xtramus

LES-5160 Cat-5e Simulator

USM Ver 1.2





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Revision History

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2014/07/23	1.0	First version.	
2014/12/03	1.1	Add the description of the three length simulation modes.	
2019/05/05	1.2	 Change header and footer pictures. Modify the description about cable length setting. 	



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1. LES-5160 Overview

1.1. General Descriptions of LES-5160

LES-5160 is a 16-slot Ethernet cable Cat-5e simulator. Upon different commands, it can simulate different network cable lengths, including 3 modes: Bypass, Short and100m. It can be used independently or jointly with other devices.



Combined with XLE series modules, LES-5160 cable length simulator provides RJ45 interfaces, which can support the protocols such as 10Base-T, 100BASE-TX, and 1000BASE-T, thus making your network verification system more complete.

All XLE series modules are equipped with real-time LEDs which display the status of the system and the simulating cable length, thus allowing users to view network status easily.

LES-5160 cable length simulator provides an easy-to-access Management Webpage, allowing users to view system status, set the simulating length for the XLE series modules and upgrade firmware.

Moreover, XLE-CASC modules allow you to cascade multiple LES-5160 chassis for managing these chassis simultaneously.



1.2. Features, Key Advantages, and Main Applications of LES-5160

Features

- Simulate Ethernet cable Cat-5e in different lengths
- Support easy-to-access Management Webpage, allowing users to view system status, set the simulating length and upgrade firmware/FPGA
- Multiple LES-5160 chassis can be cascaded for system management
- > Replaceable redundancy power modules for AC & DC power

Key Advantages

- Provide the network environments under various cable lengths, saving the cable deploying work in practical
- > Provide reliable long-distance connection
- Provide cable simulation function of a very long distance, saving plenty of space for placing the real cables
- Web management

Main Applications

- > Test for different cable length simulations in laboratories
- > Test for multiple DUTs with long cables simultaneously in production
- > Provide simple and convenient mass production software by Xtramus technologies.
- > Provide the API & Library files for development of other applications.





1.3.1. LES-5160 Chassis



LES-5160 Front Part



LES-5160 Back Part

LES-5160's chassis consists two parts: Front Part and Back Part.

LES-5160 Chassis Overview						
Front Part	LES-5160 has 16 slots for installation of modules. Each module card provides the simulation of one cable Cat-5e line. Besides, the Front Part provides 3 slots for installing the fan module, CASC module and management module. Please see "1.3.2. LES-5160 Front Part " for more information.					
Back Part	LES-5160's back part includes 3 different slots. Please see " 1.3.4. LES-5160 Back Part " for more detailed information.					



1.3.2. LES-5160 Front Part

As mentioned in "1.3.1. LES-5160 Chassis", LES-5160 has 16 slots for installing cable Cat-5e simulation modules and 3 slots for installing the Fan, CASC and management module. Please see the sections down below for more detailed information/specification for LES-5160 and the modules.



LES-5160 Front Part	
XLE-SFAN	It is a fan module pre-installed in the front part of LES-5160 chassis.
XLE-M667	It is a module card pre-installed in LES-5160 chassis with 1 management port for accessing the Management Webpage and 1 console port for accessing the terminal settings.
XLE-CASC	It is a module pre-installed in LES-5160 with 2 ports where each port can connect another LES-5160, providing simultaneous access to the Management Webpage.
Cable Cat-5e simulation module	Cable Cat-5e simulation modules can be inserted in slot 2-17.

WARNING1: XLE-SFAN, XLE-M667 and XLE-CASC do not support hot swap. Please do not pull out the XLE-SFAN, XLE-M667 and

XLE-CASC modules when the system is power on.

*WARNING2: Do not insert the XLE-M667, XLE-CASC or XLE-SFAN module to the wrong slot.



1.3.3. Modules

LES-5160's modules can be divided into two categories: **System Modules** and **Cat-5e Simulation Modules**.

Module Card Type	Module Card	Description	
	XLE-SFAN	Provide ventilation for the LES-5160 chassis	
System Modules	XLE-M667	Allow users to view counters/perform system maintenance	
	XLE-CASC	Cascade multiple LES-5160 chassis	
Cat-5e Simulation Modules	XLE-C5E	Modules for Cat-5e simulation. These Cat-5e simulation modules can be installed in slot 2~17 and support hot-swap.	

Please see the sections down below for more detailed information regarding to LES-5160 modules.



1.3.3.1. System Module- XLE-SFAN



The **XLE-SFAN** is delivered with the LES-5160 chassis, and shall be installed on the **Fan** slot located on the far left side of LES-5160 chassis. This module provides ventilation for the LES-5160 chassis.

Interface Ports						
CTRL + PWR	Reserved for future use					
PWR	Reserved for	Reserved for future use				
LED						
Bower	Green ON	XLE-SFAN is power on.				
Power	Green OFF	XLE-SFAN is power off.				
Svo	Green ON	XLE-SFAN is powering up properly.				
3y5	Green OFF	XLE-SFAN is power off.				
Status 0	Reserved for future use					
Status 1	Reserved for future use					

*Note: XLE-SFAN does not support hot-swap. Please do not draw the XLE-SFAN module out of the LES-5160 chassis when the system is power on.



1.3.3.2. System Module– XLE-M667



The **XLE-M667** is delivered with the LES-5160 chassis, and shall be installed on the **Mgm** slot located on the far right side of LES-5160 chassis. This module allows you to manage LES-5160 chassis via the Management Webpage.

To access the Management Web Page of LES-5160, please connect a RJ45 cable between the management port of LES-5160 and your PC.

To configure LES-5160 on your PC through the serial port, please connect a 2.5mm Phone Jack to RS232 cable between your PC and the Console Port of LES-5160.

Interface Port	S				
Console Port One 2.5		One 2.5	5mm Phone Jack Port for managing LES-5160 via serial port		
Management Port One 10		One 10	/100M RJ45 Port for managing LES-5160 via management webpage		
LED					
Bower	Green	ON	XLE-M667 is power on.		
Fower	Green	n OFF XLE-M667 is power off.			
	Yellow	/ ON	XLE-M667 is booting and preparing for test.		
Sys	Sys Green ON (Blinking)		XLE-M667 is booting properly and is ready for test.		
	Green	OFF	XLE-M667 is power off.		
Master	Reserved for future use.				
Remote	Reserved for future use.				

*Note: XLE-M667 does not support hot-swap. Please do not pull out the XLE-M667 module from LES-5160 chassis when the system is power on.



1.3.3.3. System Module Card – XLE-CASC



The **XLE-CASC** is delivered with the LES-5160 chassis, and shall be installed on the **CASC** slot located on the right side of LES-5160 chassis (next to **XLE-M667** module card). This module allows you to cascade multiple LES-5160 chassis.

To cascade the LES-5160, please inter-connect the **Up** port or **Down** port of the chassis with the RJ45 cables. For the cascaded chassis, you can manage all the chassis through one integrated web page.

Interface Ports					
Port (Up)		One 10/100M RJ45 Port for cascading another LES-5160 chassis			
Port (Dov	vn)	One 10/100M RJ45 Port for cascading another LES-5160 chassis			
LED					
Dowor	Green ON	LES-5160 is powered on			
Power	Green OF	F LES-5160 is powered off			

*Note: XLE-CASC does not support hot-swap. Please do not draw the XLE-CASC module card from LES-5160 chassis when the system is power on.



1.3.3.4. Cat-5e Simulation Module – XLE-C5E



XLE-C5E Front Panel Specification							
Interf	Interface Port A Port B			RJ45			
mena				RJ45			
Data T	ranst	fer Rate		1000 Mbps			
Ethe	rnet	Mode		10Base-T, 100BASE-TX, and 1000BASE-T			
LED St	atus		-				
Dur	G	ireen ON		XLE-C5E is powered on.			
Pwr	Green OFF		F	XLE-C5E is powered off.			
	G		1	XLE-C5E is booting properly and is ready for			
1m	0	Green ON		tests.			
	Yellow ON			Error occurred when booting XLE-7S81.			
100m	Green ON			Port A/B is connected.			
100111	Green Blinking		ing	Port A/B is transmitting/receiving data.			
	Reserved for future use.						
	Reserved for future use.						
Note	Note: All LEDS will be off when upgrading FPGA/Firmware						



1.3.4. LES-5160 Back Part

As mentioned in **"1.3.1. LES-5160 Chassis**", LES-5160's back part includes 3 different slots for installing the DC module, AC module and Fan module.



LES-5160 Back Part Description			
XLE-RFAN	It is a fan module pre-installed in the back part of LES-5160 chassis.		
XCP-A1W-300	It is a power module based on AC power source.		



1.3.4.1. XLE-RFAN

The XLE-RFAN consists of two fans as shown in the picture below. After installing XLE-RFAN, the Management Web Page will show the operation of XLE-RFAN, please see the **3.1.4**. **LES-5160 Management Webpage – Management** for more information.





1.3.4.2. XCP-A1W-300

XCP-A1W-300 is a power module providing power source of 300W AC Redundant SPS (Vin 90~240VAC).



The Power Jack of XCP-A1W-300 is a Male IEC 320 Receptacle. To activate XCP-A1W-300 & XLEP-AC-100, just turn on/off the O/I button after connecting a power source cable in Male IEC 320 Receptacle.



2. LES-5160 Installation

LES-5160 is a chassis with 16 slots for installation of Cat-5e simulation modules. Installing LES-5160 is very easy and simple: all you have to do is to plug the proper UTP cables into the LES-5160 ports like a general Ethernet switch without any extra configurations. However, selecting the proper physical media and applications in your network environment is crucial when installing LES-5160. Besides, using the proper method for installing Cat-5e simulation modules into LES-5160' slots is also crucial. Please see the sections down below for detailed information regarding to physical media types, LES-5160 application and the proper method for installing a Cat-5e simulation module.

2.1. Choices of UTP Cable

For better performances of LES-5160, please try to use the Cat 5e cable when connecting it to the DUT.



2.2. Hardware Installation

Please follow the steps shown below for a better understanding on how to install the hardware of LES-5160.

2.2.1. Bracket installation





Steps for installing a Bracket in LES-5160 After attaching the Bracket's Latch on the internal face of Chassis' Latch, let this point be a fix central rotation point and push the bottom part of Bracket into LES-5160. Lock the Captive Screw into the LES-5160 to fix the Bracket into LES-5160.



2.2.2. Modules Installation

Steps for installing a XLE-C5E module in LES-5160



Test Instruments and Networks

Steps for installing a XLE-C5E module in LES-5160



Lock the Captive Screw into the LES-5160 to fix the module into LES-5160.





2.2.3. Power Module

Steps for installing a XCP-A1W-300



Installing a XCP-A1W-300 into LES-5160 is quite simple. First of all, attach the Power Module into the respective slot of LES-5160 and push the handle of the Power Module into the slot. After the Bracket of the Power Module reaches the LES-5160, lock the captive screw into LES-5160 as shown by arrows 4 and 5.

Note: The XCP-A1W-300 doesn't support hot swap. Please don't remove Power Module during System operation.



2.2.4. Fan Module





Warning: The CTRL + PWR port and PWR port are preserved for future use. Please do not conduct any cable connections, or LES-5160 may

be seriously damaged.



3. LES-5160 Management

You can configure the settings and check the running status of LES-5160 on the web browser.

3.1. Managing LES-5160 with Management Webpage

Before accessing to LES-5160's management webpage, please connect the network interfaces between the PC and the manage card "XLE-M667" and configure the IP address for LES-5160. Please refer to the picture down below to configure the IP address. The default IP address is **192.168.1.8**.





3.1.1. Accessing LES-5160 Management Webpage

3.1.1.1. Access with IP address

To access LES-5160's management webpage, please open your web browser, and type in LES-5160's default IP address (**192.168.1.8**) in the web browser's URL field. **If you've changed LES-5160's IP address, please input the IP address you've changed to.**

3.1.1.2. Access with UPnP service

You can access the LES-5160's management webpage through the UPnP service provided by windows (windows XP, windows7 or versions above). It is very convenient if you forget the IP address you've set or under the condition of not connecting to the console.

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Storage Disk Management						
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Computer Management En dation View Holp Computer Management (Lecal State Tools) Table Scheduler Computer Management (Lecal State Tools) Computer Management State Scheduler State Scheduler Schedule	Select an item to view its description.	Name Description Statu Grant Cord Manages sc. Status Grant Cord Reciver tra. Status Grant Cord Descreas no. Status Grant Cord Manages and Status Grant Cord Manages and Status Grant PC Drugt Sc. Feables no. State Grant Port Park Provides Tatus State Grant Port Screet States State Grant Port Screet Tasterica State	Startup Type Marual Marual Marual Marual Automatic Marual Automatic Automatic Automatic Marual Automatic Marual Automatic Marual	Actions Services		Click Services and Applications → Services, then the available services will be listed in the middle pane. Ensure that the "SSDP Discovery and "UPnP device Host" are started. If the service is not started, double click it and a window will pop up. Then click start to activate the service. The picture just takes the SSDP Discovery Properties window for an example
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SSDP Discovery Properties (Local Computer) General Log On Recovery Dependencies Service name: SSDP SRV Display name: SSDP Discovery Description: Discovers networked devices and services that use the SSDP discovery protocol, such as UPPP Path to executable: C:\Windows\system32\svchost.exe +k LocalServiceAndNoImpersonation Startup type: Manual Help me configure service startup options. Service status: Stopped Start Stop You can specify the start parameters that apply when you start the service from here. Start parameters: OK		
Image: Second Place Image: Second Place	Nico:	Go to Network . You can see the "LES-5160" device is listed. If you cannot see the "LES-5160", please turn off your firewall and then try again.
VTRAMUS You Yout Contact LEES-551660 SYSTEM System Information System Information Model Name IP Settings Serial Number MANAGEMENT MAC Address Chassis Overview Hardware Version Cable Longth Settings IP Settings Characteristic Chart IP Status MAINTENANCE IP Mode Upgrade Firmware Subnet Mask System Reboot Subnet Mask	LES-5160 1234567891 00-22-a2-01-02-03 MP-02 v1.1b013 static 192.168.1.8 255.255.255.0	Double click the icon of "LES-5160" to enter the management webpage.





3.1.2. LES-5160 Management Webpage – Overview

XTRAMUS Home	About Contact A			
LES	5-5160 ^в	System Information		System information
		Model Name	LES-5160	
SYSTEM		Serial Number	0N5160000050	
System Information		MAC Address	00-22-a2-00-00-50	
IP Settings		Hardware Version	MP-03	
MANAGEMENT		Firmware Version	v1.1b012	D
Cable Length Settings	c	IP Status		
MAINTENANCE		IP Mode	static	
Upgrade Firmware		IP Address	192.168.1.8	
Save Changes		Subnet Mask	255.255.255.0	
System Reboot		Gateway IP	192.168.1.1	

Xtramus Co.Ltd. 2013-2014

LES	ES-5160 Management Webpage Overview							
Α	Menu Bar	 Home: Link to the home page. About: Brief introduction of LES-5160. Contact: Contact information of Xtramus Co.Ltd. 						
В	Model Name	This field displays the model name "LES-5160".						
С	Setting Options	 The Setting Options contains options for LES-5160 settings, information, and statistics, which can be divided into: System: You can view system information here in this field. Management: This option allows you to view the chassis status, characteristic curves and set the cable length. Maintenance: This option allows you to upgrade the firmware, save the settings and reset to factory defaults. 						
D	Main Display Screen	The Main Display Screen displays the detailed information of the above setting options.						



3.1.3. LES-5160 Management Webpage – System

The management page provides two information interfaces: System Information and Module Information. You can access to the two interfaces by click the links at the upper left corner.

System Information		System information
Model Name	LES-5160	Module information
Serial Number	0N5160000050	
MAC Address	00-22-a2-00-00-50	
Hardware Version	MP-03	
Firmware Version	v1.1b012	
IP Status		
IP Mode	static	
IP Address	192.168.1.8	
Subnet Mask	255.255.255.0	
Gateway IP	192.168.1.1	

3.1.3.1. System Information

System Information	
Model Name	LES-5160
Serial Number	0N5160000050
MAC Address	00-22-a2-00-00-50
Hardware Version	MP-03
Firmware Version	v1.1b012
IP Status	
IP Mode	static
IP Address	192.168.1.8
Subnet Mask	255.255.255.0

System Information displays LES-5160' system information including:

System Information				
Model Name The model of the device "LES-5160"				
Serial Number	LES-5160's serial number.			
MAC Address	LES-5160's MAC address.			
Hardware version	PCB Version of XLE-M667.			
Firmware Version	LES-5160's current firmware version.			
IP Status				

X	t	C	m	U	S
Test	Instr	uments	and a	Netw	orks

	lest instruments and Network
System Information	
IP Mode	 This field displays how LES-5160 acquires its IP address. Static: LES-5160's IP, subnet mask, and gateway addresses are assigned manually. DHCP: LES-5160's IP, subnet mask, and gateway addresses are assigned automatically by a DHCP server.
IP Address	LES-5160's IP address.
Subnet Mask	LES-5160's subnet mask.
Gateway IP	LES-5160's gateway address.

3.1.3.2. Module Information

Module	Information						
Slot No.	Name	PROM Ver.	Hardware Ver.	Firmware Ver.	Firmware Date	Serial No.	MAC Address
Slot.2	XLE-C5E	v0.1b002	MP-02	v1.0b001	2014-5-5	0NC5E000015	00-22-a2-00-00-15
Slot.3	XLE-C5E	v0.1b002	MP-02	v1.0b000	2014-5-5	0N2160667500	00-22-a2-00-00-10
Slot.4	XLE-C5E	v0.1b003	MP-02	v1.0b000	2014-5-5	0NSc5e00002	00-22-a2-00-00-02
Slot.5	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Slot.6	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Slot.7	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Slot.8	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Slot.9	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Slot.10	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Slot 11	n/a	n/a	n/a	n/a	n/a	n/a	n/a

This screen displays the detailed information of the module, including the slot number, module name, firmware version, firmware date, serial number and MAC address.

3.1.3.3. IP settings

IP Settings: Allows you to set how LES-5160 will acquire its IP, subnet mask, and gateway addresses. Also, you could input these addresses manually here.

Click IP Settings, the following screen appears.

IP Settings							
Mode	Static						
Address	192.168.1.8						
Subnet Mask	255.255.255.0						
Gateway	192.168.1.1						
Apply							

	Test Instruments and Net	IS tworks
IP Settings		
	You can choose how LES-5160 acquires its IP, subnet mask, and gateway addresses. There are two modes available:	
Mode	 Static: You have to input LES-5160's IP, subnet mask, and gateway addresses manually in the fields down below. DHCP: LES-5160 acquires its IP, subnet mask, and gateway addresses automatically from network's DHCP server. 	
Address	You can input LES-5160's IP address here in this field.	
Subnet Mask	You can input LES-5160's subnet mask here in this field.	
Gateway	You can input LES-5160's gateway address here in this field.	
Apply	Apply the changes you've made here.	

*Note1: The default IP address for LES-5160 is 192.168.1.8.



3.1.4. LES-5160 Management Webpage – Management

There are 3 options available for **Management**, including **Chassis Overview**, **Cable Length Settings**, and **Characteristic Chart**.

3.1.4.1 Chassis Overview

This page can display the status of the modules installed in the LES-5160 chassis and the cable length settings. The page is shown as follows.



Chassis Overview	
Α	Name of the module
В	Display the operation status of each module and cable length settings
С	Display the communication status of the modules: when the module is initiating, the RJ45 ports are brown, indicating the module is establishing communication with the management card and after that the RJ45 ports will be green. Now the module is ready. *Note: if the module cannot be started normally, the RJ45 ports will not turn to green.



3.1.4.2. Cable Length Settings

This page is used to individually set the simulation cable length for each module. There are three modes to choose, which are Bypass, Short and 100m, respectively regarding to short by relay, 1~3 meters and 100 meters. The page is shown as follows.

Cable Length Choose cards cable length																
L/C 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17														17		
Bypass	O	6	0	6	6	ē	ē	6	6	ē	6	6	¢	¢	6	6
Short	©	С	С	С	0	0	С	C	0	0	С	0	0	0	C	0
Long	۲	0	С	С	C	С	C	C	С	С	С	С	С	С	С	С
Apply	Apply															

Click Apply to make your settings here effective.

3.1.4.3. Characteristic Chart

This page is used to view the characteristic chart of a certain module. The page is shown as follows.



Slot ID: select the slot ID of the module to see its characteristic chart.

Line: select the wire pairs. There are four pairs (Pair-12, Pair-36, Pair-45, and Pair-78) and you can also choose to display all the four pairs (All-Pair).

In the chart, the x-axis denotes frequencies (64 points in total but 32 points for IE8) while the Y-axis denotes the decibel values.



3.1.5. LES-5160 Management Webpage – Maintenance

Four options are available in the **Maintenance** configuration webpage: **Upgrade Firmware, Save Changes, Set Factory Defaults** and **System Reboot**.

3.1.5.1. Update Firmware

This function is used to upgrade the firmware of the management card and the Cat-5e cable simulation modules. There are three modes for this function, including **Management Card**, **Single Subcard**, and **Multi Subcards**.

a. Management Card

This mode is to upgrade the firmware of management card.

Upgrade	Management Card
	Single Subcard
Choose files for upgrade	Multi Subcards
Browse	
Analy	

Management Card	
Browse	Click the Browse button to choose the firmware file you would like to upgrade. LES-5160's firmware files are in the format of "*. bin ".
Apply	Click this button to start upgrading LES-5160's firmware.

b. Single Subcard

This mode is to upgrade the firmware of a single XLE-C5E module.

Upgrade	Management C
	Single Subcard
Slot ID: 2	Multi Subcards
Choose files for upgrade	
Browse	
Apply	

Single Subcard	
	Click the scroll down menu to select the module you want to upgrade firmware
3101 10	on.
Browse	Click the Browse button to choose the firmware file you would like to
DIOWSe	upgrade. LES-5160's firmware files are in the format of "*.bin".
Apply	Click this button to start upgrading LES-5160's firmware.

c. Multi Subcard

This mode is to upgrade multiple XLE-C5E modules at the same time. The system will upgrade the firmware of the selected modules in sequence.

								Management Card
Multi-Upg	jrade							Single Subcard
Choose car	ds and files for upgr	ade						Multi Subcards
2	3	4	5	6	7	8	9	L
			Г	Г	Г	Г	Г	
10	11	12	13	14	15	16	17	
Г	Г	Г	Г	Г	Г	Г	Г	
	browse.	~	_	_		_		
Apply Subcar	rd	Select th	e availab	le module	es accor	ding to th	neir slot IDs, as	s shown in the _l
Apply	rd	Select th down bel	e availab low.	le module	es accor	rding to th	neir slot IDs, as	s shown in the I
Apply Subcar odule	rd list	Select th down bel	e availab low.	le module 2	es accor	rding to th 3 V	neir slot IDs, as	s shown in the _l
Apply Subcar odule	rd list	Select th down bel	e availab low.	le module	es accor	rding to th 3 2 11	neir slot IDs, as	s shown in the

Browse	upgrade. LES-5160's firmware files are in the format of "*.bin".
Apply	Click this button to start upgrading LES-5160's firmware. And then the firmware
Арріу	of the selected modules will be upgraded in sequence.

3.1.5.2. Save Changes

Save Changes
The device configuration will be saved to Non-volatile RAM !
Save

Save Changes	
Save	If you don't save the settings you've made via LES-5160's management webpage, all settings will be erased after rebooting LES-5160. Click the " Save " button to save the settings to LES-5160.



3.1.5.3. Factory Defaults

Set Factory Defaults
System will restore all settings to default settings! All data
and previous settings will be lost after restore to default settings.
Restore

Factory Defaults	
Restore	You can set all LES-5160's settings to default by clicking the " Restore " button.

3.1.5.4. System Reboot

System Reboot
System will reboot! All unsaved data/settings will be lost after system reboot.
Reboot

System Reboot	
Reboot	You can reboot LES-5160 by clicking the " Reboot " button. Please note that all
	unsaved settings will be lost after system reboot.



4. LES-5160 General Specifications

Model	LES-5160
Slot	16 Slots for Installing XLE Series Modules
Dimension	441 mm x 310 mm x 88 mm
Temperature	> Operating: 0°C ~ 40°C (32°F ~ 104°F) > Storage: 0°C ~ 50°C (32°F ~ 122°F)
Humidity (non-condensing)	> Operating: 0% ~ 85% RH > Storage: 0% ~ 85% RH
Built-in Sensors	Detecting system temperatures, rotation speed of fans, and system voltage