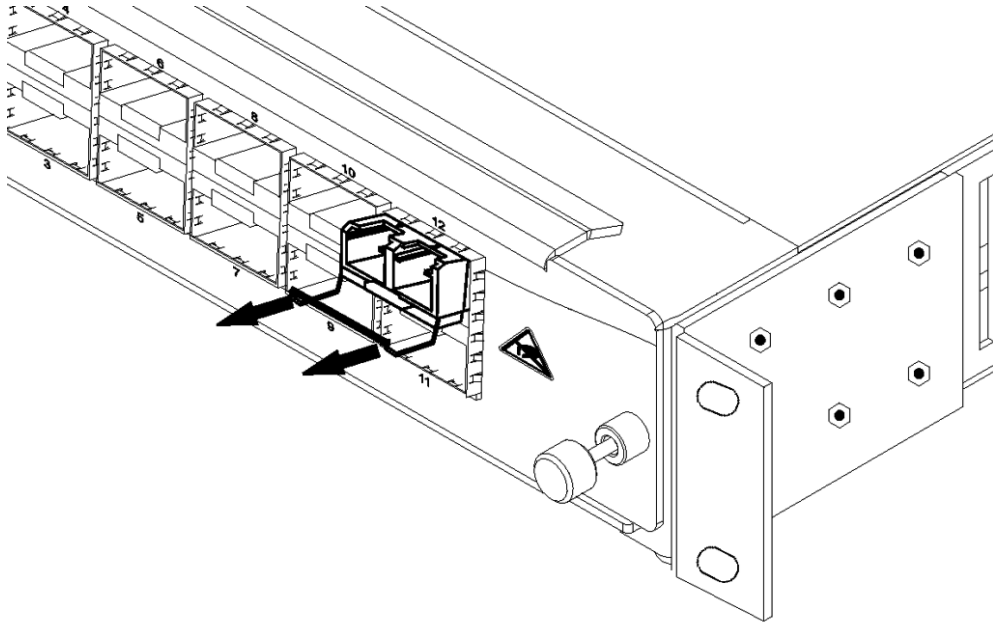


Figure 41. Removing the SFP Module

9.3. Transceiver Models

SFP Module	Data Rate	Lambda	Maximum Length
100BASE-SX	125Mbit/s	1310nm	2 km
100BASE-LX	125Mbit/s	1310nm	30 km
100BASE-LX+	125Mbit/s	1310nm	40 km
100BASE-LH	125Mbit/s	1550nm	100 km
100BASE-LZ	125Mbit/s	1550nm	120 km
100BASE-BX20-U	125Mbit/s	1550nm / 1310nm	20 km
100BASE-BX20-D	125Mbit/s	1310nm / 1550nm	20 km
100BASE-BX60-U	125Mbit/s	1550nm / 1310nm	60 km
100BASE-BX60-D	125Mbit/s	1310nm / 1550nm	60 km
1000BASE-SX	1.25Gbit/s	850nm	550 m
1000BASE-LX	1.25Gbit/s	1310nm	10 km
1000BASE-LX+	1.25Gbit/s	1310nm	30 km
1000BASE-LH	1.25Gbit/s	1550nm	80 km
1000BASE-LZ	1.25Gbit/s	1550nm	120 km
1000BASE-LZ150	1.25Gbit/s	1550nm	150 km
1000BASE-BX10-U	1.25Gbit/s	1490nm / 1310nm	10 km
1000BASE-BX10-D	1.25Gbit/s	1310nm / 1490nm	10 km
1000BASE-BX20-U	1.25Gbit/s	1490nm / 1310nm	20 km
1000BASE-BX20-D	1.25Gbit/s	1310nm / 1490nm	20 km
1000BASE-BX60-U	1.25Gbit/s	1490nm / 1310nm	60 km
1000BASE-BX60-D	1.25Gbit/s	1310nm / 1490nm	60 km
2500BASE-SX	2.5Gbit/s	1310nm	2 km
2500BASE-LX	2.5Gbit/s	1310nm	15 km
2500BASE-LX+	2.5Gbit/s	1310nm	40 km
2500BASE-LH	2.5Gbit/s	1550nm	80 km
2500BASE-LZ	2.5Gbit/s	1550nm	120 km
2500BASE-BX20-U	2.5Gbit/s	1490nm / 1310nm	20 km
2500BASE-BX20-D	2.5Gbit/s	1310nm / 1490nm	20 km
2500BASE-BX40-U	2.5Gbit/s	1490nm / 1310nm	40 km
2500BASE-BX40-D	2.5Gbit/s	1310nm / 1490nm	40 km
10GBase-LRM (XFP)	10Gbit/s	1330nm	260 m
10GBase-SR (XFP)	10Gbit/s	850nm	300 m
10GBase-LR (XFP)	10Gbit/s	1310nm	10 km
10GBase-ER (XFP)	10Gbit/s	1550nm	40 km
10GBase-ZR (XFP)	10Gbit/s	1550nm	80 km
10GBase-ZR120 (XFP)*	10Gbit/s	1550nm	120 km
10GBase-BX20-U (XFP)	10Gbit/s	1330nm / 1270nm	20 km
10GBase-BX20-D (XFP)	10Gbit/s	1270nm / 1330nm	20 km
10GBase-LRM (SFP+)	10Gbit/s	1310nm	260 m
10GBase-SR (SFP+)	10Gbit/s	850nm	300 m
10GBase-LR (SFP+)	10Gbit/s	1310nm	10 km

Table 27. Transceiver Models

* It reaches up to 120km using an external booster.

10.DM4100 RPU



Figure 42. DM4100 RPU Bayface

10.1. Specification and Installation

The DM4100 RPU (Remote Power Unit) is an external device with 1U height for 19" racks. It is illustrated in Figure 43.

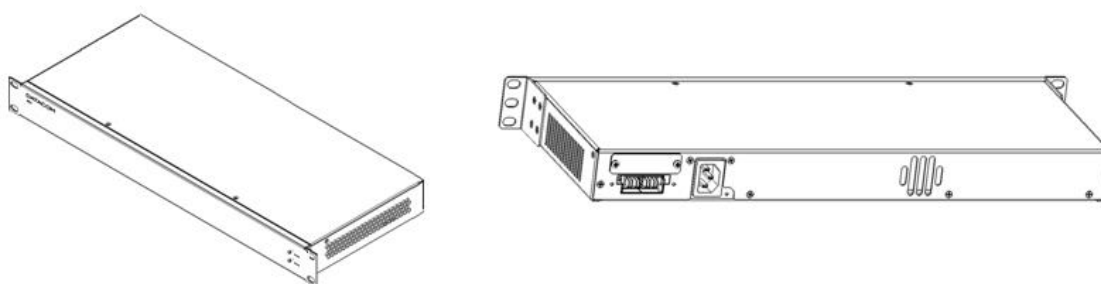


Figure 43. DM4100 RPU

This power supply has an AC input through a power cord with a three-prong plug termination (sent with the RPU) and one DC output power, through a cable with a Power Blade connector (not sent, must be purchased separately).

Datacom offers three DM4100 RPU models to power with DC voltage the DM4100 Series products, one RPU for each switch model. This power supplies are used to provide the system power redundancy in the DM4100 Series models or to provide enough power to delivery PoE+ in all equipment ports (only possible in DM4100 ETH20GP+4GC and DM4100 ETH44GP+4GC).

The compatibility of DM4100 RPU and chassis models is described in Table 28.

DM4100 Model	Power
DM4100 ETH44GT + 4GC (redundancy)	300W
DM4100 ETH20GP + 4GC (redundancy or load balance)	500W
DM4100 ETH44GP + 4GC (redundancy or load balance)	1000W

Table 28. DM4100 RPU and Chassis Compatibility



Different mounting configurations are not allowed.

The power supply must be installed in the rack near to the equipment, which will be powered, observing also the distance to the AC power source that will be connected to the RPU.

To connect the RPU to the equipment, read the next instructions:

1. Install the RPU in the rack, near the DM4100;
2. Before turn the RPU on, is mandatory to make the connection of the DM4100 and the RPU. To perform this connection, insert one end of the connector in the DC output of the RPU and the other end in the DC input of the DM4100, using the Power Blade connector;
3. Insert the AC power cord from the AC power source in the RPU and check if the Power LED will light up. It will ensure that the DM4100 RPU is correctly turned ON.



It is very important perform the step 2 carefully. Turning on at first the RPU and later perform its connection to the switch may cause irreversible damages in the equipment.

The DC power cables to connect the RPU and the switch may vary due to its length. In the following table are described the size specifications of the cable and its DATACOM code.

Cable Model	Datacom Code
Cable DM4100 RPU - Power Blade - 1m	710.0298.xx
Cable DM4100 RPU - Power Blade - 3m	710.0299.xx

Table 29. DC Cable Specifications

10.2. Redundancy and PoE+ Provision

If a DM4100 RPU is connected to a DM4100 ETH44GT+4GC model, it will provide redundancy of its equipment power system. If the internal power supply fails, the equipment will stay up and running, powered by the RPU.

To the switch models that the RPU provides PoE+ in all equipment ports, there are two different configurations for the supply mode. These configurations are performed via software by the switch DM4100, and works as follow:

If an RPU is powering a switch DM4100 ETH20GP+4GC model, or a DM4100 ETH44GP+4GC model, the operator will manage the power configuration mode that the RPU will work. The RPU can work in load sharing with the internal power supply (to provide PoE+ in all equipment ports) or as a redundant power supply. If the RPU is configured to work in a redundant power supply mode, if a failure occurs in the internal power of the equipment, it will be sustained by the DM4100 RPU. However, if the RPU is configured to work in the load-sharing mode, when a failure occurs in its internal power supply, is not guaranteed that the equipment functionalities will still be working properly.

10.2.1. PoE and PoE+ Behavior

In the DM4100 PoE+ 24-ports model, the equipment provides PoE power in the 24-ports of the equipment, and PoE+ in only 12. In the 48-ports model, it enables PoE in all 48-ports and PoE+ in only 24.

Using the DM4100 RPU in these DM4100 models and configuring the DM4100 RPU for the load sharing mode, the equipment will perform the load balance with the internal power supply, in order to provide enough power to delivery PoE+ in all 24 or 48-ports of the switch.

The PoE models are DM4100 ETH20GP+4GC and DM4100 ETH44GP+4GC.

10.2.2. Ports with PoE+ Variation Due to High Temperature

The behaviors of PoE+ delivery in the Ethernet ports described above are conditioned to the equipment operation temperature.

The description of power supply from the RPU to the equipment Ethernet ports is only valid if the equipment is working in temperature sub 50°C. If the temperature is between 50°C and 55°C, there will have a power limitation available to the PoE interfaces.

This PoE+ ports variation due to temperature variation is described in Table 30.

Equipment Temperature up to 50°C		
Model	Withou RPU	With RPU
24 Ports	Up to 12 PoE+ ports or equivalent consumption	Up to 24 PoE+ ports or equivalent consumption
48 Ports	Up to 24 PoE+ ports or equivalent consumption	Up to 48 PoE+ ports or equivalent consumption

Equipment Temperature Between 50°C and 55°C		
Model	Withou RPU	With RPU
24 Ports	Up to 9 PoE+ ports or equivalent consumption	Up to 21 PoE+ ports or equivalent consumption
48 Ports	Up to 20 PoE+ ports or equivalent consumption	Up to 43 PoE+ ports or equivalent consumption

Table 30. PoE+ Ports with Temperature Variation

The power specifications of RPU models are described in Table 31.

Model	Input Voltage	Output Power
DM4100 RPU 300W	100~240 V _{AC}	300W
DM4100 RPU 500W	100~240 V _{AC}	500W
DM4100 RPU 1000W	100~240 V _{AC}	1000W

Table 31. DM4100 External RPUs Specification

The rear panel of the RPU, with the power input and output indications, is illustrated in the next figure.

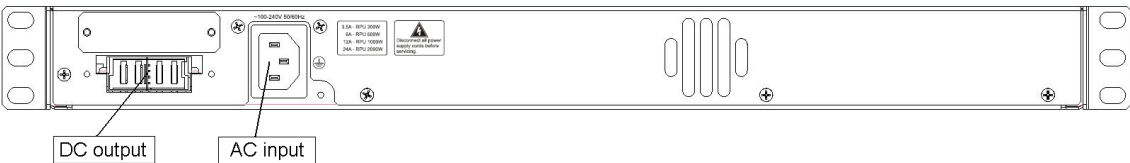


Figure 44. DM4100 RPU Rear Panel

11.UNDERSTANDING POE (IEEE 802.3AF) & POE+ (IEEE 802.3AT)

11.1. Description

The Power Source Equipment (PSE) injects power in the center tap of the line transformer enabling the power to be sent by Ethernet cable to the Powered Device (PD). The power sent by PSE and received by the PD varies from a minimum value specified by the standard classes up to the output PSE power. Due to the Ethernet connection can be done with a straight or a cross Ethernet cable, the PD uses a diode bridge rectifier and a DC/DC converter to generate its internal power.

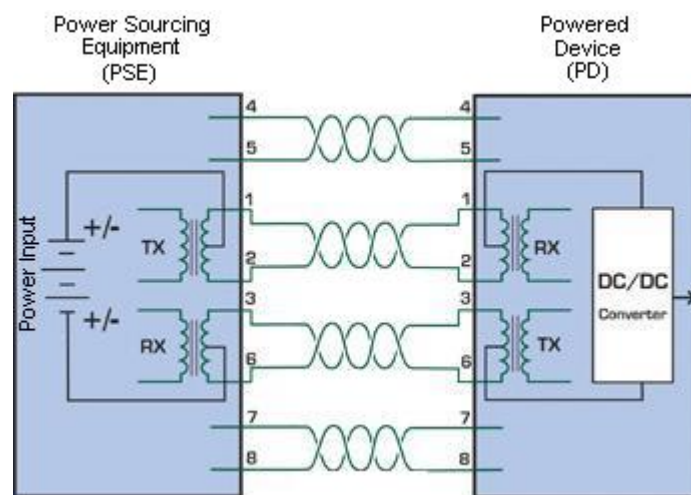


Figure 45. PoE Basic Concept

The IEEE 802.3af and IEEE 802.at standards define five classes of power that need to be negotiated by the PSE and PD at the PoE/PoE+ initialization. The class four is only valid for IEEE 802.3at (PoE+) devices and is reserved in IEEE 802.3af (PoE).

Class	PSE Power Output Level (W)	Range of Maximum Power Used by the PD (W)
0	15.4	0.44 to 12.95
1	4	0.44 to 3.84
2	7	3.84 to 6.49
3	15.4	6.49 to 12.95
4	34.2	12.95 to 25.50

Table 32. DM4100 PoE / PoE+ Classes

The difference between both columns happens due to cable power loss.

Information	IEEE 802.3af (PoE)	IEEE 802.3at (PoE+)
PSE Output Voltage	44 to 57 VDC	50 to 57 VDC
PD Input Voltage	37 to 57 VDC	42.5 to 57 VDC
Maximum Current	350mA	600mA
Supported Cabling	CAT 3, CAT5, CAT 6	CAT5, CAT 6

Table 33. PoE / PoE+ Additional Information

The PoE / PoE+ negotiation has four steps:

- Validation of PD connected to the port;
- Identification of the class which will attend the PD;
- Start-up the power process;
- PD enters in normal operation.

If the first two steps does not complete (per example for a non-PoE link), the port will not to deliver power to the cable. Depending on the software configuration, it is possible to do not start the start-up process if the PD is not supported by the PSE or if the PSE does not have enough power to supply to the PD.

11.2. PoE & PoE+ in DM4100 Family

The DM4100 family has two series, ETH20GP+4GC and ETH44GP+4GC that are fully compatible with PoE (IEEE 802.3af) and PoE+ (IEEE 802.3at) in all electrical ports. Both series, besides guaranteeing the supply of the equipment switch functions, can also guarantee the maximum output power (15.4W) on all ports for PoE applications without the usage of an external RPU supply. For PoE+ applications, the Software controls the links in all ports and, depending on the amount of available power, it will release power to the port. If an external RPU supply is used, it is possible to reach the maximum output power (34.2W) in all the switch ports (PoE+).

Information	DM4100 ETH20GP+4GC+4XX	DM4100 ETH44GP+4GC+4XX
Available PoE / PoE+ Ports	24 Ports	48 Ports
Guaranteed power for PoE and PoE+ Applications	430 Watts	879 Watts
Minimum ports in PoE applications available	24 Ports	48 Ports
Minimum ports in PoE+ applications available without the use of an external RPU	12 Ports	25 Ports
Minimum ports in PoE+ applications available with the using external 500W RPU	24 Ports	NA
Minimum ports in PoE+ applications available with the using external 1000W RPU	NA	48 Ports

Table 34. DM4100 PoE / PoE+ Support Information

The above values are examples using worst-case internal power consumptions. Use maximum power values in Table 23 to calculate available PoE Power in all DM4100 Models.

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