JetNet3010G

7 10/100TX + 3 Gigabit SFP/Gigabit Copper

Industrial Gigabit Switch

User's Manual

Version: 2.2, Jun-2011

Korenix JetNet 3010G Series
Industrial Gigabit Ethernet Switch
User's Manual

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1. Introduction

In the traditional industrial communication, the communicate infrastructure is combined with proprietary protocol and hard to connect with different layer. Today, the new trend of industrial communication is integrated all of layers to Ethernet protocol. As the bandwidth demands is growing up by several of applications, like video security, traffic signal monitoring and control; this is a need of Gigabit Ethernet becomes popular in recently.

The JetNet3010G is a 10-port Gigabit Industrial switch which embedded 7-port 10/100TX and 3 combo ports for Gigabit copper and SFP for Gigabit Ethernet uplink. With the high bandwidth switch fabric, JetNet3010G can deliver full wire speed without packet loss. This manual will introduce JetNet3010G hardware specification, system installation and the applications.

1-1. Features

- 7 10/100TX and 3 Gigabit copper/SFP combo
- IEEE802.3, 802.3u, 802.3z and 802.3ab Compliance
- Auto detection Gigabit Transmission Media
- Flexible Gigabit Fiber Link Distance
- High performance 32Gbps Switch fabric
- Supports Auto MID/MDI-X with Flow control
- IEEE802.1p for Quality of Service (QoS)
- Power redundancy with wide range input
- 1.5KV Hi-pot passed for Port, Power, Case
- Rigid IP31 grade Aluminum Case
- -10~60℃ Hazardous Operating Temperature

1-2. Packing Check List

JetNet3010G package include the following items:

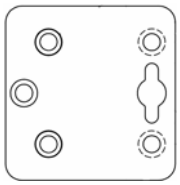
- JetNet3010G x1

- One DIN-Rail clip (already screwed on the back of JetNet3010G) x1
- One wall mounting plate
- User's manual
- Quick Installation Guide

JetNet3010G Industrial Switch

User's Manual CD-ROM

Quick Installation Guide



Wall Mounting Plate

Screw x 4 (M3 x 6mm)

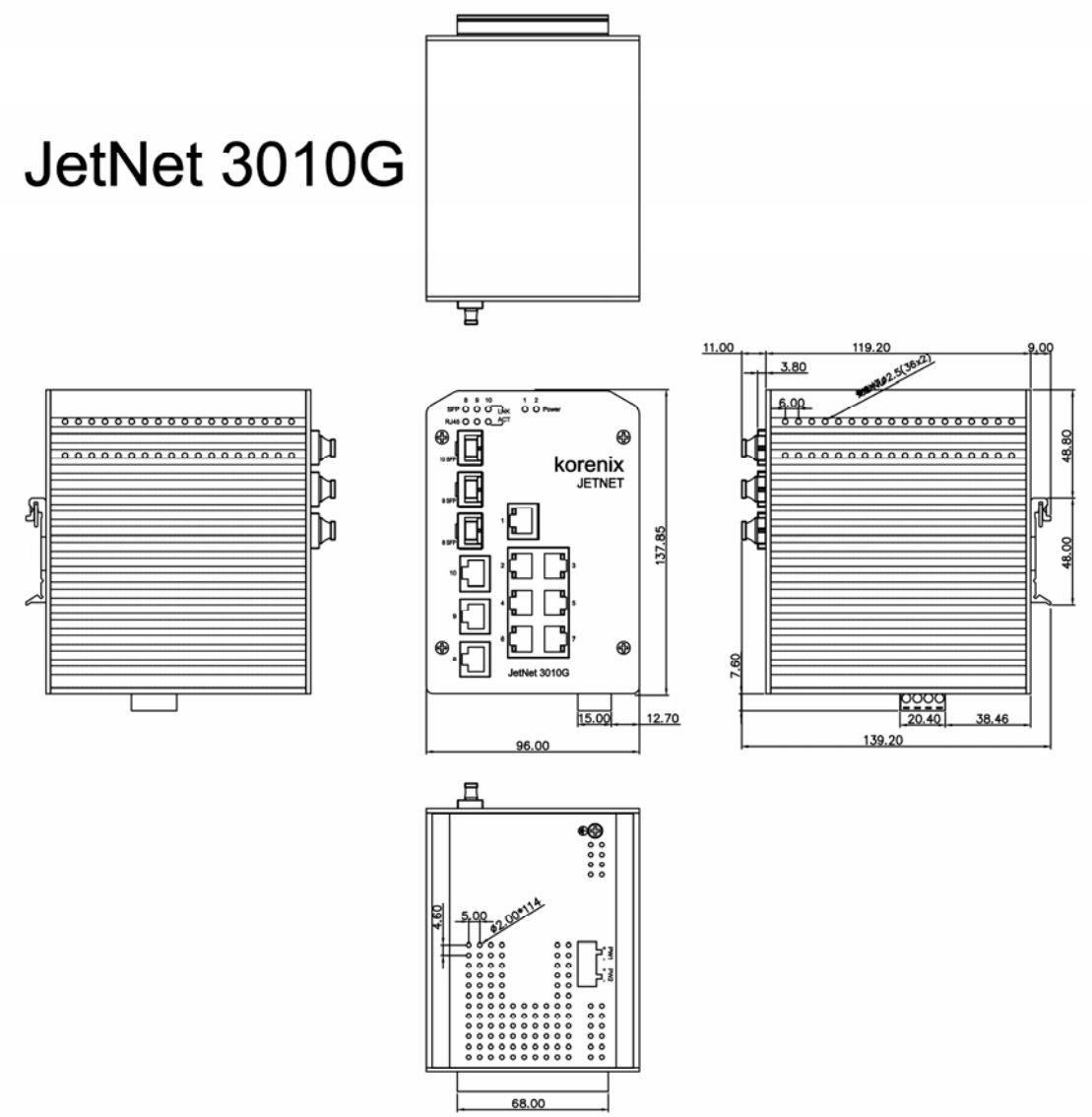
Contact your sales representative if any item is missing or damaged.

2. Hardware Description

This session will introduce the enclosure interface, system power installation, dimension and the QoS.

2-1. Dimension

The dimension of JetNet3010G is 96 mm (w) x 137 mm (H) x 119 mm (D)



2-2. Front Panel

The following diagram shows the front panel of JetNet 3010G, it describes the LEDs, Fast Ethernet and Gigabit Ethernet ports.

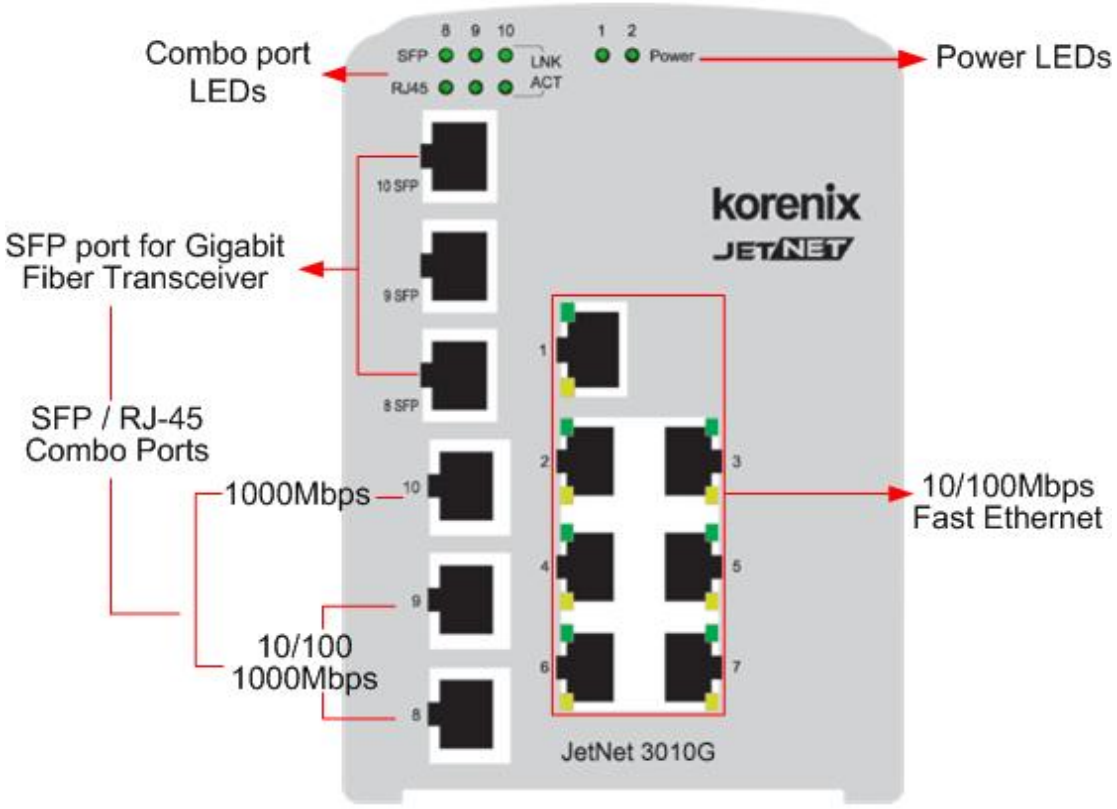


Figure A. Front Panel of JetNet 3010G

2-3. Bottom View

The bottom view of the JetNet3010G Industrial Gigabit Switch consists of one terminal block connector with two DC power inputs.

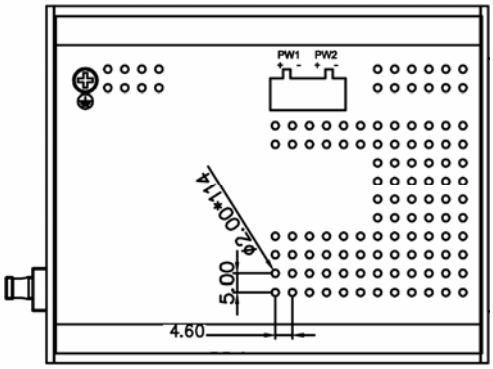
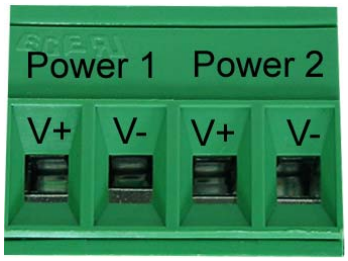


Figure B. Bottom view of the JetNet3010G Industrial Gigabit Switch

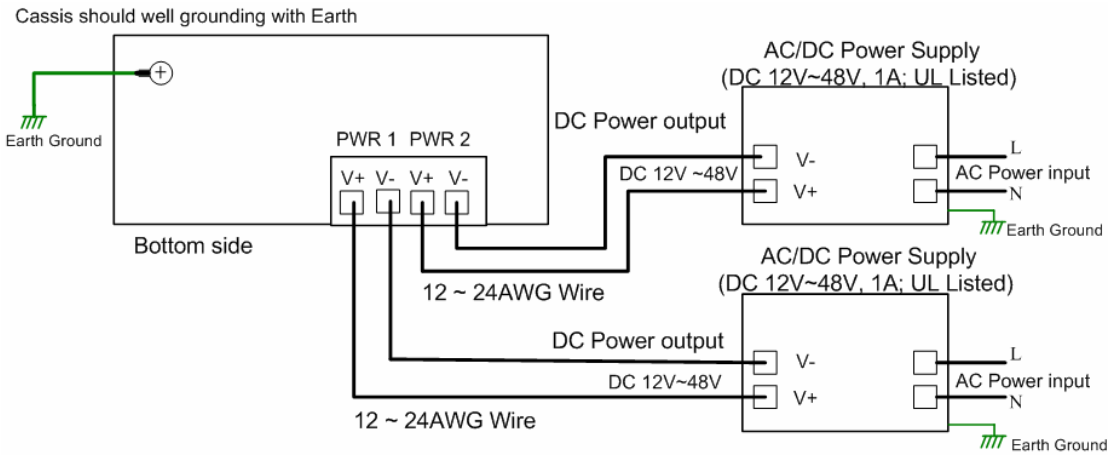
2-4. Wiring the Power Input

The JetNet 3010G supports 2 power inputs with power redundance and polarity auto reverse functions; the typically input power voltage is DC 24V with 12~48V input range. On the bottom side, there is one 4-pin removable terminal block for the redundant power input and the suitable specification of power cable is 12 ~24 AWG.



Following the instructions as below to wiring the cable and switching power system.

1. Insert the positive and negative wires into the V+ and V- contacts respectively of the terminal block connector
2. Tighten the wire-clamp screws to prevent the DC wires from being loosened.
3. The Power 1 and Power 2 support power redundancy and polarity reverse protection functions.
4. It accepts positive or negative power system input, but Power 1 and Power 2 have to apply the same mode.



Note 1: It is a good practice to turn off input and load power, and to unplug power terminal block before making wire connections. Otherwise, your screwdriver blade can inadvertently short your terminal connections to the grounded enclosure.

Note 2: The range of the suitable electric wire is from 12 to 24 AWG.

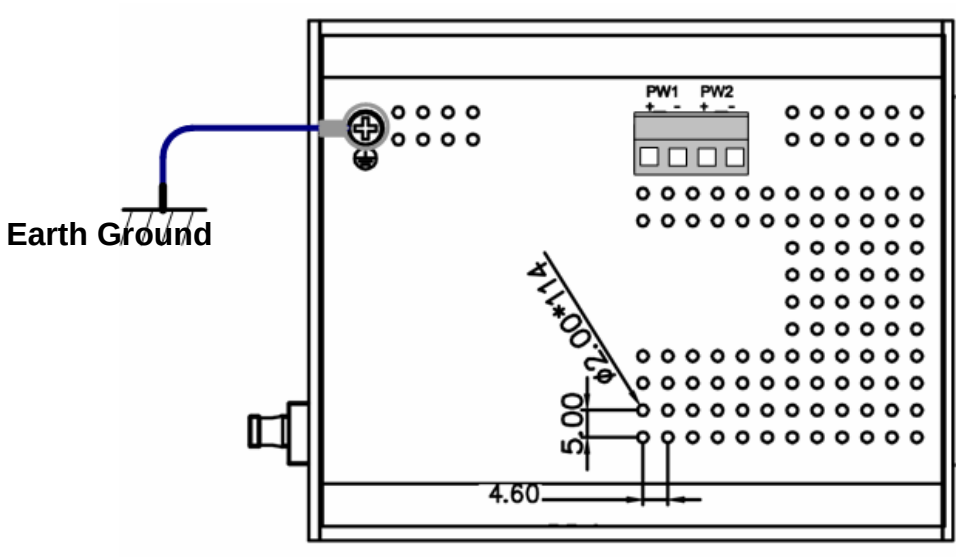
Note 3: If the 2 power inputs are connected, JetNet 3010G will be powered from the highest connected voltage. The unit will alarm for loss of power, either PWR1 or PWR2.

Note 4: To use the UL Listed LPS Power supply with output Rating 12-48 Vdc, minimum 1 A

2-5. wiring the Earth ground

To ensure that the system will not be damaged by noise or any electrical shock, we suggest you make exactly connection with JetNet3010G with Earth Ground.

On the bottom side of JetNet3010G, there is one earth ground screw, loosen the earth ground screw by screw drive and tighten the screw after earth ground wire connected



2-6. LED Indicators

The front panel of JetNet3010G includes 2 Power LEDs, 6 LEDs for Gigabit SFP and RJ-45 ports. Each 10/100Base-TX ports includes 2 LEDs with Green and Yellow color. These LED indicators provide administrators with real-time system status. Table 1 gives descriptions of the function of each LED indicator.

LED	Status	Description
Power 1	Green	Power 1 is supplying DC power.
	Off	No power is being supplied.
Power 2	Green	Power 2 is supplying DC power.
	Off	No power is being supplied.
RJ-45 (Gigabit Port 8~10)	Green	A network device is detected.
	Blinks	The port is transmitting or receiving packets from the TX device.
	Off	No device is attached or not link with RJ-45 port.
SFP (Gigabit Port 8~10)	Green	The port is transmitting or receiving packets from the TX device.
	Blinks	The port is transmitting or receiving packets from the TX device
	Off	No device is attached or not link with RJ-45 port.
10/100Mbps (Port 1 ~7)	Green	A network device is detected.
	Blinks	The port is transmitting or receiving packets from the TX device
	off	No device is attached or not link with RJ-45 port.

Notes 1: It is recommended don't connect SFP fiber transceiver and RJ-45 combo port at same time; it will cause internal wrong link signature detection and get wrong network connection.

Notes 2: Gigabit Port 10 supports 1000Base-T (1000Mbps) or Gigabit Fiber only, but port 8 and 9 support 10/100/1000Mbps or Gigabit Fiber

2-7. Ethernet interface introduction

The JetNet 3010G equipped 7 ports 10/100 Fast Ethernet, 3 Gigabit SFP / RJ-45 combo ports. The 10/100Mbps Fast Ethernet ports support auto negotiation and MDI/MDI-X; the Gigabit RJ-45 support 100/1000Mbps for port 8, 9 and port 10 supports 1000Mbps only.

The following table shows the link ability of each Ethernet port.

Port	RJ-45 Link Speed	SFP
1~7	10Mbps Full/Half Duplex 100Mbps Full/Half Duplex	Not Avaliable
8, 9	RJ-45 /SFP combo 10Mbps Full Duplex 100Mbps Full/Half Duplex 1000Mbps Full/Half Duplex	1000Mbps Fiber Transceiver
10	1000Mbps Full/Half Duplex	1000Mbps Fiber Transceiver

Note:The combo port SFP fiber link first function may not work properly, since the most of SFP fiber transceiver vendors have applied energy saving technology into the transceiver and can't trigger fiber link signature to inform hardware circuit to change the link mode; therefore, it is recommended don't make connection for SFP fiber link and RJ-45 link at same time.

2-8. Quality of Service

The JetNet3010G supports IEEE802.1p Tag based Quality of Service (QoS) and based on the priority ID which is embedded in VLAN Tag. The JetNet 3010G per port provides 4 priority queues for packet service and with 8:4:2:1 (Higher: High: Low: Lower) Weight Round Robin (W.R.R.) scheduling. The following table indicates the priority ID and queuing mapping for JetNet3010G.

JetNet 3010G	
Priority Queue	Priority ID
High Queue	6,7
Middle Queue	4,5
Low Queue	0,3
Lowest Queue	1,2

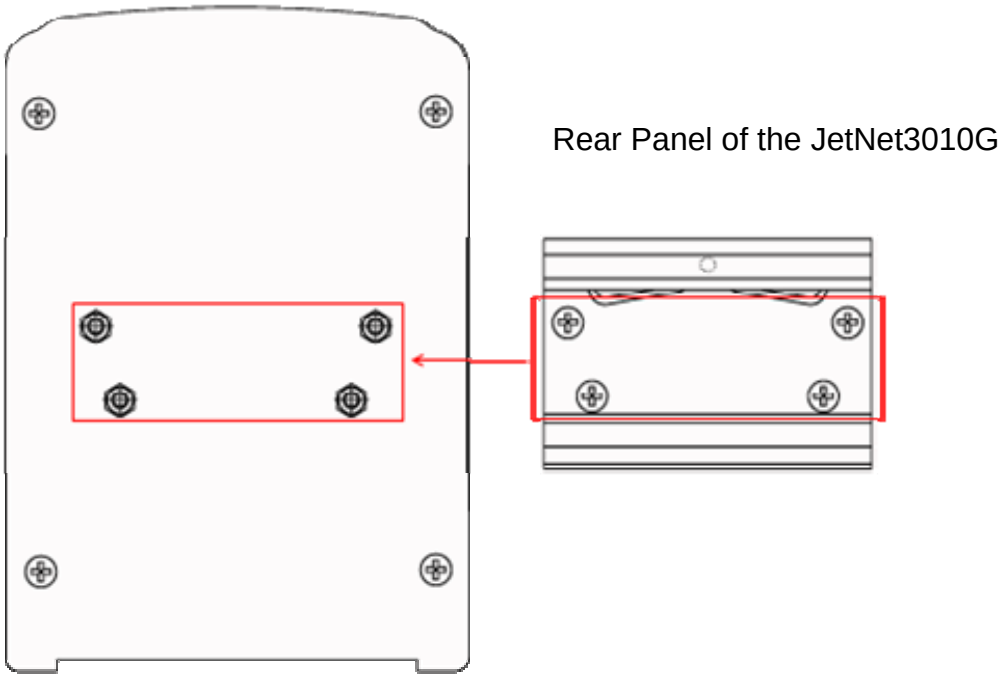
2-9. Wiring Cable

RJ-45 port: The RJ-45 cable connection between the JetNet3010G and the attached devices (switches, hubs, workstations, etc.) must be less than 100 meters (328 ft.) long and follows up IEEE 802.3 standard.
SFP port: The SFP port permits standard SFP fiber transceiver, which is provided by Korenix with 3.3v DC power supply. The fiber cable of SFP transceiver will depends on SFP fiber transceiver specification. Please notice that the link connection supports either one of RJ-45 or SFP. The SFP Link/Activity LED will be on when Gigabit RJ-45 and SFP Transceiver link with device, because the Fiber link connection always with high priority than RJ-45 port.

3. Mounting Installation

3-1. DIN Rail Mounting

The DIN-Rail clip is already attached to the JetNet3010G when packed. If the DIN-Rail clip is not screwed on the JetNet3010G, follow the instructions and the figure below to attach the DIN-Rail clip to the etNet 3010G.

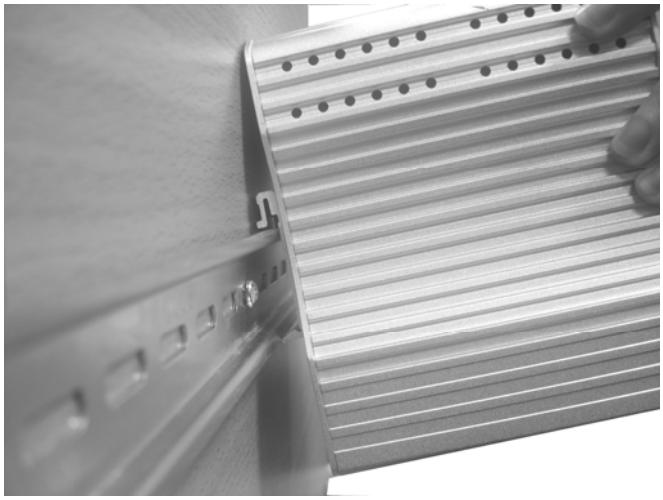


Rear Panel of the JetNet3010G

1. Use the screws to attach the DIN-Rail clip to the real panel of the JetNet3010G.
2. To remove the DIN-Rail clip, reverse step 1.

Follow the steps below to mount the JetNet3010G to the DIN-Rail track:

1. Insert the upper end of the DIN-Rail clip into the back of the DIN-Rail track from its upper side.



2. Lightly push the bottom of the DIN-Rail clip into the track.

3. Check if the DIN-Rail clip is tightly attached to the track.

4. To remove the JetNet3010G from the track, reverse the steps above.

Notes: The DIN Rail should compliance with DIN EN50022 standard. Using wrong DIN rail may cause system install unsafe.

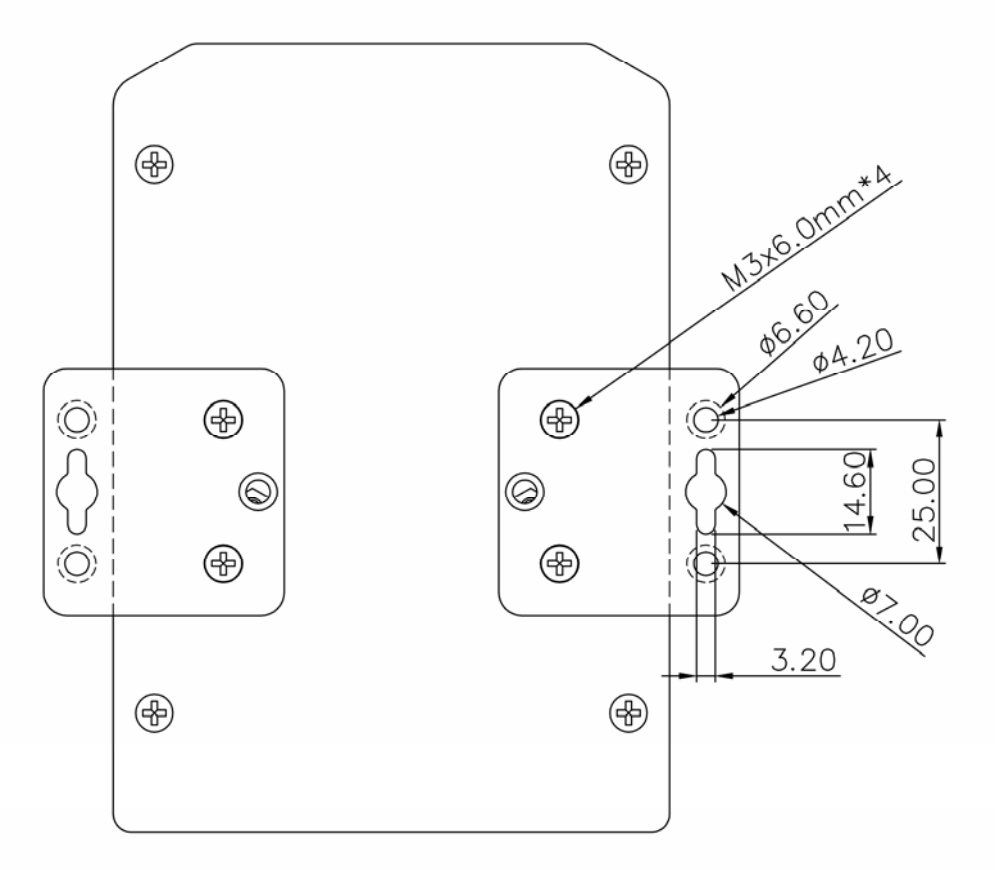
3-2. Wall Mounting

Follow the steps below to install the JetNet3010G with the wall mounting plate.

1. To remove the DIN-Rail clip from the JetNet3010G, loosen the screws from the DIN-Rail clip.
2. Place the wall mounting plate on the rear panel of the JetNet3010G.
3. Use the screws to tighten the wall mounting plate onto the JetNet3010G.
4. Use the hook holes at the corners of the wall mounting plate to hang the

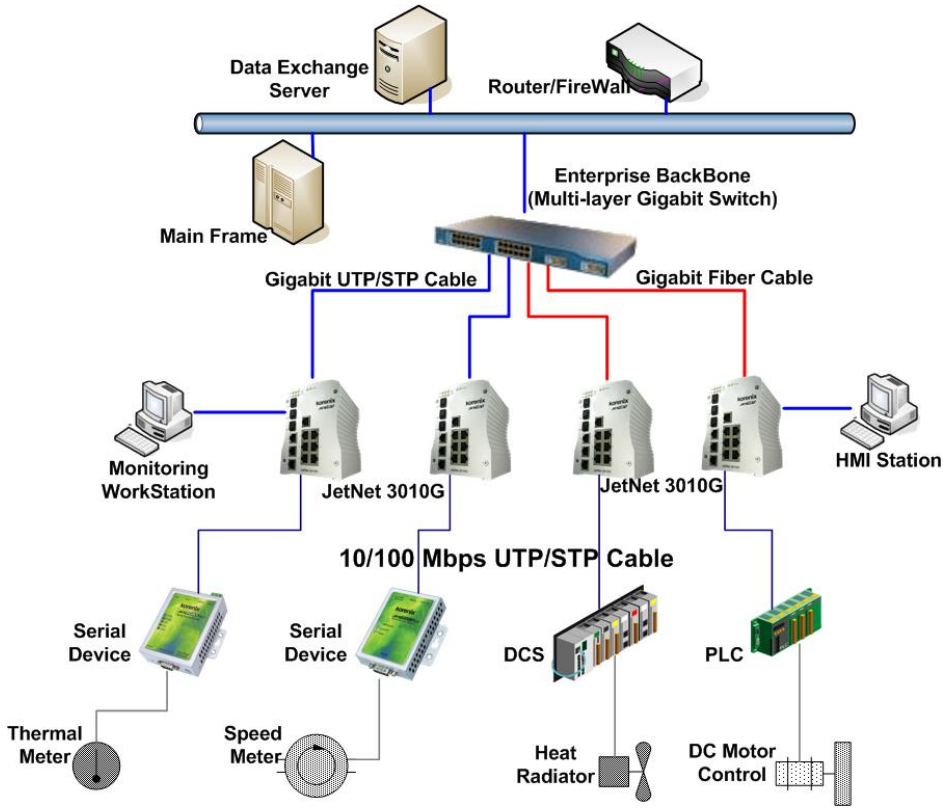
JetNet3010G onto the wall.

5. To remove the wall mounting plate, reverse the steps above.



4. Hardware Installation

The following figure illustrates a typical application of JetNet3010G Industrial Gigabit Switch.



This figure illustrates an application of JetNet3010G in factory automation. In the figure, JetNet3010G handle entry level control device, like P.Q., O.K.'S. or serial communication device and provides faster uplink ability with a backbone switch, and also provides gigabit interface for monitoring and H.M.I. stations. It aggregates 10/100Mbps bandwidth to Gigabit 1000Mbps and forward to higher level switch.

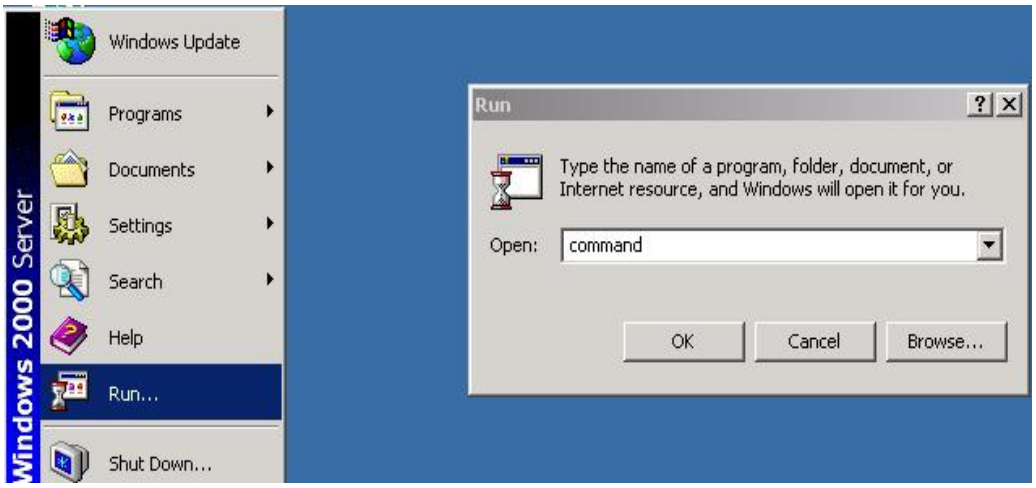
4-1 Installation and Testing

1. Take out your JetNet3010G Industrial Gigabit Switch from the package box.
2. Check if the DIN-Rail clip is attached to the JetNet3010G. If the DIN-Rail clip is not attached to the JetNet3010G, refer to **DIN-Rail Mounting** section for DIN-Rail installation. If you want to wall-mount

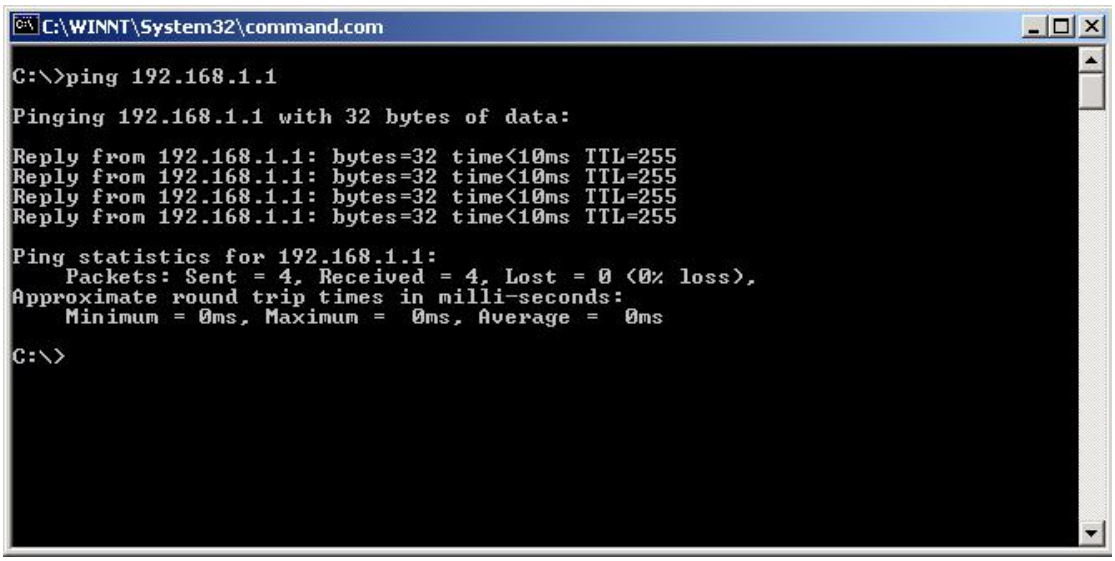
the JetNet3010G, refer to **Wall Mounting** section for wall mounting installation.

3. To place the JetNet3010G on the DIN-Rail track or wall, refer to the **Mounting Installation** section.
4. Pull the terminal block off the JetNet3010G and wire the power lines. Refer to the **Wiring the DC Power Inputs** section for how to wire the power inputs.
5. PWR1 and PWR2 dual power inputs can be connected to power sources simultaneously. When the primary power source fails (the default setting is PWR1), the system will automatically switch to the secondary power source (PWR2), preventing any power interruption.

   Both of Power 1 and Power 2 support positive electricity and negative electricity power system. Please notice the power system for power 1 and power 2 only accept either positive or negative electricity power system at one time
6. Check the LEDs of PWR1 and PWR2 to make sure that JetNet3010G is operating normally. Use Category 5 straight through Ethernet cables with RJ45 connectors to connect network devices.
7. Connect one side of an Ethernet cable with a RJ45 connector to the JetNet3010G's Ethernet port (RJ-45 port), and the other side of the Ethernet cable to the network device's Ethernet port (RJ-45 port).
8. If you want to connect with Gigabit Fiber, please install appropriate SFP fiber transceiver and fiber cable. To ensure the connection is working, please notice the type of fiber transceiver of JetNet3010G's and the other end of device.
9. Check the port status LED indicator (blinking green) on the JetNet3010G to see if the network connection is successfully established.
10. Power on the PC host, activate the Command Line mode, and ping the connected Ethernet device to see if it will respond.
11. To enable the "Command Line mode", click Run in the Start menu, type Command, and click OK to continue.



Type **ping 192.168.1.1** command to check the connection. Here we use IP address 192.168.1.1 as an example. Before the testing, be sure your PC host and target device are in the same subnet.



12. Repeat step 10 to make sure that the connection of each device connected to the JetNet3010G is successfully established.
13. Power on the host, activate the Command Line mode, and ping the connected Ethernet device by typing “ping –t 192.168.1.1” command to see if it will respond.
14. The parameter-”t” allow you to continue to ping the network device, as shown in the figure below.

```
C:\WINDOWS\system32\cmd.exe

C:\>ping -t 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
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Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
```
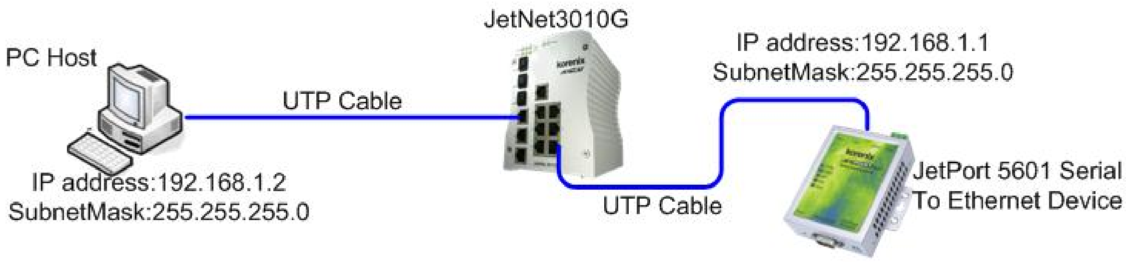
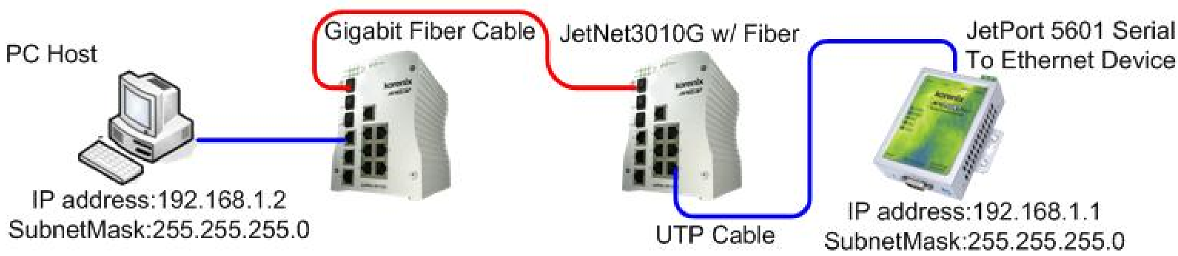

Before you continue, make sure that both PWR1 and PWR2 are successfully connected to power sources. When PWR1 fails, the LED for PWR1 will go out. At that moment, if the ping command is still replying, then it proves that redundant power input function works normally.

15. Exit the Command Line mode, and connect PWR1 power input. At this stage, your JetNet3010G has been tested and the installation is completed.

The industrial network is now established successfully. Computer A is able to connect serial to Ethernet Device via JetNet3010G Industrial Gigabit Switch, providing a reliable network environment. About the test wiring architecture, please refer to the figures as following:





5. Trouble Shooting

- Make sure you are using the correct DC power suppliers (DC12~ 48 V) or power adapters.
- Select Ethernet cables with specifications suitable for your applications to set up your systems. Ethernet cables are categorized into unshielded twisted-pair (UTP) and shielded twisted-pair (STP) cables. Category 3, 4, 5 Ethernet cables are suitable for systems with 10 Mbps transmission speed. For systems with 100/1000 Mbps transmission speed, Category 5 Ethernet cables are the only suitable specifications for this environment. Also make sure that the distance between each node cannot be longer than 100 meters (328 feet).
- If the power LEDs goes off as the power cord plugged in, a power failure might occur. Check the power output connection to see if there is any error at the power source. If you still cannot solve the problem, contact your local dealer for assistance.

6. Technical Specification

Standards	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3ab 1000Base-T IEEE 802.3z Gigabit Fiber IEEE 802.3x Flow Control and Back pressure
Protocols	CSMA/CD
Technology	Store and Forward
Transmission Rate	14,880 pps for Ethernet port 148,800 pps for Fast Ethernet port 1488000 pps for Gigabit Ethernet
MAC address table size	8K MAC address table
Memory Buffer	1Mbits

Port Link Speed	Port 1~7: 10/100Base-TX Port 8~9 (Combo): 10/100/1000Base-TX or Gigabit Fiber (SFP) Port 10 (Combo) : 1000Base-TX or Gigabit Fiber (SFP)
Quality of Service	Provides Tag Based Class of Service, per port 4 priority queues with 8:4:2:1 W.R.R. rule. Priority ID: High (6,7),Middle (4,5), Low (0,3), Lowest (1,2)
LEDs	**Per Fast Ethernet:** Link/Activity (Green) Full duplex/Collision (Orange) **Per Gigabit Ethernet:** Link/Activity (Green) **Per unit:** Power 1,Power 2(Green)
Network Cables	**10Base-T:** twisted-pair UTP/STP Cat. 3, 5 cable EIA/TIA-568B 100-ohm (100m) **100Base-TX:** twisted-pair UTP/STP Cat. 5 cable EIA/TIA-568B 100-ohm (100m) **1000Base-T:** twisted-pair UTP/STP Cat. 5/5e cable EIA/TIA-568B 100-ohm (100m)
Power Supply	12 to 48 VDC, redundant dual DC power inputs with reverse polarity protection.
Power consumption	15 Watts
Performance	Switch Fabric: 32Gbps System throughput: 11Mpps
Installation	DIN-Rail kit or panel wall mounting
Operating Temperature	-10℃ to 70℃ (14℉ to 158℉)
Operating Relative Humidity	5 to 95% (non-condensing)
Storage Temperature	-40 to 85°C
Storage Relative Humidity	5 to 95%(non-condensing)
Dimensions	96 mm (W) x 137 mm (H) x 119mm (D)

EMI	FCC Class A, CE/EN55022
EMS	CE/EN61000-4-2 CE/EN61000-4-3 CE/EN-61000-4-4 CE/EN61000-4-5 CE/EN61000-4-6
Safety	CE/EN60950, IP-31 case protection
Stability testing	IEC60068-2-32 (Free fall) IEC60068-2-27 (Shock) IEC60068-2-6 (Vibration)

7. SFP Fiber Transceiver Order Information

Korenix certificated many types of SFP transceiver. The SFP transceivers we certificated can meet up the industrial critical environment needs. We recommend you to use Korenix certificated SFP transceivers when you constructing your network.

Korenix will keep on certificating and updating the certificated SFP transceivers in Korenix web site and purchase list. You can refer to the web site to get the latest information about SFP transceivers.

Note: Poor SFP transceivers may result in poor network performance or can't meet up claimed distance or temperature.

Model Name	Gigabit SFP Transceiver
SFPGSX	1000Base-SX multi-mode SFP transceiver,550m, -10~70℃
SFPGSX-w	1000Base-SX multi-mode SFP transceiver,550m, wide operating temperature, -40~85℃
SFPGSX2	1000Base-SX plus multi-mode SFP transceiver,2Km, -10~70℃
SFPGSX2-w	1000Base-SX plus multi-mode SFP transceiver, 2Km,wide operating temperature, -10~70℃
SFPGLX10	1000Base-LX single-mode SFP transceiver 10Km, -10~70℃

SFPGLX10-w	1000Base-LX single-mode SFP transceiver, 10Km, wide operating temperature, -40~85℃
SFPGLHX30	1000Base-LHX single-mode SFP transceiver,30Km, -10~70℃
SFPGLHX30-w	1000Base-LHX single-mode SFP transceiver, 30Km, wide operating temperature, -40~85℃
SFPGXD50	1000Base-XD single-mode SFP transceiver, 50Km, -10~70℃
SFPGXD50-w	1000Base-XD single-mode SFP transceiver, 50Km, wide operating temperature, -40~85℃
SFPGZX70	1000Base-ZX single-mode SFP transceiver, 70Km, -10~70℃
SFPGZX70-w	1000Base-ZX single-mode SFP transceiver, 70Km, -40℃ - 85℃

Some of SFP Transceiver model is not listed on the table, please contact Korenix's distributor for your inquire.

Revision History

Edition	Date	Modifications
V2.0	31-July,2008	New Case design (no curve) 1. Add port link speed table to remind user about the port 10 only support 1000Mbps in RJ-45. 2. Add power installation diagram for UL certificate.
V2.1	Apr,2009	Remove company address
V2.2	Jun,2011	Modify chapter 2.7 – Ethernet interface: Add explanation of Fiber link first function and recommend don't plug-in Gigabit RJ-45/SFP transceiver at same time. **As this result, it is recommended don't plug-in SFP transceiver and RJ-45 cable at same time, it may take long time to perform the fiber link first feature.**