

# DATACOM



## DM4615

### OLT – OPTICAL LINE TERMINATION

#### INSTALLATION GUIDE

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## Legal Notice

Despite all precautions having been taken in the preparation of this document, DATACOM does not assume any responsibility for any errors or omissions, as well as no liability is assumed for damages resulting from the use of the information contained in this manual. The specifications provided in this manual are subject to changes without prior notice and are not recognized as any type of contract.

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## Warranty

This product is guaranteed against material and manufacturing defects for the period specified in the sales invoice.

The warranty only includes the repair and replacement of components or defective parts at no charge to the customer. Defects resulting from the following are not covered: improper use of the equipment, electric power failure, natural phenomena (lightning for example), failure of equipment connected to this product, installations with improper grounding or repairs carried out by personnel not authorized by DATACOM.

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



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## Equipment Documentation

This manual is part of a set of documents prepared to provide all the necessary information about Datacom equipment.

- **Description** – Presents equipment information and characteristics.
- **DmOS Command Reference** – Lists all commands relevant to the equipment.
- **Installation Manual** – Provides instructions about equipment installation procedures.
- **Quick Reference Guide** – Provides summarized instructions about equipment installation and configuration procedures (shipped with the equipment).
- **Release Notes** – Informs users about new features, known bugs and hardware compatibility.

The availability of certain documents may vary depending on the type of equipment.

Visit the Datacom website to find related documentation or contact Technical Support for more information (see [Contacts](#)).

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## INSTALLATION MANUAL - INTRODUCTION

## 1.1. About this Manual

This manual can be used with the DM4615 OLT GPON equipment, providing information on the installation of this equipment.

The document focuses on the electrical and physical parts, also in the indication of the equipment status, as well as in the installation of its hardware. It is assumed that the individual or individuals who will handle or manage any aspect of the equipment have basic knowledge of electrical installations, GPON and Ethernet interfaces, in addition to overall telecommunications knowledge.







## 1.2. Target Audience

This manual is intended for network administrators, technicians or qualified personnel to install, configure, plan and maintain this equipment.

## 1.3. Conventions

In order to facilitate understanding throughout this manual, the following conventions have been adopted:

### 1.3.1. Icons

Icon	Category	Description
	Note	Notes further explain certain details presented in the text.
	Warning	This formatting indicates that the text contained herein is of great importance and there is a risk of damage.
	Hazardous	Indicates that, if the procedures are not followed correctly, there is a risk of electric shock.
	Hazardous	Indicates the presence of laser radiation. If instructions are not followed and if direct exposure to the skin and eyes is not avoided, it may cause damage to the skin or eyes.
	Warning	Indicates equipment or a part that is sensitive to static electricity. It shouldn't be handled without using an antistatic bracelet or equivalent.
	Warning	Indicates the emission of non-ionizing radiation.


Icon	Category	Description
	Note	Symbol of the WEEE directive (Applicable for the European Union and other countries with a selective collection system). This symbol on the equipment or packaging indicates that the equipment cannot be disposed of with household waste. However, it is your responsibility to take the equipment to be discarded at a collection point assigned for the recycling of electro-electronic equipment. Separate collection and the recycling of equipment at the time of disposal help in the conservation of natural resources and ensure that the equipment will be recycled so as to protect people's health and the environment. For further information on where to discard equipment for recycling, contact your local dealer where the equipment was purchased.

Table 1 - Icon Conventions



A warning icon calls attention to conditions that, if not avoided, may cause physical damage to the equipment.



A text of the Notice type calls the attention for the conditions that, if not avoided, may result in death or serious injury.

### 1.3.2. Texts

Convention	Description
<a href="#">Hyperlink</a>	Indicates an internet or email address. It can also be used to indicate a link within the document itself.
<code>Terminal</code>	System commands and terminal outputs
<i>Object</i>	Indicates a reference to something. Used to emphasize a referenced object.
[Key]	Keyboard keys

Table 2 - Text Conventions



The conventions used in this document are not necessarily the same as those in the Command Reference document. Observe the conventions established for each document.



## 2. GETTING STARTED

### 2.1. Safety Warnings

Before proceeding, carefully observe the safety warnings below:



Before installation, the entire manual must be read carefully. If you have questions, you should contact the authorized technical support.

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Pay attention to the safety instructions during installation, operation and maintenance of this equipment. The installation, operation and maintenance procedures must be performed preferably by qualified, trained personnel authorized to perform such tasks.

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To prevent the risk of electric shock, before turning the equipment on or connecting cables, make sure you have installed a suitable grounding system.

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Optical modules use invisible radiation laser transmitters. Although most SFP+ and SFP GPON on the market meet LASER safety specifications, never look directly at the terminals of a module or of an optical cord. Exposure to laser emissions may cause partial or total loss of vision.

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### 3. EQUIPMENT OVERVIEW

The DM4615 OLT GPON is a compact solution with support for up to 2048 subscribers on 16 GPON ports (1:128 split ratio), it has 4 1GbE (RJ45 electrical) ports and 4 10GbE ports in SFP+ connectors. Below is the illustration that reflects the equipment.

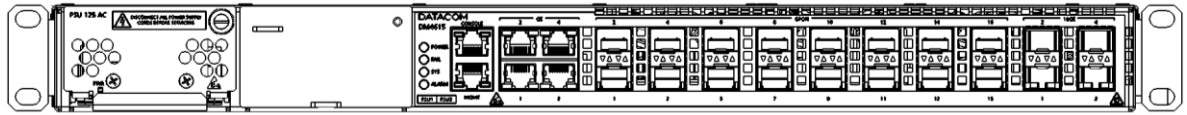
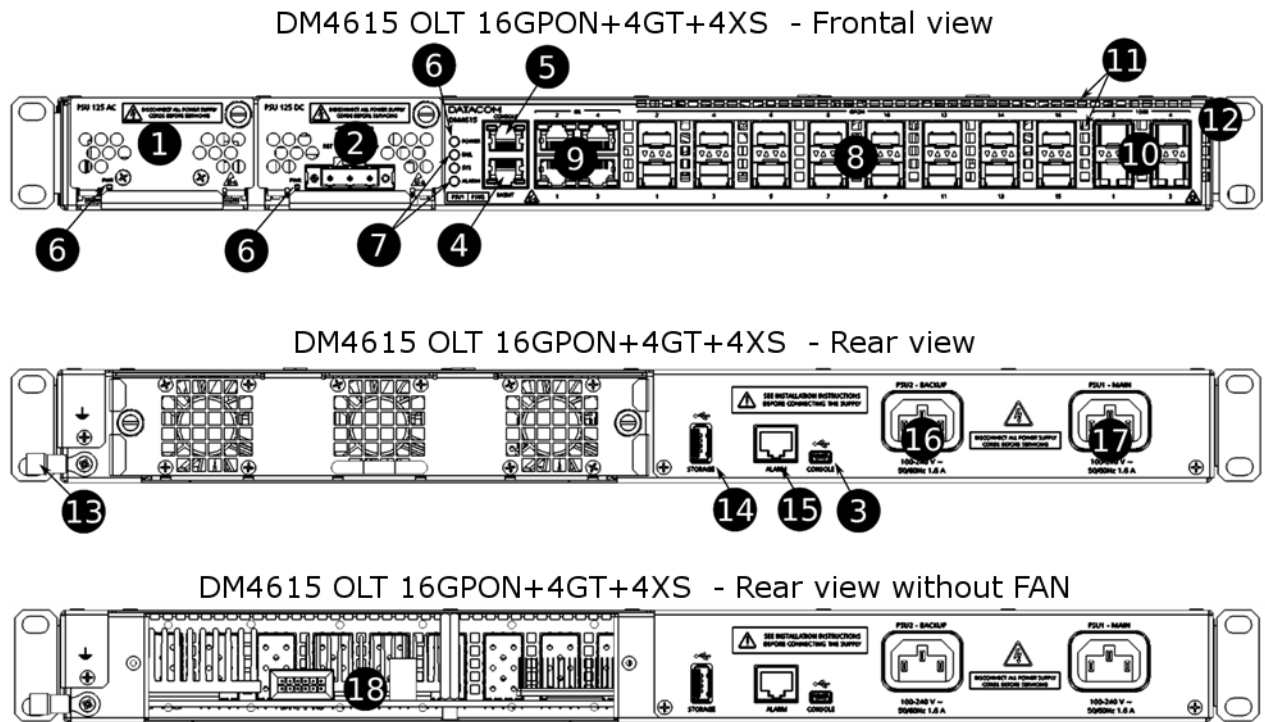


Figure 1 –DM4615 OLT 16GPON+4GT+4XS

### 4. HARDWARE DESCRIPTION



#### 4.1. DM4615 OLT 16GPON+4GT+4XS

Figure 2 - DM4615 OLT 16GPON+4GT+4XS Views

Number	Description
1	SLOT PSU1 (MAIN)

2	SLOT PSU2 (BACKUP)
3	USB Console Interface
4	Gigabit Ethernet Management Interface (MGMT)
5	Serial Console Interface (RS-232)
6	Power LED (PWR)
7	ALARM/FAIL LED
8	16 GPON Ports
9	4 Gigabit Ethernet Ports (RJ45)
10	4 10 Gigabit Ethernet Ports (SPF+)
11	Cooling Front Air Inlets
12	Cooling Side Air Inlets
13	Auxiliary Safety Grounding
14	USB Storage Interface
15	Alarm Interface (2 inputs and 1 output)
16	PSU2 Power Input (Backup)
17	PSU1 Power Input (MAIN)
18	FAN Connection Module

Table 3 - Description of Interfaces

## 4.2. Equipment Status LEDs

The DM4615 OLT has four status LEDs on the front panel, PWR LED, ALARM LED, FAIL LED and SYS LED. There are also the PWR LEDs for each PSU. Table 4 - Status LED Behavior describes the behavior of the equipment's panel LEDs.

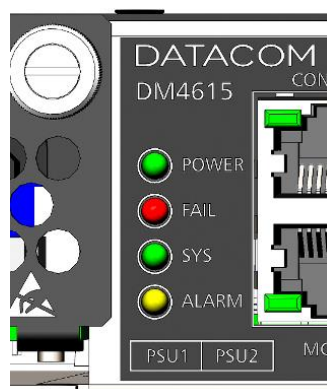




Figure 3 - DM4615 OLT Status LEDs

Indicator	Color	Status	Description
PWR LED	GREEN	ON	Indicates that the power supply is energizing the equipment and internal power supplies are operating without failure.
		OFF	Power supply with problem or not energized.
Alarm LED and FAIL LED	YELLOW	ON	Indicates that alarms have been detected by the equipment.
	RED	ON	Indicates that the equipment is in an internal failure status.  Note: When the power is connected to the equipment, the FAIL LED will be red for a short interval of time and will then turn off.
	-	OFF	Equipment in normal operation, no failures or alarms detected.
SYS LED	GREEN	ON	Indicates that the system is operating normally.
		OFF	System initiating the operation.
		BLINKING	System is in special status, such as running the DmOS software update.

Table 4 - Status LED Behavior

### 4.3. Serial Console Interface (RS-232)

The DM4615 OLT has a console port for local management. The console port uses an RJ45 connector. A cable with a male RJ45 connector and a female DB9 connector must be used for the connection to a computer or laptop.

The serial console cable is an accessory included with the DM4615 OLT. Additional cables can be purchased separately via code 710.0137.xx or assembled as described in the figures below. The RJ45 connector pinout and its match with the DB9 connector is described in [Table 5 - Serial Console Connector Pinout](#).



Figure 4 - Console Cable

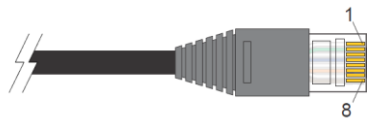


Figure 5 - Console Cable RJ45 Connector Pins

RJ45 Male	DB9 Female	Function	DM4615 OLT Input/Output
1	-	Reserved	-
2	-	Reserved	-
3	2	RS232_TX	Output
4	5	DGND	Ground
5	5	DGND	Ground
6	3	RS232_RX	Input
7	-	Reserved	-
8	-	Reserved	-

Table 5 - Serial Console Connector Pinout

### 4.4. USB Serial Console

The DM4615 OLT has a USB Interface Console (micro-USB connector) on the rear panel for local management. The USB console port is accessible via Micro-USB cable (not included). In Linux distributions USB port is automatically recognized by the hotplug system and the console for management can be accessed directly from terminal. On Microsoft Windows before Windows 10, a driver that emulates the USB

port as a serial port will be necessary, and then the console for management can be accessed by an emulation program. In the Microsoft Windows 10 the USB port is recognized and emulated as a serial port, this port can be accessed via a serial connection program.



DATAKOM does not provide the driver that will emulate or create a virtual serial port from the USB port. Due to security issues it is highly recommended that only use driver from trusted sources.

## 4.5. USB Interface Host

The equipment provides an A-type USB Interface Host in the rear panel that can operate according to specification 2.0. There is no need to use this interface during the equipment installation process. Contact [Erro! Fonte de referência não encontrada.](#) for more information on using this interface.

## 4.6. Ethernet Management Interface (MGMT)

The DM4615 OLT has an Electric Gigabit Ethernet interface used for the equipment's local or remote management. For further details on how to use it, refer to the chapter [Erro! Fonte de referência não encontrada.](#). This interface has two status LEDs that have their behavior described in Table 6 - MGMT Interface LEDs.

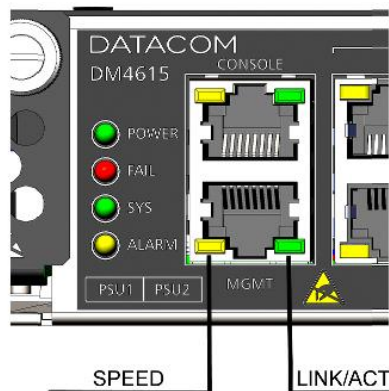


Figure 6 - Management Interface LEDs (MGMT)

Indicator	Color	Status	Description
LINK/ACT	GREEN	Off	Link Down (inactive port)
		On	Link Up (active port)
		Blinking	Data sending and/or receiving data
SPEED	YELLOW	Off	Port operating in 1000Base-T mode
		On	Port operating in 10Base-T or 100Base-TX mode

Table 6 - MGMT Interface LEDs

## 4.7. Data Interface

### 4.7.1. Electrical Gigabit Ethernet Interfaces – RJ45 (10/100/1000 Base-T)

The DM4615 OLT has 4 Electrical Gigabit Ethernet interfaces using RJ45 connectors. There are LINK/ACT and SPEED LEDs that are built into the connectors corresponding to each interface. On the printed part of the front panel, the ports are identified according to the figure below:

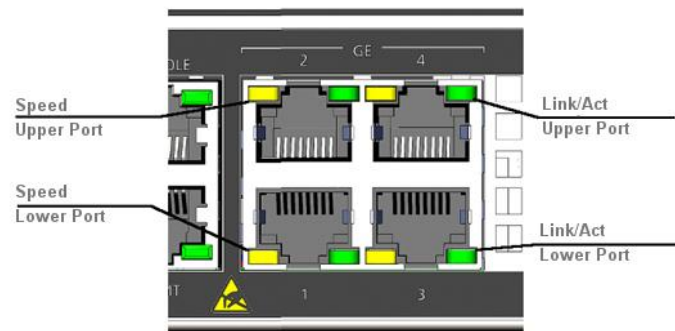


Figure 7 - Electrical 1GbE Ports and LEDs

#### 4.7.1.1. LEDs Indicating Electrical Interfaces

The convention to indicate the operation and functioning mode of the 1GbE SFP interfaces is described in the table below:

Indicator	Color	Status	Description
LINK/ACT	GREEN	Off	Link Down (inactive port)
		On	Link Up (active port)
		Blinking	Data sending and/or receiving data
SPEED	YELLOW	Off	Port operating in 1000Base-X or 1000Base-T mode
		On	Port operating at a rate lower than 1 Gbps

Table 7 - Electrical 1GbE Interface LED Indicators

### 4.7.2. GPON SFP+ Interfaces

The DM4615 OLT has 16 GPON interfaces that use GPON SFP+ connectors. The ports have LINK/ACT and SPEED LEDs; such LEDs are built into the ports corresponding to each interface. The ports are identified in the printed front panel according to the figure below:



Figure 8 - GPON Ports and LEDs



Only the first 8 GPON interface are active by default. To activate all 16 GPON interfaces will be necessary to contact the Support for the acquisition of a license (if it was not done at the time of purchase).

#### 4.7.2.1. GPON Port LEDs

The convention to indicate the operation and functioning mode of the GPON SFP+ interfaces is described in the table below:

Indicator	Color	Status	Description
STATUS	GREEN	Off	Interface with the administrative status <i>DOWN</i> or SFP not connected.
		On	Interface with the administrative status <i>UP</i> and SFP connected.
ALARM	YELLOW	Blinking 4Hz	<i>Critical</i> or <i>Major</i> alarm active in the port
		Blinking 0.5Hz	<i>Minor</i> alarm active in the port
		Off	Port operating correctly without alarms

Table 8 - GPON Interface LED Indicators

#### 4.7.3. Optical 10 Gigabit SFP+ Ethernet Interfaces (10GBase-X)

The DM4615 OLT has 4 optical 10 Gigabit Ethernet interfaces, all using the SFP+ connector. There are LINK/ACT and SPEED LEDs that are built into the connectors corresponding to each interface. The ports are identified in the printed front panel. The numbering of the other ports follows the order according to the figure below:

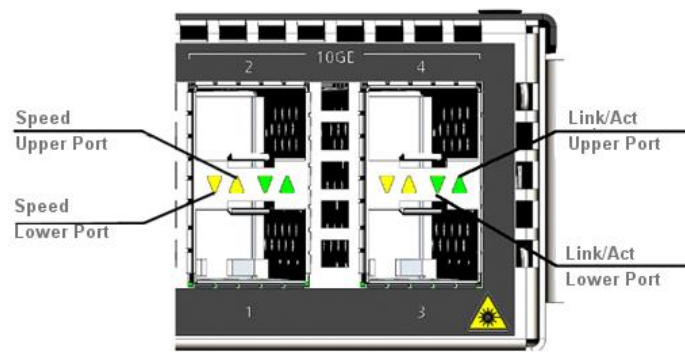


Figure 9 - 10GbE SFP+ Ports and LEDs

#### 4.7.3.1. Optical Interface LED Indicators

The convention to indicate the operation and functioning mode of the 10GbE SFP+ interfaces is described in Table 9 - 10GbE SFP+ Interface LED Indicators.

Indicator	Color	Status	Description
LINK/ACT	GREEN	Off	Link Down (inactive port)
		On	Link Up (active port)
		Blinking	Data sending and/or receiving data
SPEED	YELLOW	Off	Port operating in 10GBase-X or 10GBase-T mode
		On	Port operating at a rate lower than 10Gbps

Table 9 - 10GbE SFP+ Interface LED Indicators

### 4.8. Alarm Input and Output

The DM4615 OLT has two alarm inputs and one alarm output on an RJ45 connector. Alarm inputs 1 and 2 are isolated by means of an optocoupler. External alarm detection occurs when the potential difference between IN+ and IN- reaches 12V. Table 10 presents the operating voltages and status for alarm inputs 1 and 2.

Signal IN-	Signal IN+	Description
0V (Reference)	0V to 3V	Without alarm
0V (Reference)	12V to 60V	With alarm

Table 10 - Conditions for Alarm Detection

The equipment uses a relay for the alarm output. In the event of an alarm, or whenever the equipment is switched off, pin 7 (common) is short-circuited with pin 8 (NF). When operating without alarms, pin 7 (common) will be short-circuited with pin 6 (NA), while pin 8 (NF) will be isolated. The table below describes the pinout used on the alarm interface's RJ45 connector.

Male RJ45	Signal
1	Input 1 – IN+
2	Input 1 – IN-
3	Input 2 – IN+
4	Input 2 – IN-
5	Not connected
6	Output – NA (Alarm Off)
7	Output – Common
8	Output – NF (Alarm On)

Table 11 - Alarm Connector Pinout

## 4.9. PSUs and Power Inputs

The DM4615 OLT has two PSU 125 power supply slots (supplied separately) in the front part of the equipment. There are two models of PSUs, PSU 125 DC that operates with DC -48/60 Vdc power supply, and the PSU 125 AC that operates with 100/240Vac (50/60Hz) AC power supply. Further details in the chapter [Errol Fonte de referência não encontrada..](#)

The PSU 125 DC has TERMINAL BLOCK power feed terminals; the terminals are located on the front part of the PSU.

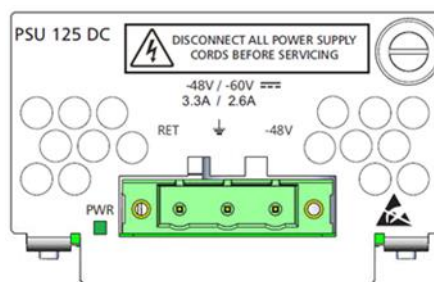


Figure 10 - PSU 125 DC Terminal Block Panel and Connection

The PSU 125 AC has three-pin IEC 320/C14 plug power feed terminals, with each terminal being responsible for supplying power to each of the sources. The connection to the PSU 125 AC is located on the back of the DM4615 OLT.

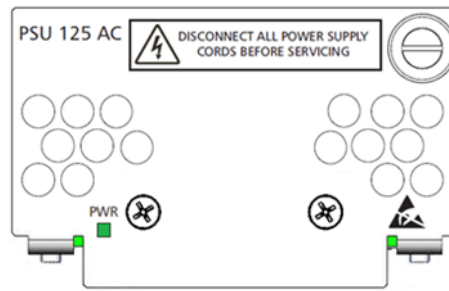


Figure 11 - PSU 125 AC Panel

The PSU 125 power sources operate in a 1:1 redundant manner, where only one is sufficient to maintain the full operation of the equipment. The combination of AC and DC power sources on the same equipment is allowed. The insertion/removal of the power cables and of the PSU 125 can be hot-swapped, allowing uninterrupted operation of the equipment, if one of the two power sources is turned off or fails.

The PSU 125 has a PWR LED on its front panel that, when lit, indicates that it is properly powered and operational.



The de-energizing of the equipment is done through its power cable (s). The power outlet must be nearby and easily accessible.



The site's electrical installation should be protected by devices against short circuits.



In the PSU 125 DC, fuses F1 and F2 support currents of up to 15A. They are Fast Acting 86V fuses. If necessary, only replace it with one of the same specifications. The F3 output fuse supports up to 15A. It is also an 86V Fast Acting fuse. If necessary, only replace it with another one with the same specifications.



In the PSU 125 AC, the F1 fuse supports currents of up to 5A. They are 250V Fast Acting fuses. If necessary, only replace it with one of the same specifications. The F1000 output fuse supports up to 15A. It is an 86V Fast Acting fuse. If necessary, replace it with another one with the same specifications.



In the situation where both PSUs are present and the power inputs are energized and operating with voltages within the specified range, the main power input (MAIN) will take precedence over the BACKUP power supply.

## 4.9.1. Pinout and Polarity

### 4.9.1.1. PSU 125 AC

Figure 12 - AC Power Connector Pinout shows the IEC 320/C14 connector pinout to power the equipment.



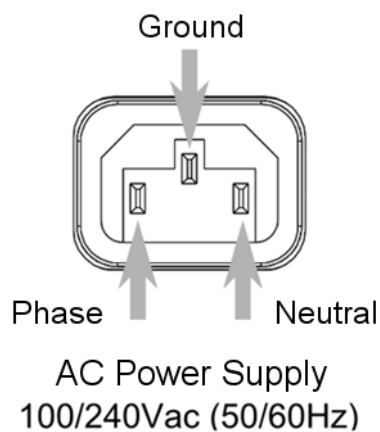


Figure 12 - AC Power Connector Pinout



According to the NBR 14136 standard, the equipment's grounding pin must be connected to the grounding installations of the installation site, since the power pins have no polarity indication.

#### 4.9.1.2. PSU 125 DC

Figure 13 shows the TERMINAL BLOCK connector pinout to power the equipment.

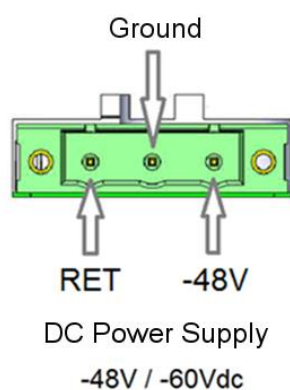


Figure 13 - DC Power Terminal Block Connection Pinout

### 4.9.2. Power Cables

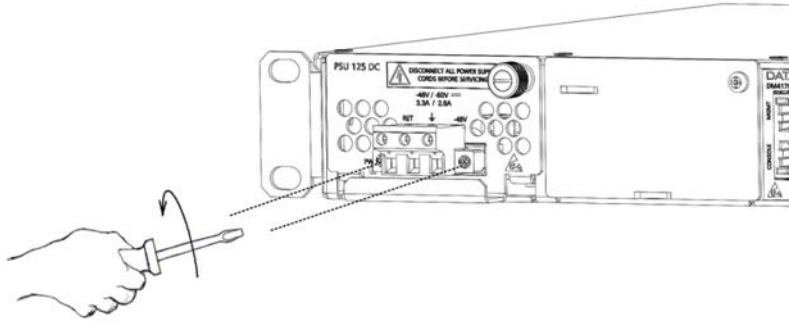
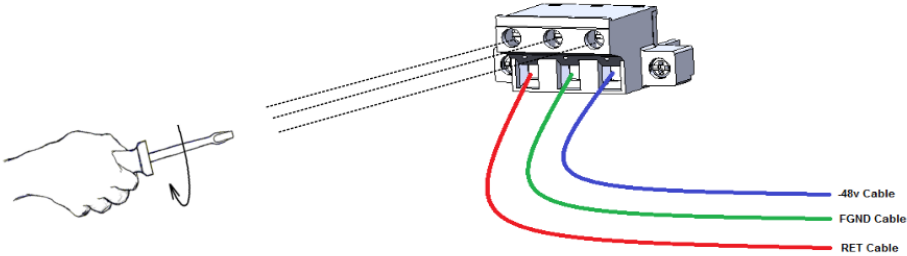
#### 4.9.2.1. PSU 125 AC

PSU 125 AC contains a female 3-meter IEC 320 / C14 power cable for a NBR 14136 plug.

4.9.2.2. PSU 125 DC

The PSU 125 DC includes a 3.5 meter, PP standard, 1mm2 gauge power cable with both ends open and a male TERMINAL BLOCK standard connector (usually shipped screwed to the PSU 125 DC) for the installation of the cable.

Follow the information below to install the cable to the Terminal Block connector:

Step	Description
1	<p>Remove the TERMINAL BLOCK connector from the PSU 125 DC by unscrewing the connector's two side screws using a 1/8" screwdriver (number 0) as shown below:</p>  <p>Figure 14 - Removing the TERMINAL BLOCK from the PSU 125 DC</p>
2	<p>Locate the power cord shipped with the PSU 125 DC and cut it to the desired length if you prefer. If the cable needs to be replaced, it is important that have a gauge of 1mm2 or larger and that the conductor colors follow the specifications of the country of installation.</p>
3	<p>Using a 1/8" screwdriver (number 0) screw on the cable as shown below:</p>  <p>Figure 15 - Installing the TERMINAL BLOCK Cable</p>
4	<p>With the cable still de-energized, screw the connector with the cable installed on the PSU 125 DC, using the same 1/8" screwdriver (number 0) used above, as shown below:</p>

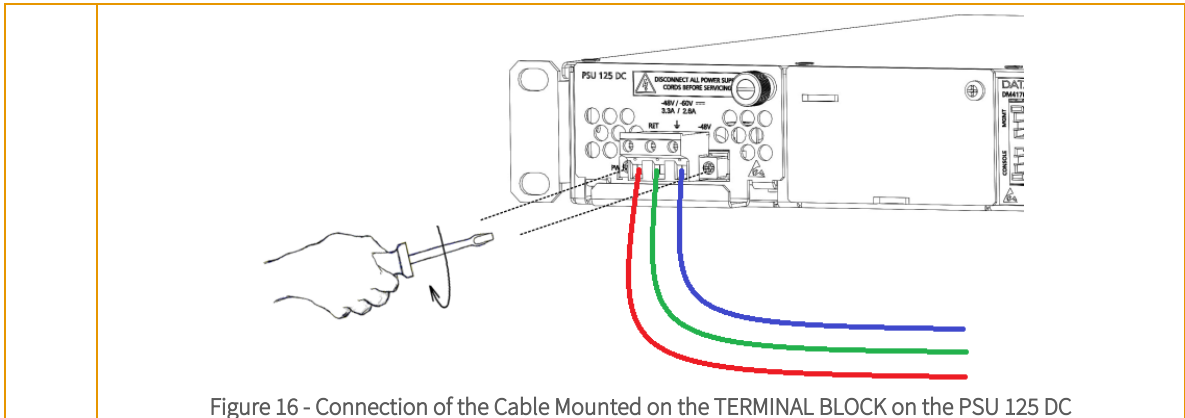
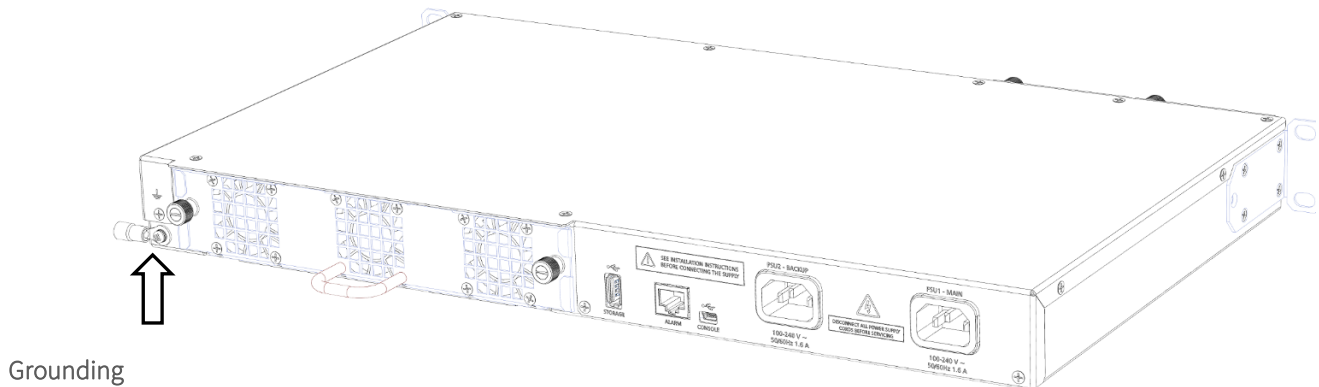


Figure 16 - Connection of the Cable Mounted on the TERMINAL BLOCK on the PSU 125 DC

Table 12 - PSU 125 DC Power Installation

## 4.10. Grounding

The OLT GPON DM4615 has a safety protection grounding point on the rear panel. This connector must be connected to the ground (FGND), in conformity with the instructions in the chapter.



Grounding

Figure 17 - Grounding Position

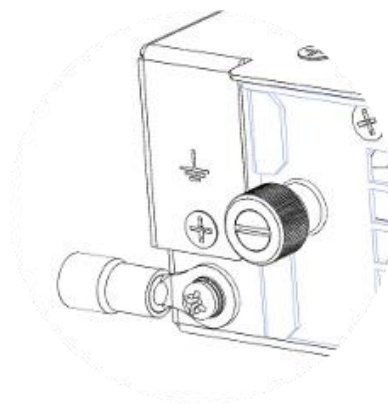


Figure 18 - Grounding Details

## 4.11. DM4615 FAN

The DM4615 FAN module is a removable mechanical structure containing three fans and a connection board. The DM4615 FAN module must be installed so that both the connector of the DM4615 FAN module and the DM4615 OLT module are connected correctly. In this manner, it will be possible to activate and control the FAN module.

This FAN module can generate a maximum of 66 CFM (Cubic Feet Minute). Under this condition, the equipment's acoustic noise will also be at its maximum value.

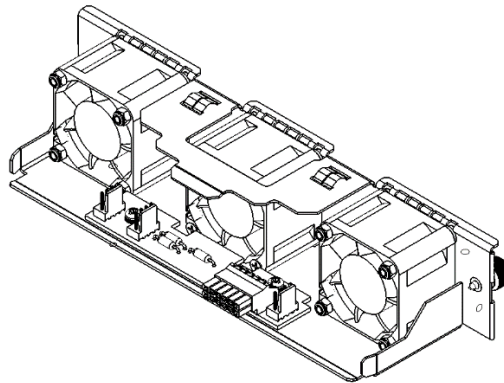


Figure 19 - DM4615 FAN

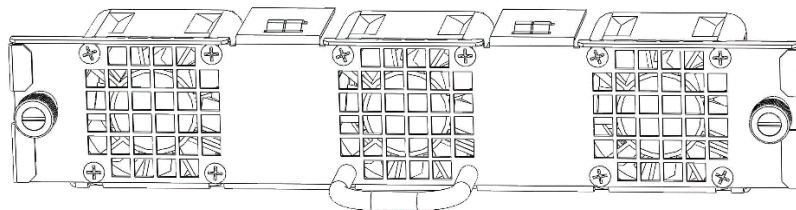


Figure 20 - DM4615 FAN – Front View



Although there are protections to avoid contact with the fan, be careful when handling the ventilation module. It should only be inserted or pulled by means of the red metal handle. In addition, it requires attention regarding necklaces, bracelets, and other objects small enough to pass through the ventilation grilles.

## 5. DM4615 OLT INSTALLATION

The DM4615 OLT GPON was developed for the most diverse operating environments; it is ideal for indoor and outdoor installations, being compact, with only 1U in height, and narrow. Its flexible power supply allows full-range DC or AC power source with redundancies and supports hot swapping.

## 5.1. Preparing the Installation Site

Before installing the equipment, care must be taken to ensure that all steps are followed correctly, thus ensuring proper installation.

### 5.1.1. Installation Site Requirements

Check that the electrical and physical installations of the site where the equipment will be installed are in accordance with all specifications and technical standards applicable by the local governmental authority.

The facilities in question must be prepared to withstand mechanical and electrical loads of the new equipment to be installed. Refer to the **Erro! Fonte de referência não encontrada.** to check relevant information regarding the equipment's weight and consumption.



Make sure the rack's power supply is not overloaded.

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### 5.1.2. Environmental Requirements

Electrical equipment can generate a significant amount of heat. Therefore, it is essential to provide an environment with controlled temperature to ensure proper and safe operation.

In addition to temperature control, the equipment should only operate in places with controlled humidity. In addition, the environment must be free of materials or gases capable of conducting electricity.

### 5.1.3. Equipment Requirements

In order to ensure proper operation, when installing the DM4615, observe the information available in the **Erro! Fonte de referência não encontrada.** and **Erro! Fonte de referência não encontrada.** sections.

## 5.2. DM4615 OLT Package Contents

The package contains the DM4615 OLT equipment, the RS-232 console cable and a Quick Installation Guide (141.0030.XX). The equipment is properly protected by polystyrene sheets and a plastic cover, whose purpose is to protect it from damage during transport.

Make sure the equipment is not damaged. If there is any irregularity, contact **Erro! Fonte de referência não encontrada..**

The DM4615 FAN Module and PSU 125 power sources are shipped in separate boxes depending on the order.

Quantity	Content
----------	---------

1	DM4615 OLT 16GPON+4GT+4XS
1	Quick Installation Guide
1	RS-232 Serial Console Cable

Table 13 - DM4615 OLT Package Contents

Make sure that the equipment received is identical to the equipment shown in Figure 1 –DM4615 OLT 16GPON+4GT+4XS (the PSU 125 is not shipped connected). The DM4615 OLT has a label on the back; it contains model information, equipment code and serial number. Check if there is any divergent information on the label regarding the information presented on the packaging, in case there is, please contact **Erro! Fonte de referência não encontrada..**

### 5.3. PSU 125 Package Contents

The AC or DC PSU 125 are shipped in boxes separate from the DM4615 OLT, depending on the order requested to the **Erro! Fonte de referência não encontrada.** department.

The PSU 125 (regardless of model) is shipped in a box protected by polystyrene sheets and covered by antistatic plastic. If there is a problem with the packaging or the PSU 125 is damaged, contact **Erro! Fonte de referência não encontrada..**

Both PSU models are shipped with their cables. For further details, check the **Erro! Fonte de referência não encontrada.** item in this manual.

Quantity	Content
1	PSU 125 AC
1	3-meter IEC 320 / C14 female power cable for NBR 14136 plug

Table 14 - PSU 125 AC Package Contents

Quantity	Content
1	PSU 125 DC
1	Male Terminal Block Connector
1	3.5-meter 1 mm <sup>2</sup> -gauge PP power cable with both ends open

Table 15 - PSU 125 DC Package Contents

Make sure that the PSU received is in accordance with the information on the packaging and matches the figures below.

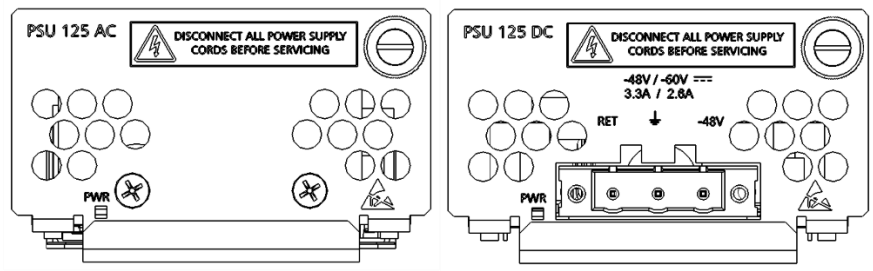


Figure 21 - Details of the Front of the Power Supplies

5.4. DM4615 FAN Package Contents

For proper functioning of the DM4615 OLT, it is necessary to use the DM4615 FAN, a ventilation module that assists in maintaining the equipment’s internal temperature under normal operating conditions.

Like the power modules, the DM4615 FAN is shipped separately in another box protected by polystyrene sheets and covered with antistatic plastic, since it’s a module connected to the back part of the DM4615 OLT.

As with other accessories, in the event of a problem or damage contact DATACOM’s **Erro! Fonte de referência não encontrada.** da DATACOM.

Quantity	Content
1	DM4615 FAN

Table 16 - DM4615 FAN Package Contents

Make sure the ventilation module contained in the package matches the image below:

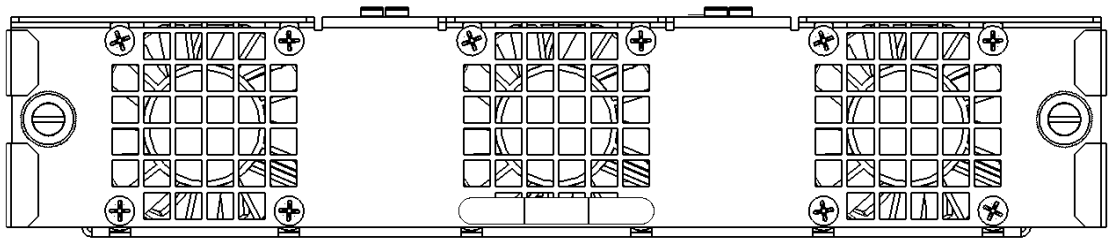


Figure 22 - Detailed Front View of the DM4615 FAN

5.5. Use in 19” Racks

Before choosing the site where the equipment will be installed, read the recommendations in the chapter, **Erro! Fonte de referência não encontrada.** in this manual and follow the installation instructions below:

- Choose an accessible site for the equipment where its LEDs can be seen;
- The ambient temperature should be maintained between 0°C and 65°C and relative humidity between 10% and 90% non-condensing;

- Install the equipment near a power source.

After choosing the proper site, bring the equipment to the rack and proceed with the installation as shown in Figure 23. Before inserting the screws, make sure that the M5 cage nuts (not supplied with the equipment) are correctly positioned in the rack's mounting columns, only then carefully position the equipment. Screw on the equipment using two standard M5 screws (not shipped with the equipment) into each adapter side tab. Finally, tighten the screws to ensure that the equipment is securely attached to the rack.

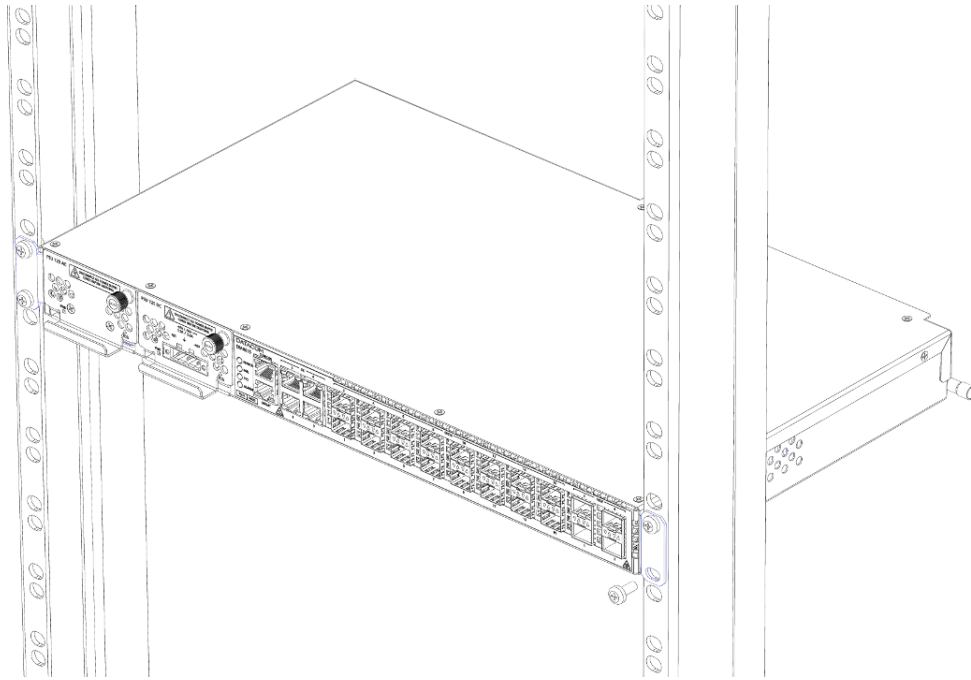


Figure 23 - Installation in a 19" Rack

## 5.6. Ventilation

Another important aspect that must be taken into account for the correct installation of the **DM4615 OLT** is the airflow inside the equipment and its free areas that must be respected for proper cooling.

The areas that must be observed are **5 cm** free in the rear panel and on both sides of the equipment. These areas must have free air circulation so that the temperature inside the equipment remains within the operating levels, also observing the cooling of the environment.

In **Figure 24** we see the DM4615 OLT free ventilation areas.



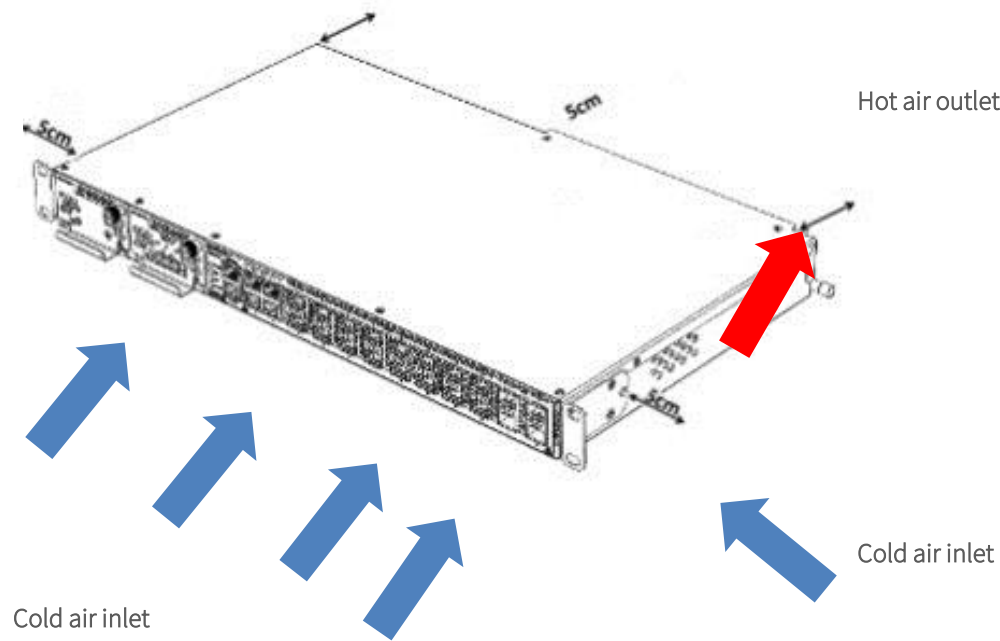


Figure 24 - Free Areas for Ventilation

5.7. Connecting the Grounding Protection

The DM4615 OLT has a place on its back panel to attach a cable for the grounding connection, as shown in the [Error! Fonte de referência não encontrada.](#) section of this manual.

The grounding cable is not part of the basic accessories included with the equipment. The cable indicated for the installation must have a thickness of 10 to 12 AWG. The color of the cable must follow the specific requirements of the country where the equipment is installed; most countries require that the cable should be green with yellow stripes.

Step	Description
1	Locate the grounding connector located in the back of the equipment as shown in Figure 17 - Grounding Position, remove the connector with a Phillips screwdriver.
2	Secure the cable to the grounding connector.
3	Cut the cable to a length suitable for the connection with the grounding installation.
4	Screw the connector onto the machine using the same screw removed in step 1 of this table.

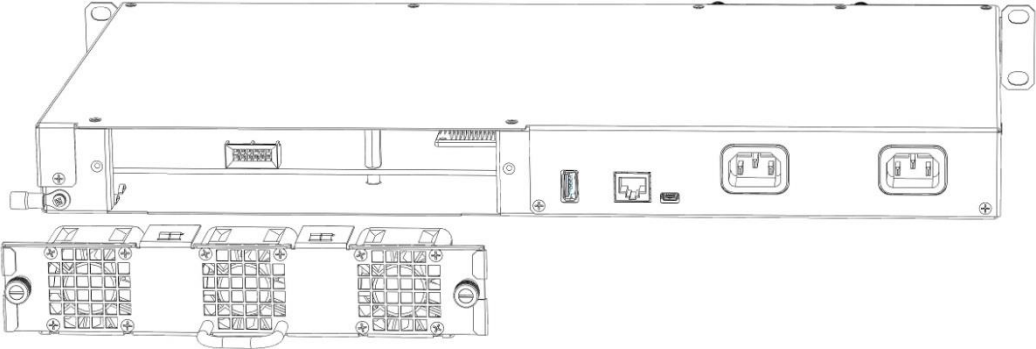
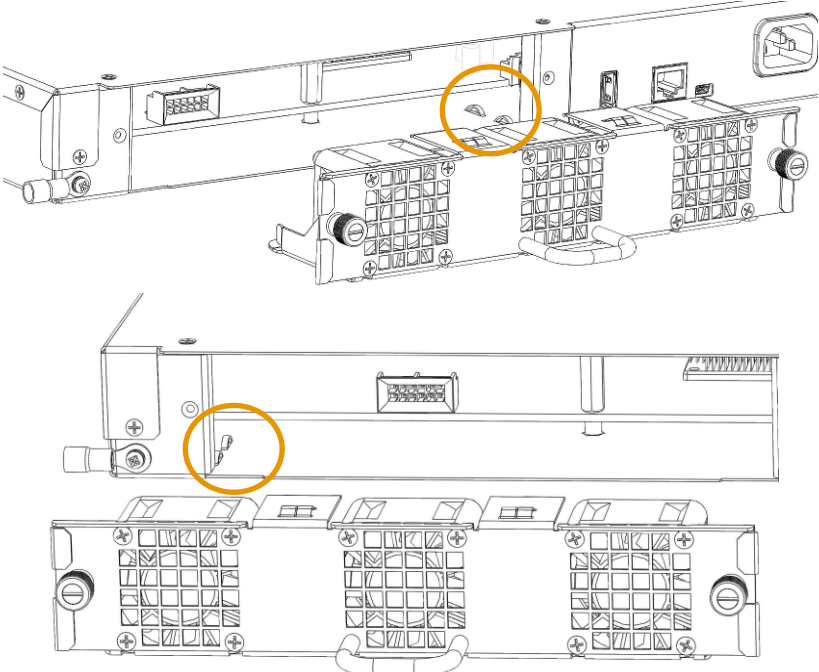

Table 17 - Grounding Installation Steps

5.8. DM4615 FAN Module Use

The FAN module is an independent mechanical structure and requires the correct DM4615 OLT installation and connection for the operation of the ventilation system referred to in [Chapter Error! Fonte de referência não encontrada.](#)

The following figures show all components used for the DM4615 OLT ventilation system and demonstrate the correct installation of the system to the equipment.

The FAN module occupies its respective position located in the rear of the DM4615 OLT chassis and is secured with two side screws included in the module. The insertion process should follow the steps below.

Step	Description
1	<p>Position the DM4615 FAN aligned with the back of the OLT.</p>  <p>Figure 25 - Installing the DM4615 FAN</p>
2	<p>Align the DM4615 FAN with the DM4615 OLT internal tabs.</p>  <p>Figure 26 – Details of the Internal Guides for the Installation of the DM4615 FAN</p>
3	<p>Push the module carefully until you feel that contact has been made with the DM4615 OLT internal board. Use the red metal handle.</p>  <p>Figure 27 - DM4615 FAN Metal Handle</p>
4	<p>Make sure there was contact and that the DM4615 OLT and DM4615 FAN fit perfectly.</p>

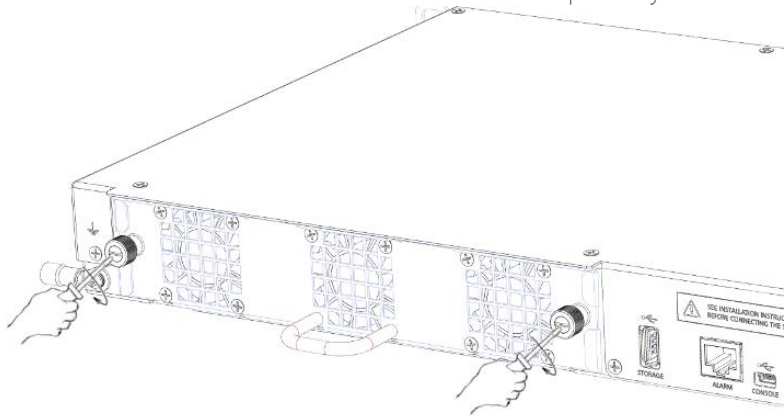
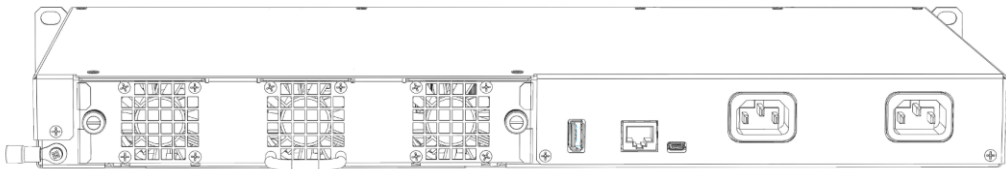
5	<p>Tighten the two screws with a screwdriver until the FAN module is perfectly connected to the OLT.</p> 
<p>Figure 28 – DM4615 FAN Connection to the DM4615 OLT</p>	
6	<p>The DM4615 FAN is connected and installed in the DM4615 OLT.</p> 
<p>Figure 29 - DM4615 FAN Connected to the DM4615 OLT</p>	

Table 18 - Installing the FAN Module

The correct FAN operation, and consequently its installation, can be checked by turning on the DM4615 OLT, since it starts at full speed until the DmOS operating system is operating correctly.

The FAN module can be removed and replaced due to failure or damages, for its removal, the following steps must be followed:

Step	Description
1	Unscrew the two side screws until you feel the FAN module become loose from the mechanical part of the OLT.
2	Pull the fan module using the red metal handle until it's completely loose.
3	Store the module correctly in the packaging.

Table 19 - Removing the FAN Module



Although there are protections covering the fan, be careful when handling the fan module. It is recommended that the DM4615 OLT be turned off for any handling of the FAN module in order to prevent accidents.



The FAN module should only be pulled by using the red metal handle. In addition, be careful with necklaces, bracelets, and other objects small enough to pass through the ventilation grilles.



There is the risk of electric shock if the FAN module is repaired with the OLT connected to the power supply.



Only repair the FAN module if you have another one for immediate replacement, the DM4615 OLT may malfunction if it remains for a long time without the ventilation system in operation.



Periodically check the condition of your FAN module. If necessary, order a new one from the **Erro! Fonte de referência não encontrada.** department. This procedure extends the life of the DM4615 OLT equipment and the PSU and SFP modules.

## 5.9. Equipment Power Feed

The DM4615 OLT has two slots for the PSU 125 power supplies in the front; the back panel has two power input connectors (IEC 320/C14) that supply power for the PSU 125 AC, each connector powers one of the PSU modules.

### 5.9.1. Connecting the PSU 125

The PSU 125 power supplies can be hot-plugged. In order to connect a PSU to the equipment, align your printed circuit board with the plastic tabs in the slot, and insert the card until the panel touches the equipment panel. Then tighten the knurled screw in order to ensure the correct attachment of the power source, according to FIGURE 21 - Inserting the PSU 125. If the slot to be used is covered, remove it by unscrewing the screw with a Phillips screwdriver.

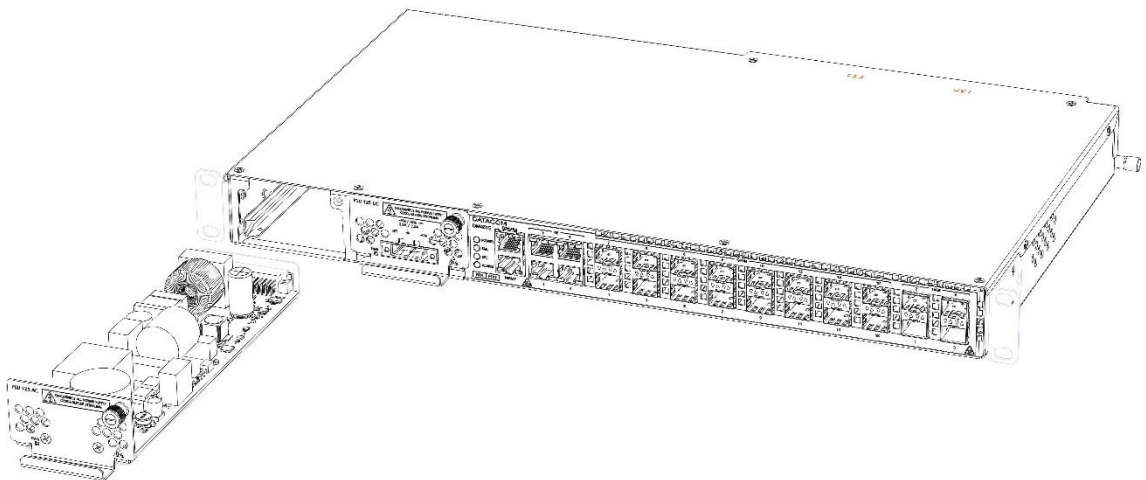


Figure 30 - Inserting the PSU 125

### 5.9.2. Connecting the Power Feed

After inserting the PSU 125(s), connect the power supply according to the levels specified in chapter, **Erro! Fonte de referência não encontrada.** and in chapter, **Erro! Fonte de referência não encontrada..**



Each PSU slot has a separate power input; the DC PSUs have a front power feed, while the AC PSUs have a power feed in the back panel aligned with its respective slot. The equipment will only power on if there is at least one properly powered PSU.

## 5.10. Checking the Equipment's Operation

### 5.10.1. Checking the PSU's Operation

Once powered, the PSU 125 module can activate two LEDs on its panel. The table below shows the possible LED status:

Indicator	Color	Status	Description
Power	GREEN	Off	Failure to power up the PSU 125 module.
		On	Module powered up correctly.
ACT	GREEN	Off	PSU 125 in <i>standby</i> .
		On	PSU 125 in operation.

Table 20 - PSU 125 Module Indicator LEDs

### 5.10.2. Checking the DM4615 OLT's Operation

Considering that the DM4615 OLT was installed according to the guidelines in this manual, and there is a properly powered and active PSU, as shown in Table 20, the steps below indicate whether the equipment is operating normally.

Step	Description
1	After checking that the PSU 125 is active with the ACT led lit, the equipment will be energized and boot process will start. After approximately 3 seconds, the equipment's PWR LED will light up, followed by a brief FAIL blink (red).
2	After the boot up has finished, observe the ALARM/FAIL indicator: <ul style="list-style-type: none"> <li>• OFF: indicates that the equipment has been initialized, and is operating correctly.</li> <li>• ON RED (FAIL): indicates that the equipment has encountered an internal failure. <b>Erro! Fonte de referência não encontrada.</b> must be contacted.</li> <li>• ON YELLOW (ALARM): Indicates that the equipment has been initialized correctly, but an alarm has been activated. If you have any questions, please contact <b>Erro! Fonte de referência não encontrada.</b></li> </ul>

Table 21 - Checking the DM4615 OLT Operation

Once the initialization process has been successfully completed, the operator must configure the equipment's management as indicated in the **Erro! Fonte de referência não encontrada.** section.

## 6. Installing and Removing Modules and Cables

### 6.1. Installing and Removing the 10 Gbe SFP+ and GPON SFP+

This chapter describes how the 10 Gbe SFP+ and GPON SFP+ modules (not supplied) must be installed and removed. It also informs about DATACOM guidelines for cleaning and storing modules and optical fibers.

The GPON SFP+ and 10 Gbe SFP+ modules are inserted into the GPON ports and 10 Gbe SFP+ equipment, operating as transceivers between the equipment and the selected optical communication path.

In order to ensure a long life and good performance of the equipment, it is very important to follow the DATACOM guidelines described below.

Optical Module care:

- To handle the optical modules, it is necessary to always use an antistatic wrist strap;
- In order to transport and store the optical modules it is always necessary to use their original packaging in order to prevent any physical or electrostatic damage to the module.
- Modules and ports that aren't being used must always have their protective cover inserted so as to avoid dirt, thus generating a loss of link performance.



When performing any maintenance to the equipment, make sure the technician responsible for the maintenance is using the appropriate protections. Grounding (use of antistatic wrist strap) can prevent harm to the operator's health and damage the equipment.

#### 6.1.1. Installing the 10 Gbe SFP+ and GPON SFP+ Modules

Follow the steps below to install the SFP+ and GPON SFP+ modules to the equipment.

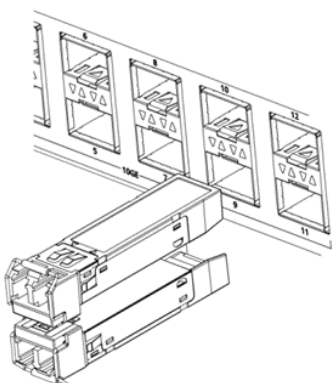
Step	Description
1	Remove the plastic cover from the port to be connected to the 10 Gbe SFP+ or the GPON SFP+.
2	Insert the module into the 10 Gbe SFP+ or GPON SFP+ slot and press it into the slot until it is firmly inserted, as shown in the figure: 

Figure 31 - Inserting the Optical Module in the Cage

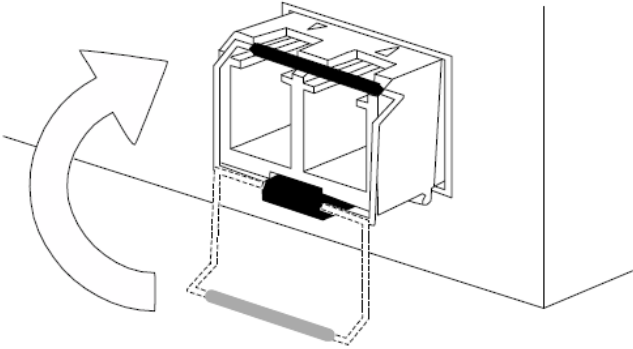
3	<p>After inserting the module, it is necessary to lock it by moving the safety latch. This latch also serves to lock the optical cords after they are inserted:</p> 
4	<p>After positioning the safety latch, the optical cords can be inserted.</p>

Figure 32 - Locking the Optical Module in the Cage

Table 22 – Inserting the DM4615 OLT Modules



The DM4615 OLT is supplied with dust protection plugs on all SFP+/SFP+ - SC/UPC ports. Before inserting the module into the slot, remove the plug. Unused ports must be plugged in order to ensure that the electrical contacts are free of dust.



The SFP modules provided by DATACOM meet the INF-8474 (SFP MSA), SFF-8431 (SFP+ MSA), SFF-8436 (QSFP+ MSA) and IEC/EN 60825-1 (LASER safety) specifications. Modules that haven't been certified do not guarantee the correct operation of the equipment and can damage it. Contact [Erro! Fonte de referência não encontrada.](#) for further information on the risks of using uncertified modules and the possibility of using them.

### 6.1.2. Removing the 10 Gbe SFP+ and GPON SFP+ Modules



Before removing the optical cables, it is recommended that you check if there are labels on them, which indicate in which equipment and port it should be connected, facilitating their later identification.

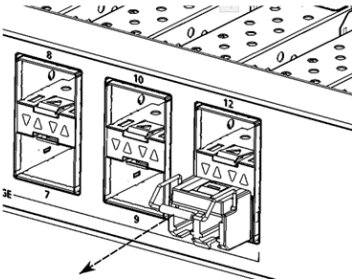
Step	Description
1	Remove the optical cables
2	Lower the safety latch.
3	<p>Pull the module by its safety latch, as shown in the figure below:</p> 

Figure 33 – Removing the Optical Module from the Cage	
4	Insert the plastic protection into the cage so that the DM4615 OLT is protected from dust.

Table 23 – Removing the DM4615 OLT Modules



When operating at a temperature above 45°C, users must monitor the operating temperature of the optical modules. Contact **Erro! Fonte de referência não encontrada.** if you have any questions.

## 6.2. Installing and Removing Cables

In order to ensure the long life and good performance of the equipment, it is very important to follow the DATACOM guidelines described below.

### 6.2.1. Serial Cable

As already shown in this manual, the DM4615 OLT has an RS232 serial port and the cable that connects the DM4615 to a PC is supplied with the equipment. This connection is required only once, when starting the equipment, when it is necessary to register the IP address in the DM4615 OLT.

The console's serial cable must be connected to the console's port, as shown in Figure 2 - DM4615 OLT 16GPON+4GT+4XS Views.

If you need a new cable, contact **Erro! Fonte de referência não encontrada.** and order a new cable through DATACOM code 710.0137.xx. If you wish to make a new cable, refer to chapter Serial Console Interface (RS-232).

### 6.2.2. Management Cable (MGMT)

For management connection via Ethernet network, the standard fast Ethernet cable (not supplied) must be connected to port RJ45, which is specific for management, as shown in Figure 2 - DM4615 OLT 16GPON+4GT+4XS Views.

### 6.2.3. Optical Fibers

As shown in earlier chapters of this manual, the DM4615 OLT uses SFP+ and GPON SFP+ modules (not supplied) for optical access, in order for access to be possible, the use of fibers is required.

According to the defined modules, the equipment will operate in the optical ports only with optical fibers with LC connectors.



Refer to the Installing and Removing SFP+ and GPON SFP+ item for more information on connecting and preparing the modules for the fiber optic connection.

Due to excess cable to the right (the optical ports are central and to the right of the equipment) of the rack, there is always the risk of damaging the fibers. In order to avoid this effect and considering that optical



fibers are very thin, the installer should always pass the cables on the upper or lower side of the chassis, by using the lower cable guide.



During the installation of the fiber optics, it is highly recommended that you use corrugated or plastic tubes to attach the fiber optics connected to the equipment, protecting them from possible breakage or damage and consequently, service interruptions.



The curvature radius of the optical cables cannot be too small. Fibers with a small radius present micro cracks that drastically reduce the optical signal's range. Fibers from different manufacturers have different characteristics. To make sure, if the curvature radius is adequate, check the characteristics of the cable used in the fiber supplier's manufacturing manual.



Optical interface modules use transmitters with invisible laser radiation. Never look directly at the laser or fiber optic terminals. Exposure to laser emission may cause partial or total loss of vision.



The DM4615 OLT has 16 front connectors for GPON, 4 connectors for 10 Gigabit Ethernet SFP+ optical interfaces and 4 front connectors for Gigabit Ethernet RJ45. In order not to damage removal from the other units, fiber or electrical cables should be directed to the upper or lower side of the chassis, depending on the interface's position.

In order to ensure the equipment's long life and good performance, it is very important to follow the DATACOM guidelines described below.

Optical Cord care:

- Keep optical cords that aren't always used with their protective cover on. The core of the optical cords can become dirty and result in loss of performance just by being stored without the protective cover, even if stored in a proper cabinet;
- Clean the core of the optical cords before using them. In order to clean them, it is necessary to use only the specific materials. Any other material used to clean the core of the optical cords may result in loss of performance or even irreparable damage to the cords.



When performing any maintenance to the equipment, make sure the technician responsible for the maintenance is using the appropriate protections. Grounding (use of antistatic wrist strap) can prevent harm to the operator's health and damages to the equipment.

## 7. ACCESSING THE EQUIPMENT

### 7.1. Management through the Serial Console

It is possible to access the Command Line Interface (CLI) through the local serial console, located on the left side of the equipment's front panel. To do this, simply connect a compatible console cable (710.0137.xx - supplied with the equipment) and run a terminal emulator such as Hyper Terminal or similar on a computer or laptop. The DM1615 OLT default setting is baud rate 9600, with 1 stop bit and no parity, as shown in Figure 34 - Serial Port Configuration on the Computer.

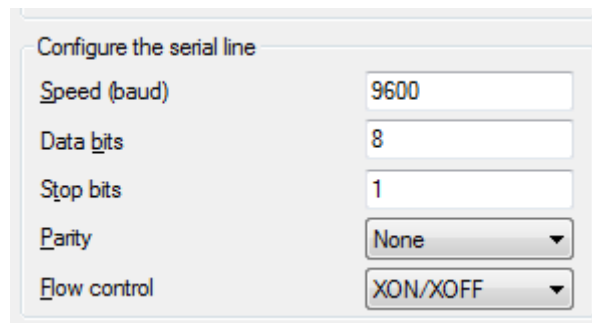


Figure 34 - Serial Port Configuration on the Computer



If you are not using the 710.0137.xx console cable shipped with the equipment, check the Serial Console Interface (RS-232) section to check the console cable's pinout and assembly.



The DM4615 OLT equipment line does not support hardware flow control. In the configuration of the console port, the hardware flow control should be disabled.

### 7.2. Management through the Ethernet Outband Interface (MGMT)

Considering that the equipment was correctly installed according to the previous steps, users should be able to manage it through the Command Line Interface (CLI). The CLI is accessible through the serial console or through SSH and Telnet clients.



Before proceeding, check the preferred method for management access, **Erro! Fonte de referência não encontrada.** or Management through the Ethernet Outband Interface (MGMT).

Only one account is accessed in the DM4615 OLT factory default setting: admin.

Indicator	Password	Description
<i>admin</i>	<i>admin</i>	<i>admin</i> is an account with administrator privileges, which allows the creation of the other accounts.

Table 24 - Default Access Account

In either method, perform this procedure:

Step	Description
1	With the use of a PC or laptop connected through the chosen port (console or Ethernet), open the terminal emulator. After pressing [Enter], you should see the following login request message:  DM4615 login:
2	The equipment's default user/password pair is <i>admin/admin</i> . Enter username <i>admin</i> and press [Enter].  DM4615 login: admin [Enter]
3	Enter the password <i>admin</i> and press [Enter]:  Password: admin [Enter]
4	The next prompt screen will be displayed, indicating that the login was successful:  Welcome to the DmOS CLI DM4615#

Table 25 - DM4615 OLT Equipment Login



Due to security issues, it is strongly recommended that you change the admin account password immediately after the device is installed. Refer to the *Command Reference Guide* for instructions on how to change passwords.

## 8. DETAILED FEATURES

### 8.1. Management

- IPv4 management
- In-band and Out-of-Band management
- Statistics by GPON port and by Ethernet port
- Supports commit and rollback operations
- Command line interface (CLI) via SSHv2, Telnet and RS-232 Console
- Digital diagnostics according to SFF 8472
- Firmware rollback
- Firmware upgrade via TFTP, SCP or HTTP
- Inventory information
- SNMPv1, v2c, v3
- Configuration support via XML (NETCONF)
- Alarm LED indicator
- Supports storage of up to 2 Firmware
- CPU use monitoring
- Supports SNTP
- Storage of up to 64 configurations in Flash memory
- CPU and system memory status available by SNMP

### 8.2. GPON Ports

- 16 GPON interfaces in SFP+ connector, SC/UPC type.
- Transmission (downstream): 2.488 Gbit/s.
- Reception (upstream): 1.244 Gbit/s.
- Supports GPON Laser B+ and C+.
- AES (Advanced Encryption Standard) 128 bits downstream
- DBA (Dynamic Bandwidth Allocation) and SBA (Static Bandwidth Allocation)
- FEC (Forward Error Correction) upstream and downstream
- ONU activation by serial number, password and serial number + password
- Remote firmware upgrade of the ONUs
- Supports pre-provisioning of ONUs
- Automatic discovery of ONUs
- Self-provisioning of ONUs, including the application of profiles for ONU router
- Hairpin turn
- ONU rogue insulation
- Supports N:1, 1:1 and TLS services
- User isolation
- DHCP option 82

- PPPoE Intermediate Agent
- Static Access List IPv4
- Remote provisioning of FXS ports in ONU via OMCI
- Traffic monitoring of ONUs
- GPON link monitoring
- Support for up to 768 Alloc-IDs per PON Link
- Support for up to 2048 GEM Ports per PON Link

### 8.3. Ethernet Ports

- Auto MDI/MDIX.
- Flow Control (802.3x).
- Duplex mode.
- Auto negotiation.

### 8.4. VLAN

- Tagging with up to 4096 VIDs of simultaneous use (IEEE 802.1Q).
- Port-based, with the possibility of port overlap.
- Protocol-based (IEEE 802.1v), MAC-based, IP-Subnet based.
- Q-in-Q double tagging, Selective Q-in-Q.
- VLAN Translate adding, removing or replacing VLAN.

### 8.5. L2 Features

- Maximum Broadcast, Multicast and DLF rate controlled by port.
- Head of Line Blocking protection.
- Supports Jumbo Frame of up to 2KB.
- IGMP (v1/v2/v3). Snooping and query functions can be used.

## 9. Applications

### 9.1. Triple Play Broadband Access

GPON technology, through optical access, provides users with higher rates than copper and cable-based technologies, allowing voice (VoIP) and video (IPTV) convergence in a single access.

In addition, the point-multipoint network feature and passive elements between the central and the users reduce the CAPEX and OPEX to provide these services.

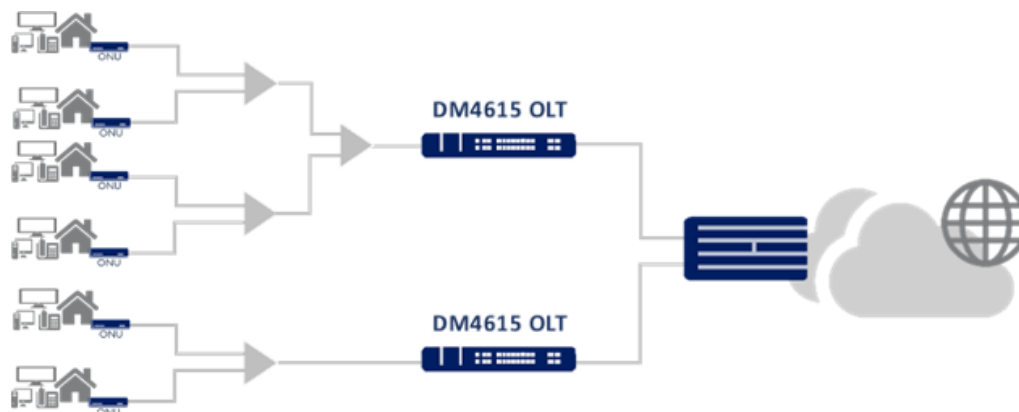
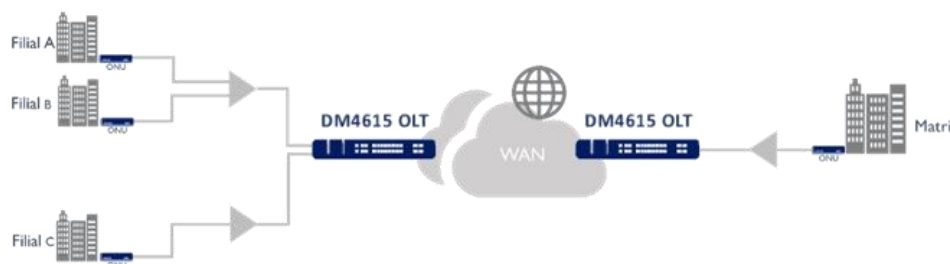


Figure 35 - Triple Play Application

### 9.2. Corporate Services

The DM4615 OLT provides several features allowing the provision of data, voice and video services for small, medium and large companies.

The TLS (Transparent LAN Service) feature together with the hairpin allows the provision of LAN-to-LAN



services without the need of equipment.

Figure 36 - Corporate Access

### 9.3. FTTD – Fiber to The Desk

The traditional LAN network project consists of a structure with copper cables connecting each user equipment to an Access switch, typically installed in a communications room. These access switches are connected in aggregator switches through point-to-point cables or fibers. GPON, through FTTD, simplifies this network by typically replacing the switches with an OLT central and ONUs in users, reducing the network infrastructure through the use of passive elements, fiber optics and point-multipoint topology.

The DM4615 provides features that allow the implementation of GPON LAN networks for companies of varying sizes and needs.

### 9.4. Digital Cities

Cities are the center of modern society and are becoming more complex every day. Technology can make life better and easier. In this context, universal public services is needed. However, the government shouldn't pay attention only to a digital inclusion network, but must also implement a high-performance network that fosters the city's development.

The implementation of the DM4615, associated with GPON equipment and DATACOM Ethernet switches, is a valuable and cost-effective solution for smart cities. Through the numerous features available, it is possible to connect public departments, provide fast, reliable and completely secure internet access to the population and companies.

## 10. TECHNICAL SPECIFICATIONS

### 10.1. Interfaces

		DM4615 OLT 16GPON+4GT+4XS
INTERFACES	GPON (SFP+ SC/SP)	16
	1 GbE (RJ45)	4
	10G Base-X (SFP+)	4
	GE Outband Management (RJ45)	1
	Console (RJ45)	1
	USB Console	1
	Alarms	1 output and 2 inputs (*)
	LEDs status: Power, Fail, Sys UP	

Table 26 - DM4615 OLT Interfaces

### 10.2. Power Supply Specifications

	PSU 125 AC'	PSU 125 DC
Rated Operating Voltage	100 to 240Vac ( $\pm 10\%$ ) 50/60Hz;	-48 to -60Vdc ( $\pm 20\%$ )
Rated Input Current	1.5 A @ 100Vac 0.63 A @ 240Vac	3.3 A @ -48Vdc 2.6 A @ -60Vdc
Maximum Input Current	1.66A	3.90A
Output Voltage	12V ( $\pm 5\%$ )	
Output Current	10A ( $\pm 5\%$ )	
Efficiency	>80%	>80%



Typical OLT Consumption (Watts)	90W	90W
Maximum OLT Consumption (Watts)	125W	125W
Weight (kg)	0.335 Kg	0.162 Kg

Table 27 - Power Supply Specifications

### 10.3. Physical Specifications

	DM4615 OLT 16GPON+4GT+4XS
Height	44 mm
Width (with adapters L)	483 mm
Width (without adapters L)	446 mm
Depth	271 mm
Net weight (without accessories)	3.2 Kg
Net Weight of Fan Module	0.335Kg

Table 28 - DM4615 OLT Physical Specifications

### 10.4. Environmental Information

	DM4615 OLT 16GPON+4GT+4XS
Operating Temperature	0°C to 65°C
Operating Relative Humidity	0% to 95%, non-condensing
Altitude	0 to 3000m
Storing Temperature	-10°C to 70°C
Storing Relative Humidity	0% to 95%, non-condensing

Table 29 – DM4615 OLT Environmental Characteristics

## 11. APPLICABLE STANDARDS

ITU-T	
G.984.1	GPON general characteristics
G.984.2	Physical Media Dependent GPON (PDM) layer
G.984.3	GPON Transmission Convergence Layer
G.984.4	ONT Management and Control Interface (OMCI) specification
G.988	ONT Management and Control Interface (OMCI) specification

Table 30 – Applicable ITU-T Standards

IEEE	
802.1ad	Double Tagging (Q-in-Q)
802.1D	Spanning Tree Protocol (STP)
802.1D	MAC bridges
802.1p	Traffic Class Expediting
802.1Q	Virtual Bridged LAN (VLAN)
802.1w	Rapid Spanning Tree Protocol (RSTP)
802.1AX	Link aggregation
802.3ad	
802.3i	10BASE-T 10Mbit/s (1.25 MB/s) over twisted pair
802.3u	100BASE-TX Fast Ethernet at 100 Mbit/s (12.5 MB/s) w/auto negotiation
802.3z	1000BASE-X Gbit/s Ethernet over Fiber-Optic at 1 Gbit/s (125 MB/s)
802.3ab	1000BASE-T Gbit/s Ethernet over twisted pair at 1 Gbit/s (125 MB/s)
802.3ae	10 Gigabit Ethernet over fiber

Table 31 – Applicable IEEE Standards

IETF	
RFC 783	The TFTP Protocol (Revision 2)
RFC 792	Internet Control Message Protocol (ICMP) (Ping IPv4)
RFC 1157	A Simple Network Management Protocol (SNMPv1)
RFC 1213	Management Information Base for Network Management of TCP/IP-based internets: MIB-II
RFC 1215	A Convention for Defining Traps for use with the SNMP - TRAPS MIB
RFC 1441	Introduction to version 2 of the Internet-standard Network Management Framework (SNMPv2)
RFC 2030	Simple Network Time Protocol (SNTP) Version 4 for IPv4, IPv6 and OSI
RFC 2236	Internet Group Management Protocol, Version 2 - IGMPv2 Snooping support
RFC 2348	TFTP Block size Option (obsolete RFC1783)
RFC 2865	Remote Authentication Dial In User Service (RADIUS)
RFC 3376	Internet Group Management Protocol, Version 3 - IGMPv3 Snooping support

Table 32 – Applicable IETF Standards

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