

## QUICK START GUIDE



## RELIANCE RLGE2FE16R

**Substation-Rated, Enhanced Security Scada-Aware Ethernet Layer 2 Managed Switch/Layer 3 Router With Optional 2G/3G & 4G LTE Cellular Radio Link, Enhanced Network Security, Terminal Server, PoE+, and 100FX SFP Ports**

ComNet product series RLGE2FE16R are substation-rated and industrially hardened layer 2 managed switches/layer 3 routers, with a unique and highly robust packet processing SCADA-aware security firewall for the most mission-critical and demanding cyber-security applications. The RLGE2FE16R is intended for deployment in environments where high levels of electromagnetic noise and interference (EMI) and severe voltage transients and surges are routinely encountered, such as electrical utility substations and switchyards, heavy manufacturing facilities, track-side electronic equipment, and other difficult out-of-plant installations. Layer 3 routing functionality allows for the participation and foundation of a core network infrastructure.

The RLGE2FE16R is an ideal platform for deploying a secure communications and networking gateway for remote electrical utility sites, and other critical infrastructure applications.

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## About This Guide

This quick start guide includes relevant information for utilizing the Reliance RLGE2FE16R line of switches.

The information in this document is subject to change without notice and describes only the product defined in the introduction of this document.

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## Intended Audience

This user guide is intended for network administrators responsible for installing and configuring network equipment. Users must be familiar with the concepts and terminology of Ethernet and local area networking (LAN) to use this User Guide.

## Related Documentation

The following documentation is also available:

- » RLGE2FE16R Data sheet
- » RLGE2FE16R Installation and Operation Manual
- » RLGE2FE16R\_ES Enhanced Security Software Options Installation and Operation Manual
- » SFP Modules Data sheet

## About ComNet

ComNet develops and markets the next generation of video solutions for the CCTV, defense, and homeland security markets. At the core of ComNet's solutions are a variety of high-end video servers and the ComNet IVS software, which provide the industry with a standard platform for analytics and security management systems enabling leading performance, compact and cost effective solutions.

ComNet products are available in commercial and rugged form.

## Website

For information on ComNet's entire product line, please visit the ComNet website at <http://www.comnet.net>

## Support

For any questions or technical assistance, please contact your sales person ([sales@comnet.net](mailto:sales@comnet.net)) or the customer service support center ([techsupport@comnet.net](mailto:techsupport@comnet.net))

## Safety

- » Only ComNet service personnel can service the equipment. Please contact ComNet Technical Support.
- » The equipment should be installed in locations with controlled access, or other means of security, and controlled by persons of authority.

## Overview

### Hardware and Interfaces

Depending on the RLGE2FE16R hardware variant ordered your switch will be equipped with a combination of Fast Ethernet Ports, Gigabit Ethernet SFPs, Serial ports, and Cellular interfaces

- » Serial RJ 45 ports supporting RS-232. Max 4 ports (Optional)
- » Ethernet RJ45 copper 10/100 Fast Ethernet. (8 Standard, POE Optional) (Additional 8 10/100 ports optional, replaces cellular and serial)
- » Ethernet SFP based ports,100/1000 GE. Max 2 ports (Standard)
- » Ethernet SFP based ports 100 FE. Max 8 ports Additional. (Optional, replaces serial and cellular)

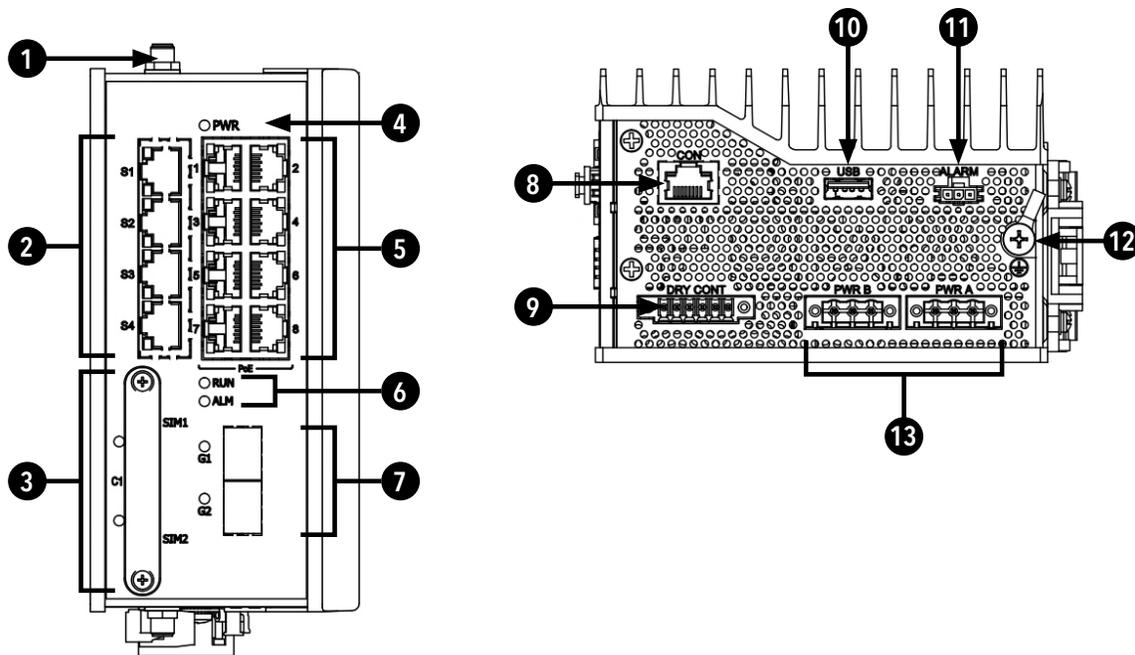
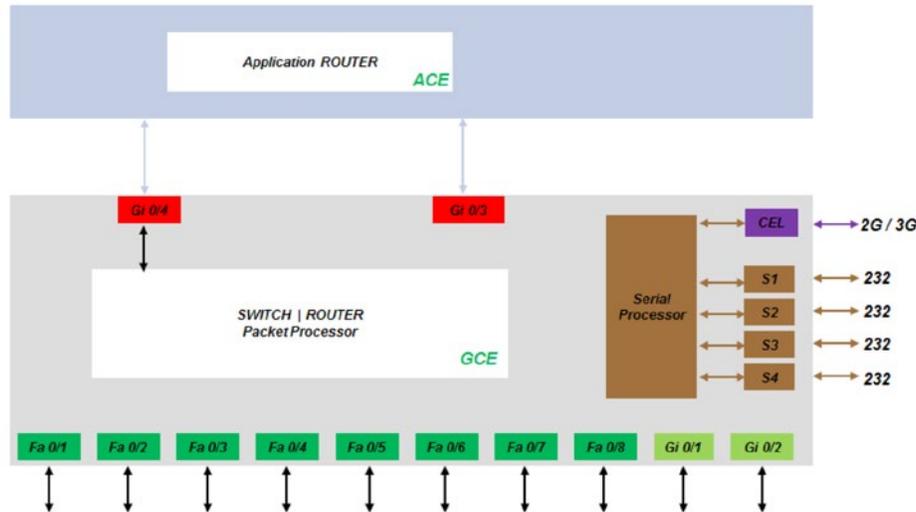


Figure 2 - R/S/22/28 Variant

## Device walkthrough

- » Ports Labeled 1 - 8 are Fast Ethernet capable of 10/100 FE capable ports with optional POE capabilities.
- » Ports Labeled S1-S4 are RJ45 ports with RS-232 support, establishing serial connections.
- » Ports Labeled 9 & 10 are 100/1000 GE ports. They require SFPs in order to connect fiber/copper interfaces. Many alternate SFP types are supported, including T1 lines, etc, please reach out to support for testing inquiries before implementing any untested or non-ComNet SFP.
- » Sim Slots 1 & 2 for cellular sim card placement.
- » Port Labeled CON is communication port for serial console connections to device from PC.
- » ANT for antenna placement.
- » USB port for software upgrade.
- » Power - AC or DC power supply needed depending on model.

## Logical Structure



## Distance kept for natural air flow

Proper installation depends on natural air flow for cooling. You must maintain a 10cm distance above and below the ComNet switch for proper air flow.

## Grounding

To install the grounding wire:

- » Prepare a minimum 10 American Wire Gauge (AWG) grounding wire terminated by a crimped two-hole lug. Use a suitable crimping tool to fasten the lug securely to the wire. Adhere to your company's policy as to the wire gauge and the number of crimps on the lug.
- » Apply some anti-oxidant onto the metal surface.
- » Mount the lug on the grounding posts, replace the spring-washers and fasten the bolts. Avoid using excessive torque.

**CAUTION - Do not remove the earth connection unless all power supply connections are disconnected.**

**DANGER - Before connecting power to the platform, make sure that the grounding posts are firmly connected to a reliable ground, as described below.**

## Connecting to a Power Source

**CAUTION - Please refer to the RLGE2FE16R installation guide for complete installation instructions.**

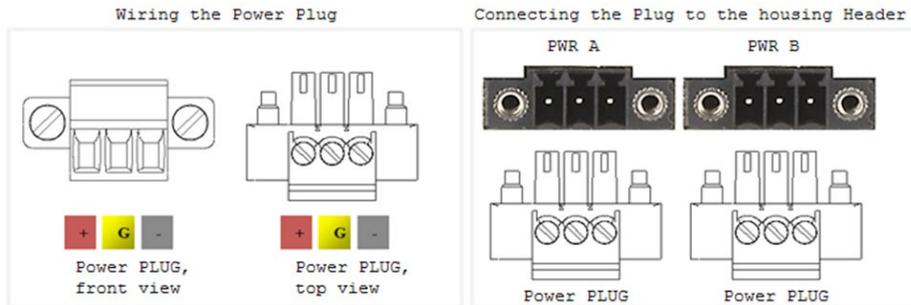
## Wiring DC Input voltage feed

Input voltage can be either AC or DC depending on the specific module you purchased. Please

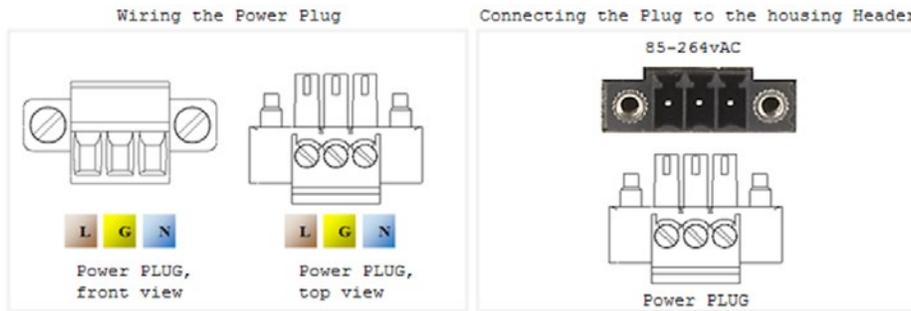
take care to notice the label on the back of the module.

For the DC version there are 2 connection inputs, marked as "PWR A" and "PWR B". For proper operation it is only necessary to connect one power source, either to "PWR A" or to "PWR B". However, for redundancy purposes you may connect 2 different power sources one at "PWR A" and the second to "PWR B".

For wiring the voltage an opposite plug connector (2 pcs) is supplied.



**Wiring AC Input voltage connector**



For an AC product variant there is a single input connector.

Use a Brown wire for the Line (Phase) conductor, a Green/Yellow for the grounding and a Blue wire for the Neutral conductor. Use 18AWG (1mm<sup>2</sup>) wire, with insulated ferrules.

## Power Budget

The following table details power consumption of the Hardware variants with cellular and serial interfaces.

Unit Power feed	Max Power [Watt] Version without POE ports	Max Power [Watt] Version with POE ports
12 VDC	18.5	80
24 VDC	18.5	100
48 VDC	18.5	140
110 VDC	18.5	120
220 VDC	18.5	120
110 VAC	20.35	141
220 VAC	20.35	141

## Configuration Environment

Two CLI based configuration environments are available for the user, these are:

- » Global Configuration Environment (GCE)
- » Application Configuration Environment (ACE)

These two environments are complementing each other and allowing each a set of supported interfaces, network tools and management. At the RLGE2FE16R infrastructure, the GCE and ACE are representing two different software processing areas. The physical and logical communication between these areas are done by internal switching /routing using the Ethernet gigabit ports Gi 0/3 and Gi 0/4. These are known as the ACE ports.

For additional information about the ACE ports see chapter ACE ports.

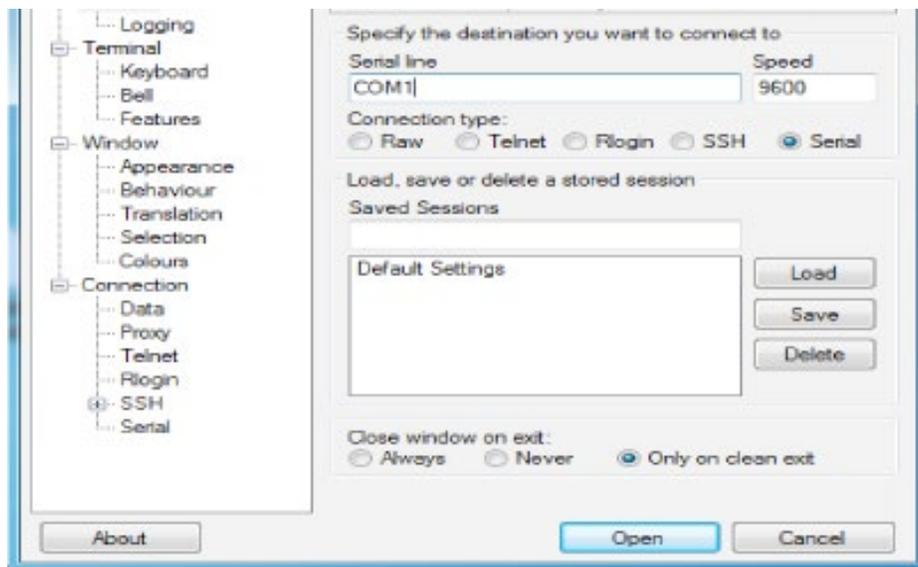
## Management over Console

### Connecting to Device

- » Device is capable of being first set up via either the console port, or via an SSH connection
- » Default **Username: su**
- » Default **Password: 1234**
- » By default all ports act as a flat switch, with all ports as members of VLAN 1
- » VLAN 1 set to hold an IP interface by default
- » Default Management IP: **10.0.0.1/8**

### Terminal

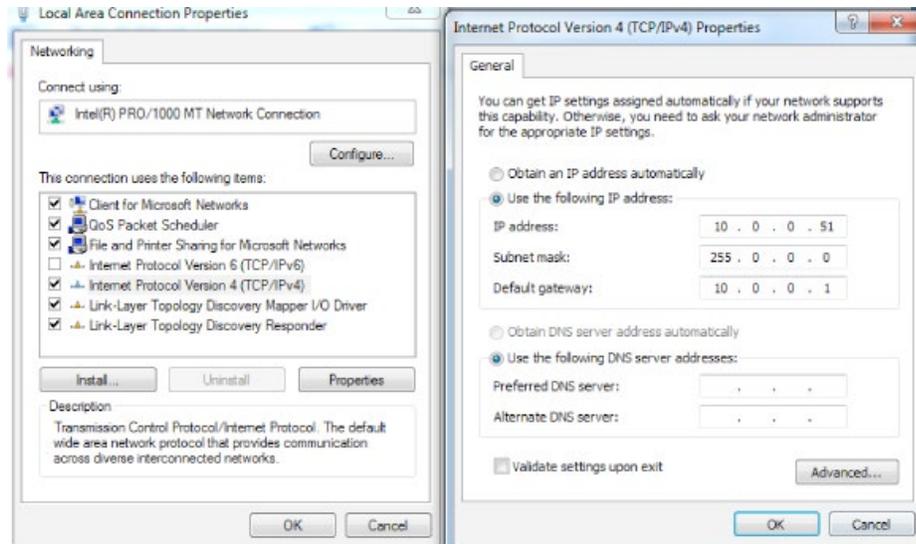
- » Power on device (Boot may take up to 3 minutes). PWR light should be green
- » Console into Device
  - › Connect to CON port using white ComNet Console Cable. Other console cables will not work as they have a different pinout.
  - › Connect to serial port of PC, or use Serial to USB cable. (Drivers may need to be installed)
  - › Terminal Serial Connection
    1. Install and open terminal software
    2. Setup terminal for serial session
    3. Determine correct COM port on PC (Device manager)
    4. Enter correct COM port, enter correct baud rate speed (Default 9600)
    5. Click Open to start session with device



- › Press enter if screen is blank
- › Default login username su, password 1234 (password will be invisible)

## SSH

- » SSH Connection to RLGE2FE16R
  - › Setup PC network to be on the same as the default management network
- » Example PC Setup:
  - › IP Address of PC: 10.0.0.51
  - › Subnet mask: 255.0.0.0
  - › Gateway: 10.0.0.1 (Optional)



- › Ping management VLAN IP: 10.0.0.1
- › From any terminal session type: `ssh su@10.0.0.1`
- › Default login username `su`, password 1234 (password will be invisible)

**Modes of Operation**

ACE vs GCE

GCE interface used for

- » IP Management to switch (SSH, Terminal, SNMP, FTP)
- » Routing of access traffic using static entries or OSPF
- » Mainly used for Switching (Vlans, Interface Troubleshoot, System information, etc.)

ACE interface used for

- » Layer 3 configurations (Firewalls, Cellular, Routing, IPSEC, DMVPN,etc.)
- » Access Control Lists
- » Authentication-Proxy
- » Event Logger

Command Mode	Access Method	Prompt	Exit Method	Usage
Root	Following user log in	RLGE2FE16R#	User needs to log out using command logout or exit	Issue Show commands
Global Configuration Environment (GCE)	Command Configure Terminal	RLGE2FE16R(config)#	Return to root mode using command exit or end	Issue configurations
Global Hierarchy Configuration	From Global Configuration mode you can access sub tree feature. Ex. Interface configuration sub tree	RLGE2FE16R(config-if)#	Return to global config using command exit	Deep configurations of device ranging from interface to routing, etc.
Application Configuration Environment (ACE)	Use the "application connect" from the root mode to enter the application configuration area	[/]	Exit to root mode using exit and pressing enter to see prompt	Global Configuration of the ACE
Application Hierarchy Configuration	From application root you can access sub tree feature. Ex. Router interface	[router/interface]	To go back to root of application you must type two dots (..) and press enter	Deep configurations of device ACE ranging from cellular to VPN, etc.

## Configuration through CLI

*At any point of operation you can type ? to get a listing of all available options*

*At any point of typing a command you can press tab to complete a word.*

Check device software/firmware version typing Show System information (pressing q will end the listing when it shows --more-- , space will continue the page)

```

RLGE2FE16R# show system information

Hardware Version          : 0202
Firmware Version         : 3.5.04.32 U-Boot 2010.12 (Dec 11 2012 - 10:34:29)

Hardware Part Number     : RLGE2FE16R/S/12/28/S22/CEU _ _ _ _ _

-----
System Name              : Switch software version 3.5.04.32
System Contact           : Not Specified
System Location          : Not Specified
Logging Option           : Console Logging
Login Authentication Mode : Local
Config Save Status       : Successful
Remote Save Status       : Not Initiated
Config Restore Status    : Not Initiated
Traffic Separation Control : none
Board Serial Number      : 1600265635
Manufacture Serial Number : 1111111111
Assembly Number          : 00265635
Hardware Revision        : 0202
HW sub-type              : 2239
CLEI                     : FFFFFFFFFFFFFFFFFF
MAC address              : 00:22:3B:11:22:33
License value            : 000000000000
Device Type ID           : <null>
Part Number 2           : RLGE2FE16R/S/12/28/S22/CEU _ _ _ _ _

```

**Check VLAN (Virtual LAN) interface using show vlan to see ports associated to vlan**

```
RLGE2FE16R# show vlan

Switch default

Vlan database
-----
Vlan ID          : 1
Member Ports     : Fa0/1, Fa0/2, Fa0/3, Fa0/4, Fa0/5, Fa0/6
                  Fa0/7, Fa0/8, Gi0/1, Gi0/2, Gi0/3, Gi0/4
Untagged Ports   : Fa0/1, Fa0/2, Fa0/3, Fa0/4, Fa0/5, Fa0/6
                  Fa0/7, Fa0/8, Gi0/1, Gi0/2
Forbidden Ports  : None
Name             :
Status           : Permanent
-----
Vlan ID          : 4091
Member Ports     : Gi0/1, Gi0/2, Gi0/3, Gi0/4
Untagged Ports   : None
Forbidden Ports  : None
Name             :
Status           : Permanent
-----
Vlan ID          : 4092
Member Ports     : Gi0/3, Fa0/10, Fa0/11
Untagged Ports   : Fa0/10, Fa0/11
Forbidden Ports  : None
Name             :
Status           : Permanent
-----
Vlan ID          : 4093
Member Ports     : Gi0/3
Untagged Ports   : None
Forbidden Ports  : None
Name             :
Status           : Permanent
-----
Vlan ID          : 2
Member Ports     : Fa0/1
Untagged Ports   : Fa0/1
Forbidden Ports  : None
Name             :
Status           : Permanent
-----

RLGE2FE16R#
```

## Check Vlan IP addresses by typing show ip interface

```
RLGE2FE16R# show ip interface
vlan1 is up, line protocol is up
Internet Address is 10.0.0.0/8
Broadcast Address 10.0.0.255
```

## Create management VLAN

Give management VLAN an IP address

- » Enter global configuration mode by typing Configure Terminal in the command line you will see RLGE2FE16R(config)#
- » Enter vlan interface you wish to set an IP address for (Format will be ip address (a) subnet mask (b) a.a.a.a b.b.b.b)
- » Followed by no shutdown command to make sure vlan is not shut down
  - › Exit will be used to exit the interface
  - › Now you set up layer 2. Enter Vlan x and add ports to the vlan.
  - › Once done, use end to exit back to root mode
  - › Enter wr st (write startup) to save all configurations

```
RLGE2FE16R(config)# interface vlan 1
RLGE2FE16R(config-if)# ip address 10.10.10.1 255.255.255.0
RLGE2FE16R(config-if)# no shutdown
RLGE2FE16R(config-if)# exit
RLGE2FE16R(config)# vlan 1
RLGE2FE16R(config-vlan)# ports fastethernet 0/1-8 gigabitethernet 0/3 untagged fastethernet
0/1-8
RLGE2FE16R(config-vlan)# end
RLGE2FE16R# wr st
Building configuration ...
[OK]
% startup-config saved successfully
RLGE2FE16R# █
```

- » You now need to add ports to specific vlans.
  - › Enter into global config once again (Conf t)
  - › Enter the interface you wish to add to the vlan and set Port vlan ID to the vlan number

```
RLGE2FE16R(config)# interface fastethernet 0/1
RLGE2FE16R(config-if)# switchport pvid 1
RLGE2FE16R(config-if)# end
RLGE2FE16R# wr st
Building configuration ...
[OK]
% startup-config saved successfully
RLGE2FE16R# █
```

- » End to exit global config mode
- » Finish by saving configurations

An example of more in depth management interface assignment can be found in the RLGE2FE16R Installation and Operation Manual under the section "Management>Example"



### ComNet Customer Service

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