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NT100 Series Unmanaged Ethernet Switches

REDLION NT100 Series Unmanaged Ethernet Switches User Guide

Contents

RED LION®

REDLION NT100 Series Unmanaged Ethernet Switches

Specifications

- **Model:** LP1230
- **Type:** Unmanaged Ethernet Switch
- **Manufacturer:** Red Lion Controls, Inc.
- **Website:** www.redlion.net

Product Usage Instructions

Safety Information

- Users are advised to follow all safety regulations and instructions provided in the manual to ensure personal safety and prevent damage to the device or connected equipment.

Compliance Information

- This product complies with Part 15 of the FCC-A Rules and meets the requirements of the Canadian Interference Causing Equipment Regulations.

Conditions of Safe Use per ATEX and IECEx

- Ensure the equipment is used in an area with at least pollution degree 2, installed in an enclosure with a minimum ingress protection of IP 54, and provides fire, shock, mechanical, and environmental protection.
- Transient protection should be provided not exceeding 140% of the peak rated voltage value at the supply

terminals.

Frequently Asked Questions

Q: How do I contact customer support?

A: For Americas, call +1 **877-432-9908** during 8 am-6 pm Eastern Standard Time. For Asia-Pacific, call +86 21-6113-3688 x767 during 9 am-6 pm China Standard Time. For Europe, refer to specific country phone numbers and hours provided.

Q: Where can I find more information about Red Lion Controls, Inc.?

A: Visit the official website at **www.redlion.net** for more information about the company and its products.

Preface

Disclaimer

- This hardware guide provides an overview of the installation, maintenance, and operation of the N-Tron® Series NT116 Unmanaged Ethernet Switches equipment.
- It is not intended as a step-by-step guide or a complete set of all procedures necessary and sufficient to complete all operations.
- While every effort has been made to ensure that this document is complete and accurate at the time of release, the information that it contains is subject to change.
- Red Lion Controls, Inc. is not responsible for any additions to or alterations of the original document. Industrial networks vary widely in their configurations, topologies, and traffic conditions. This document is intended as a general guide only.
- It has not been tested for all possible applications, and it may not be complete or accurate for some situations.
- Users of this document are urged to heed warnings and cautions used throughout the document.

Safety Summary

- All safety-related regulations, local codes, and instructions that appear in this document or on equipment must be observed to ensure personal safety and to prevent damage to either the device or equipment connected to it.
- Do not use these products to replace proper safety interlocking. No software-based device (or any other solid-state device) should ever be designed to be responsible for the maintenance of personnel safety or consequential equipment not equipped with safeguards. Red Lion disclaims any responsibility for damages, either direct or consequential, that result from the use of this equipment in a manner not specified.

Compliance Information

FCC Statement

This product complies with Part 15 of the FCC-A Rules. Operation is subject to the following conditions:

1. This device may not cause harmful Interference

2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used under the instructions, may cause harmful interference to radio communications.
Operation of this device in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

Industry Canada

This Class A digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations. Operation is subject to the following two conditions;

1. this device may not cause harmful interference,

2. this device must accept any interference received, including interference that may cause undesired operation.

Warnings and Cautions

Warnings apply to situations where personal injury or death may result.
Cautions apply to where reduced function or damage to equipment may result.

⚠️	**CAUTION:** Risk of Danger Read complete instructions before installation and operation of the unit. **CAUTION:** If equipment is used in a manner not specified by Red Lion, the protection provided by the equipment may be impaired. **CAUTION:** Do not perform any services on the unit unless qualified to do so. Do not substitute unauthorized parts or make unauthorized modifications to the unit. **WARNING – EXPLOSION HAZARD –** Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
⚡	**WARNING:** Properly ground the unit before connecting anything else to the unit. Units not properly grounded may result in a safety risk that could be hazardous and may void the warranty. **CAUTION:** Observe proper DC Voltage polarity when installing power input cables. Reversing voltage polarity can cause permanent damage to the unit and void the warranty.
🔥	**DANGER:** Hot Surface. During operation, take care to avoid coming into contact with a hot surface. Do not touch it over 1 second.

Conditions of Safe Use per ATEX and IECEx

- The equipment shall only be used in an area of at least pollution degree 2, as defined in EN IEC 60664-1.
- The equipment shall be installed in an enclosure that provides a minimum ingress protection of IP 54 in

accordance with EN IEC 60079-0.

- The equipment is open-type and intended to be installed in suitable, tool accessible external enclosure to provide fire, shock, mechanical and environmental protections. The enclosure shall be tool accessible and suitable for the location.
- Transient protection shall be provided that is set at a level not exceeding 140 % of the peak rated voltage value at the supply terminals to the equipment.

Regulatory Information

Product Safety
UL 61010 and C22.2 No. 61010 Ordinary Locations
UL 121201 and CSA C22.2 No. 213 Class I, Division 2 Hazardous Locations
ATEX/IECEx
Ex ec nC IIC T4 Gc
IECEx UL 23.0092X
UL 23 ATEX 3128X
EMI/EMC
CFR 47, Part 15, Subpart B
Innovation, Science and Economic Development Canada ICES-003 Issue 6
ANSI C63.4
EN 61000-6-2 Generic standards – Immunity standard for industrial environments
EN 61000-6-4 Generic standards – Emission standard for industrial environments
IEC 61000-4-2 (ESD)
IEC 61000-4-3 (Radio-Frequency Electromagnetic Field)
IEC 61000-4-4 (Fast Transient)
IEC 61000-4-5 (Surge)
IEC 61000-4-6 (Radio-Frequency Continuous Conducted)
IEC 61000-4-8 (Power Frequency Magnetic Field)
Shock & Vibration
IEC 68-2-27: 200 g @ 10 ms Triaxial; non-operational; panel mounted
IEC 68-2-6: 15 g @ 5-200 Hz Triaxial; operational; panel mounted

Railway/Rolling Stock
EN 50155, EN 50121 and EN 61373
Marine
ABS Type Approval for Shipboard Applications
Designed to Comply With
IEEE 1613 for Electric Utility Substations
NEMA TS1/TS2 for Traffic Control
Other
RoHS compliant

Trademark Acknowledgments

- Red Lion Controls acknowledges and recognizes ownership of the following trademarked terms used in this document.
- Ethernet is a registered trademark of Xerox Corporation.
- All other marks are the property of their respective owners.
- Document History and Related Publications
- The hard copy and electronic media versions of this document are revised only at major releases and therefore, may not always contain the latest product information.
- Tech Notes and/or product addendums will be provided as needed between major releases to describe any new information or document changes.
- The latest online version of this document can be accessed through the Red Lion website at **www.redlion.net/support/documentation**.

Additional Product Information

Additional product information can be obtained by contacting the local sales representative or Red Lion through the contact numbers and/or support website address listed on the inside of the front cover.

Introduction

- The compact N-Tron® NT116 unmanaged Industrial Ethernet switch is ideal for industrial applications that demand dependable performance under harsh conditions.
- The compact 16-port device offers exceptional reliability and performance for a range of mission-critical applications including data acquisition, Ethernet I/O, and process control.
- Delivered in a rugged industrial metal enclosure, the NT116 provides 16 high-performance 10/100BaseTX copper ports with full wire speed communications—up to 3.2 Gb/s throughput—for robust network support.
- The unit boasts exceptional MTBF and extended tolerances to shock, vibration, temperature fluctuations, and noise—common elements in factory floor control networks, utilities, wastewater treatment, wind turbines, rail

cars, intelligent traffic control, and transportation applications.

Features include:

- Sixteen 10/100BaseTX RJ45 ports
- Redundant 10–49 VDC power inputs
- High shock and vibration tolerance
- Slim, space-saving design
- 40°C to 85°C operating temperature
- IEEE 802.3 compliance
- ESD and surge protection diodes on all ports
- Store-and-forward technology
- Supports full/half duplex operation
- Full wire speed communications
- Up to 3.2 Gb/s maximum throughput
- Visit **www.redlion.net** for detailed model specifications.
- For a complete list of features and certifications.

Features and Benefits

HARDWARE FEATURES

- **Compact,** space-saving, hardened industrial design
- **Wide** operating temperature
- **High** shock and vibration tolerance
- **Shock:** IEC 68-2-27: 200 g @ 10 ms Triaxial; non-operational; panel mounted
- **Vibration:** IEC 68-2-6: 15 g @ 5-200 Hz Triaxial; operational; panel mounted
- **Reverse** polarity protection
- **ESD** and surge protection
- **LED** port status indicators
- **Jumbo** frame support
- **Redundant** power inputs (10-49 VDC)
- **Hardened** industrial design
- **IEEE** 802.3 compliance
- **Full** wire speed communication
- **MDIX** auto-sensing cable
- **Auto-sensing** speed and flow control
- **Up** to 3.2 Gb/s maximum throughput
- **Store-and-forward** technology
- **MTBF:** 1.2M Hours

REGULATORY CERTIFICATIONS

- **Product Safety:** UL 61010 and C22.2 No. 61010 OrdLoc, UL 121201 and CSA C22.2 No. 213 Class I, Division

2 HazLoc, ATEX, IECEx Ex ec IIC T4 Gc, IECEx UL 23.0092X and UL 23 ATEX 3128X

- **EMI/EMC:** CFR 47, Part 15, Subpart B, Canada ICES-003, ANSI C63.4, EN 61000-6-2 and 4, IEC 61000-4-2, 3, 4, 5, 6 and 8
- **Railway/Rolling** Stock: EN 50155, EN 50121, EN 61373
- **Marine:** ABS Type Approval for Shipboard Applications
- **Designed** to Comply With – IEEE 1613 for Electric Utility Substations and NEMA TS1/TS2 for Traffic Control
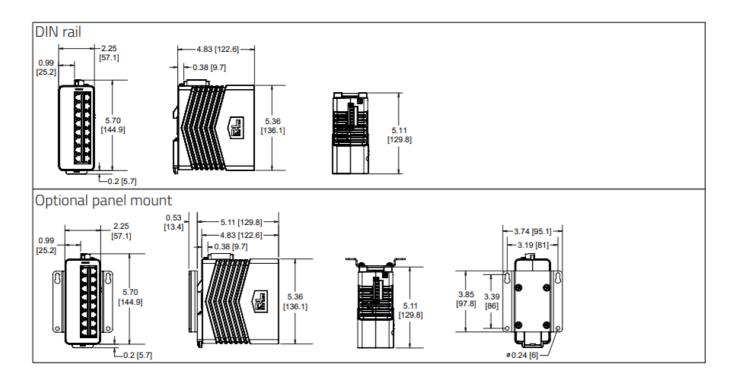- **Other** – RoHS compliant

Specifications

NT116

MECHANICAL						
MTBF	Ingress Protection	Height	Width	Depth	Weight	Installation Options
1.2M Hours	IP20	5.36″ (136.1 mm)	2.25″ (57.1 mm)	5.11″ (129.8 mm)	1.8 lbs. (0.82 kg)	DIN rail or optional panel mount

POWER INPUT			
Power Input Options	Input Voltage Range	Steady Input Range	BTU/hr
Redundant Input Terminals; Reverse Polarity Protection	10-49 V DC	0.26 A @ 24 VDC	21.22

ENVIRONMENTAL AND COMPLIANCES			
Operating Temperature Range	Storage Temperature Range	Humidity (non-condensing)	Operating Altitude
-40 to 85 °C	-40 to 85 °C	10 to 95% RH	0 to 10,000 ft.

SHOCK AND VIBRATION	
Shock	Vibration
IEC 68-2-27: 200 g @ 10 ms Triaxial; non-operational; panel mounted	IEC 68-2-6: 15 g @ 5-200 Hz Triaxial; operational; panel mounted

CONNECTORS	
10/100BaseTX	Sixteen (16) RJ45 copper ports

NETWORK MEDIA	
10BaseT	≥Cat3 Cable
100BaseTX	≥Cat5 Cable

NETWORK THROUGHPUT	
Maximum Throughput	Up to 3.2 Gb/s

RECOMMENDED MINIMUM WIRING CLEARANCE	
Front	2″ (50.8 mm)
Top	2″ (50.8 mm)

DIMENSIONS

NT116 DIMENSIONS In inches [mm]

LEDs

Data ports have two LEDs labeled LNK and ACT. The LNK LED indicates link and the ACT LED indicates port activity status.

The table below describes the operating modes:

LED	COLOR	DESCRIPTION
⏻	Green	Power is On
	Red	Power is On and a fault condition exists
	Off	Power is Off
LNK	Green	10/100 Mb Link between ports
	Off	No link between ports
ACT	Green	Data is active between ports. Activity light blink rate indicates activity, not necessarily the volume of activity.
	Off	Data is inactive between ports

Installation

Contents of Package

- Carefully remove the switch and accessories from the shipping container and inspect them for damage.
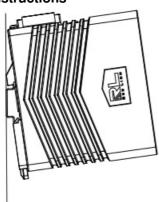 Contact Red Lion immediately if any damage is discovered.

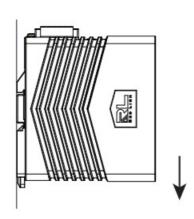**Please verify that the box contains the following items:**

- NT116 switch
- Quick Start Guide

Mounting the NT116 Unit

- A clearance of one inch should be observed on the sides, back, top and bottom to allow proper ventilation. Also, the NT116 requires a cable bend radius of two inches to be observed for the front and top side of the unit.
- For hazardous location installation, the following shall be taken into consideration:
- The equipment shall only be used in an area of at least pollution degree 2, as defined in EN 60664-1.
- The equipment shall be installed in an enclosure that provides a minimum ingress protection of IP54 in accordance with EN 60079-0. The enclosure shall be accessible only with the use of a tool.

DIN Rail Mounting Instructions

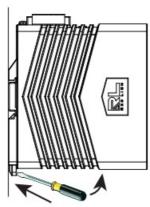

Install the switch to the standard 35mm DIN rail as shown in the diagram above.

1. First, hook the top of the DIN rail clip on the back of the switch to the rail.
2. Then, gently rotate the front of the switch downward, towards the panel.
3. Push the bottom of the switch towards the rail until it locks into place.
4. Apply upward force to verify the switch is securely installed.
5. Connect any communications cables to the switch.
6. Install the power and ground wires.
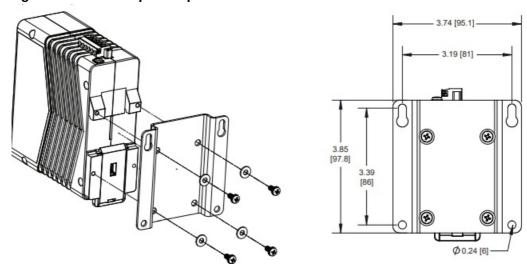7. Apply power to the power supply.

DIN Rail Removal Instructions

Remove the switch from the standard 35mm DIN rail as shown in the diagram above.

1. Ensure power from the power source is off.

2. Disconnect power and ground wires.

3. Disconnect any communications cables from the unit.

4. Insert a standard flat/slotted screwdriver into the slot provided on the DIN rail clip.

5. Using the base of the switch as a pivot point, apply upward force on the screwdriver to release the DIN rail clip.

6. With the DIN rail clip latching mechanism released, continue to rotate the switch upward and away from the panel.

7. Once the switch has been rotated upward, remove the screwdriver.

   - Carefully lift the switch upward and away from the DIN rail and panel.
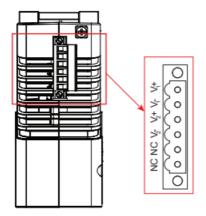
Panel Mounting NT116 Models Optional panel mount

- The NT116 models are also designed for panel mounting. This section includes the mechanical dimensions and drill hole placements to consider when panel mounting the unit.
- For horizontal clearance in the installation location for cable bend radius, allow at least 2″ for copper.
- 1. Screw the rugged panel bracket on with the screws in the accessory kit. Tighten screws with 6 in-lb torque.
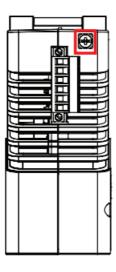- **WARNING:** Panel mounting installation in non-hazardous locations.

Power Source

- The switch can be powered from two UL61010-2-201 certified SELV power supplies (input range 10 to 49 VDC). Unscrew and remove the DC voltage input plug from the power input header. Insert the positive and negative wires (AWG 12-20) into V+ and V- contact on the terminal block and tighten the wire-clamp screws. Tighten the wire-clamp screws with a torque value of 4.4 pound-force inch (0.5 Nm) to prevent the wires from being loosened. Verify that the power LED is on.
- **Note:** The DC power should be connected to a well-fused power supply. Use 12AWG-20AWG wire and screw torque value 4.4 pound-force inch (0.5 Nm) for power connection.
- **Note:** Use with Copper Conductors Only.
- **Note:** Cable temperature rating is at least 90 degrees or more. Note: The stripping length of the power cable is recommended to be 8-9 mm.

- **WARNING:** Ensure that all power sources to the chassis (power distribution panel) are turned off during the connection.
- **Note:** At least one DC power supply must be connected for operation. For redundant power operation, PWR1 and PWR2 inputs must be connected to separate DC voltage sources. This unit will draw power from the supply with higher voltage.
- Recommended 24 VDC power supply, similar to Red Lion's P/N NTPS-24-1-3.
- Verify that the proper input voltage is connected to the NT116 before powering on the unit. Applying AC power to a DC NT116 unit will damage the unit.
- **Note:** LEDs are described in detail in "LEDs.

Connecting to Earth Ground

- The grounding of any control system is an integral part of the design. The optimum noise immunity and emissions are obtained when the NT116 chassis is connected to earth ground via a 12 gauge wire or better.
- The NT116 units provide a grounding lug (see illustration) that is used to provide a safe grounding path for the device. Torque the screw to 4.4 pound-force inch (0.5 Nm) for grounding connection. Do not over-tighten the screw.
- **Note:** The NT116 power input (V-) pins are isolated from the chassis ground. Do not attempt to ground the switch to earth ground via the power input pins (V-).
- **Note:** Use with Copper Conductors Only.
- **Note:** The stripping length of the grounding cable is recommended to be 8-9 mm.
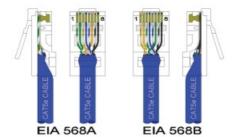

Connecting to the Ethernet Port (RJ45 Ethernet)

- For 10/100BaseT(X) ports, plug a Category 5e twisted pair cable into the RJ45 connector. Connect the other

end to the far end station. Verify that the LNK LEDs are ON once the connection has been completed.

- To connect any port to another device, use a standard Cat5e straight-through or crossover cable with a minimum length of one meter and a maximum length of 100 meters.
- Red Lion recommends the use of pre-manufactured Cat5e cables to ensure the best performance. If this is not an option and users must terminate their ends on the Cat5e cables, one of the two color-coded standards shown to the right should be utilized.
- If a user does not follow one of these standards, then the performance and maximum cable distance will be reduced significantly and may prevent the switch from establishing a link.

EIA 568A   EIA 568B

- **WARNING:** Creating a network loop without employing a network path protocol such as RSTP is an illegal operation that can create a network storm that will crash the network.

PIN #	ASSIGNMENT
1,2	T/RxA+,T/RxA-
3,6	T/RxB+,T/RxB-
4,5	T/RxC+,T/RxC-
7,8	T/RxD+,T/RxD-

Cleaning

Clean only with a damp cloth. Excess moisture or harsh chemicals can cause damage to the unit.

Ordering Information

PART NUMBER	DESCRIPTION
NT-116-0000-0000	16-Port 10/100 Unmanaged Industrial Ethernet Switch (16 10/100BaseTX RJ45 Ports)

The model number may be followed by –CC indicating conformal coating.

Accessories

PART NUMBER	DESCRIPTION
NT-CPMA-03-0 0000	NT5000 Panel Mount Kit, Type A (Wide) Models: NT5008-FX2, NT5008-GX2, NT5010-FX2, NT5010-GX2, NT5016, NT5018-DM2, NT5018-FX2, NT5018- GX2, NT116
NTPS-24-1-3	DIN Rail Power Supply, 1.3 Amp @ 24 VDC

Service and Support Information

Service Information

- We sincerely hope that you never experience a problem with any of our products. If you do need service, call Red Lion at 1-**877-432-9908** for Technical Support. A trained specialist will help you determine the source of the problem.
- Many problems are easily resolved with a single phone call. If it is necessary to return a unit to us, an RO (Repair Order) can be obtained on the Red Lion website.
- Red Lion tracks the flow of returned material with our RO system to ensure speedy service. You must include this RO number on the outside of the box so that your return can be processed immediately.
- Be sure to have your original purchase order number and date purchased available.
- We suggest that you give us a repair purchase order number in case the repair is not covered under our warranty. You will not be billed if the repair is covered under warranty.
- Please supply us with as many details about the problem as you can. The information you supply will be written on the RO form and supplied to the repair department before your unit arrives.
- This helps us to provide you with the best service, in the fastest manner. Repairs are completed as soon as possible. If you need a quicker turnaround, ship the unit to us by air freight. We give priority service to equipment that arrives by overnight delivery.
- We apologize for any inconvenience that the need for repair may cause you. We hope that our rapid service meets your needs. If you have any suggestions to help us improve our service, please give us a call.
- We appreciate your ideas and will respond to them.

For Your Convenience:

Please fill in the following and keep this manual with your Red Lion system for future reference.

- **P.O. #:**————————————————
- **Date Purchased:**———————————————
- **Purchased From:**—————————————
- **Serial Number**—————————————

Product Support

Technical Support:

- Inside the US: +1 **877-432-9908**

- Outside US: +1 **717-767-6511**
- Support: **support.redlion.net**
- Hours: 8:00 am to 6:00 pm EST
- Corporate Headquarters
- Red Lion Controls
- 1750 5th Avenue
- York, PA 17403
- Website: **www.redlion.net**

LIMITED WARRANTY

- **(a)** Red Lion Controls Inc. (the "Company") warrants that all Products shall be free from defects in material and workmanship under normal use for the period provided in "Statement of Warranty Periods" (available at **www.redlion.net**) current at the time of shipment of the Products (the "Warranty Period"). EXCEPT FOR THE ABOVE-STATED WARRANTY, THE COMPANY MAKES NO WARRANTY WHATSOEVER TO THE PRODUCTS, INCLUDING ANY (A) WARRANTY OF MERCHANTABILITY; (B) WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE; OR (C) WARRANTY AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS OF A THIRD PARTY; WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE. Customer shall be responsible for determining that a Product is suitable for Customer's use and that such use complies with any applicable local, state, or federal law.
- **(b)** The Company shall not be liable for a breach of the warranty outlined in paragraph (a) if (i) the defect is a result of Customer's failure to store, install, commission, or maintain the Product according to specifications; (ii) Customer alters or repairs such Product without the prior written consent of Company.
- **(c)** Subject to paragraph (b), to any such Product during the Warranty Period, the Company shall, in its sole discretion, either (i) repair or replace the Product; or (ii) credit or refund the price of the Product provided that, if Company so requests, Customer shall, at Company's expense, return such Product to Company.
- **(d)** THE REMEDIES outlined in PARAGRAPH (c) SHALL BE THE CUSTOMER'S SOLE AND EXCLUSIVE REMEDY AND COMPANY'S ENTIRE LIABILITY FOR ANY BREACH OF THE LIMITED WARRANTY outlined in PARAGRAPH (a).
- BY INSTALLING THIS PRODUCT, YOU AGREE TO THE TERMS OF THIS WARRANTY, AS WELL AS ALL OTHER DISCLAIMERS AND WARRANTIES IN THIS DOCUMENT.

COPYRIGHT

- Corporate Headquarters
- Red Lion Controls, Inc.
- 1750 5th Avenue
- York, PA 17403

CONTACT INFORMATION: AMERICAS

- Inside the US: +1 **877-432-9908**
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- Hours: 8 am-6 pm Eastern Standard Time (UTC/GMT -5 hours)

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- Hours: 9 am-6 pm China Standard Time
- (UTC/GMT +8 hours)

EUROPE

- Netherlands: +31 33-4723-225
- France: +33 (0) 1 84 88 75 25
- Germany: +49 (0) 1 89 5795-9421
- UK: +44 (0) 20 3868 0909
- Hours: 9 am-5 pm Central European Time
- (UTC/GMT +1 hour)
- Website: **www.redlion.net**
- Support: **support.redlion.net**

Documents / Resources

	REDLION NT100 Series Unmanaged Ethernet Switches [pdf] User Guide NT100 Series Unmanaged Ethernet Switches, NT100 Series, Unmanaged Ethernet Switches, Ethernet Switches, Switches

References

- **RL Red Lion Support**
- **S Welcome to Red Lion | Red Lion**
- **S Documentation | Red Lion**
- **User Manual**