



QLogic 12000 Site Planning Guide

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Preface

This manual describes site planning tasks for the QLogic 12000 series of QDR InfiniBand switches:

- The QLogic 12200 36-port fixed configuration switch
- The QLogic 12300 36-port configurable switch
- The QLogic 12800 series:
 - 12800-040
 - 12800-120
 - 12800-180
 - 12800-360

This manual is organized as follows:

[Preface](#) describes the intended audience and technical support.

[Section 1](#) provides an overview of the 12000 series hardware.

[Section 2](#) provides site planning information.

[Section 3](#) provides installation information.

Intended Audience

This manual provides network administrators and other qualified personnel instructions on how to set up a site and install a QLogic 12000 Series QDR InfiniBand switch.

License Agreements

Refer to the *QLogic Software End User License Agreement* for a complete listing of all license agreements affecting this product.

Technical Support

Customers should contact their authorized maintenance provider for technical support of their QLogic products. QLogic-direct customers may contact QLogic Technical Support; others will be redirected to their authorized maintenance provider. Visit the QLogic support Web site listed in [Contact Information](#) for the latest firmware and software updates.

For details about available service plans, or for information about renewing and extending your service, visit the Service Program web page at <http://www.qlogic.com/services>.

Training

QLogic offers training for technical professionals for all iSCSI, InfiniBand, and Fibre Channel products. From the main QLogic web page at www.qlogic.com, click the **Support** tab at the top, and then click **Training and Certification** on the left. The QLogic Global Training portal offers online courses, certification exams, and scheduling of in-person training.

Technical Certification courses include installation, maintenance and troubleshooting QLogic products. Upon demonstrating knowledge using live equipment, QLogic awards a certificate identifying the student as a certified professional. You can reach the training professionals at QLogic by e-mail at trainingatqlogic.com.

Contact Information

QLogic Technical Support for products under warranty is available during local standard working hours excluding QLogic Observed Holidays. For customers with extended service, consult your plan for available hours. For Support phone numbers, see the Contact Support link at support.qlogic.com.

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QLogic Web Site	www.qlogic.com
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Technical Support E-mail	supportatqlogic.com
Technical Training E-mail	trainingatqlogic.com

Knowledge Database

The QLogic knowledge database is an extensive collection of QLogic product information that you can search for specific solutions. We are constantly adding to the collection of information in our database to provide answers to your most urgent questions. Access the database from the QLogic Support Center: <http://support.qlogic.com>.

Cluster Issues

When planning a cluster there are a number of options to consider beyond the switch(es).

Extended and/or Upgraded Service

Protect hardware investments and extend the life of the product through extended service contracts. For mission-critical applications, purchase service programs providing 24-hour on-site service.

InfiniBand Adapters: QLogic offers a number of adapter choices to provide customers with the best end-to-end solution. Consider purchasing QLogic InfiniBand adapters to complement your QLogic switch.

Cabling: With high data speeds it is critical to make sure that the cabling you choose provides the best signal integrity and durability possible. QLogic has done extensive testing to certify the best cables on the market. By purchasing cables through QLogic, you can be assured of the same high standards of quality and performance for this vital component as you receive on all of the other components QLogic provides.

1 QLogic 12000 Series Hardware Overview

NOTE:

The 12000 series products are shipped fully assembled and tested.

Physical Specifications

The 12000-series switches have the following physical attributes:

Table 1-1. 12000 Physical Attributes

Model #	12200	12300	12800-040	12800-120	12800-180	12800-360
Height (rack units/inches)	1U/1.75"	1U/1.75"	5U/8.75"	10U/17.5"	14U/24.5"	29U/50.75"
Depth (without cables)	14.5" (362.5mm)	25.75" (654mm)				
Width	17.3" (440mm)					
Max weight (lb./kg.)	15/6.8	20/9.1	100/45.5	155/70.5	285/129.3	536/243.1

Environmental Specifications

The 12000-series switches have the following environmental specifications:

- **Operating temperature:** 5°–40°C (41°–104°F) at sea level, altitude derating 1°C (34°F) per 300m to 2,400m (984ft to 7874ft)
- **Non-operating temperature:** –40° to 65°C (–40° to 149°F)
- **Relative humidity (non-condensing):** Operating 5%–85%; Non-operating 5%–90%

12200 and 12300

Cooling and Thermal Management:

The 12200 and 12300 switches have the following cooling and thermal management features:

- Air cooled with a hot plug fan/power tray, three fans per tray, 12VDC (12300)
- Four fans, no fan trays (12200 switch)
- Front-to-back airflow

NOTE:

The 12200 also offers a reversed airflow model.

Power

The 12200 and 12300 switches have the following power supply features:

- Two redundant, hot plug fan/power supplies (12300 switch)
- 90/264 VAC operation
- 275W max power per supply
- Input: 90–264V AC, 47–63Hz, 1 Phase, 3.6A max current at 100VAC
- Inrush Current: 13A at 115VAC, 6.5A at 230VAC
- Power Factor: 95% at 230VAC, 50% load
- Power Inlet Plug: two IEC 320-c14 connectors for independent AC inputs (12300 switch)

12800 Series

All 12800 Series switches use the same fan tray modules—intake and exhaust—and share the same thermal management attributes listed in the following paragraphs. The quantity of fan tray modules used in each system is defined in [Table 1-2](#):

Table 1-2. 12800 Power and Fan Maximum Configurations

Model #	360	180	120	040
Fan Trays (Intake/Exhaust)	10/10	5/3	5/3	4/0
Power Supplies	12	6	4	4

- **Fan tray:** Hot plug with one axial, brushless, 12V fans per Fan Tray
- **Chassis airflow:** Front to back
- **Power supply airflow:** Front to back

NOTE:

QLogic recommends that the 12800-180 and 12800-360 be installed with the intake fans towards the cold aisle and the exhaust fan sie towards the hot aisle. The intake fans are located on the same side of the chassis as the management modules.

- **Thermal management:**
Temperatures of all major heat producing components are continuously monitored by system management modules. Fan speed is monitored and automatically adjusted by system management modules to maintain appropriate temperatures of major heat producing components. Monitoring is performed using a two-wire I2C interface to each fan tray.

Power Specifications

All 12800-Series products use a common switching power supply. System power attributes are shown in [Table 1-3](#). Powers supplies can be configured to be N+1 redundant and are hot pluggable.

NOTE:

An AC power cord is required for each power supply. Refer to the table below.

Table 1-3. System Power Attributes

Model #	12800-360	12800-180	12800-120	12800-040
Maximum number of power supplies	12	6	4	4
Maximum output per supply	1200 Watts			
Input voltage	90-264 VAC autoranging			
Input frequency and phase	47–63 Hz			
Maximum current per supply	100Amps			
Inrush current	30Amps Max			
Power factor efficiency	99% at 230V, full load			
Power inlet connector	IEC320-C20			
Number of power inlets	12	6	4	4
Power cord connector	IEC320-C19			

2 Site Planning

Moving Considerations

The 12800-series switches have following moving considerations:

- Dimension of pallet/container for all models
 - 12800-120: 26" x 36"
 - 12800-180: 26" x 36"
 - 12800-360: 40" x 36"
- Mechanical lift for x360 and x180

WARNING!!



To avoid injury, do not manually lift the switch when it is fully loaded. The 12800-180, when fully-populated, weighs 270lbs (125kg). The 12800-120 weighs 199 lbs (91 kg). Use only a mechanized lift. For a manual lift, unload the switch to minimize the weight (an empty chassis weighs 100lbs/45kg). Use a team of people appropriate to the weight of the product and in conjunction with applicable laws and guidelines.

WARNING!!



To avoid injury, install the 12800-360 using only a mechanized lift. When fully-populated, the switch weighs 535lbs (244kg) (an empty chassis weighs 197lbs/90kg).

WARNING!!

To avoid injury, use a team of people appropriate to the weight of the product and in conjunction with applicable laws and guidelines. The 12800-040, when fully-populated, weighs 95lbs (43kg).

Space Planning

Racking

All the 12200, 12300, and 12800 Director Series switches can be installed in industry-standard, 19-inch four-post server racks.

Racks must conform to conventional standards. Use the American National Standards Institute (ANSI)/Electronic Industries Association (EIA) standard ANSI/EIA-310-D-92 and the International Electrotechnical Commission (IEC) 297 standard. These racks are commercially available in various depths. QLogic recommends using a rack with minimum depth of 36 inches to facilitate cable installation and routing.

NOTE:

The 12000 series products should not be installed in two-post telecommunication racks.

Mark the Rack

Allow enough vertical space in the rack for each specific switch installation.

1. Determine the location in the rack of the bottom of the switch.
2. Mark the upper (if applicable) and lower mounting positions on the vertical rails on the front of the rack.
3. Mark the upper (if applicable) and lower mounting positions on the vertical rails on the back of the rack.

NOTE:

It is recommended that 12800-180 is installed into the rack at a 5U or 6U location. This position locates the chassis approximately 12 inches from the floor and allows the chassis to be moved onto the support rails when sliding it off of the pallet.

It is recommended that 12800-360 is installed into the rack at a 5U or 6U location. This position locates the chassis approximately 12 inches from the floor and allows the chassis to be moved onto the support rails when sliding it off the pallet.

Power

Uninterruptible Power Supply

When selecting UPS equipment:

- Determine the minimum amperage requirements for a UPS:
 - Calculate the VA (Volt-Amps) by locating the voltage and amperage requirements for each piece of equipment (refer to [Table 1-3](#)). Multiply the numbers together to determine the VA.
 - Add the VA from each piece of equipment together to find the total VA requirement. Then add 30 percent to determine the minimum amperage requirements for the UPS.
- Consider the transition time (the time necessary for the UPS to transfer from utility power to full-load battery power).
- Determine the longest potential time period the UPS might be required to supply backup power.
- Determine whether the UPS unit provides online protection.

Power Distribution Guidelines

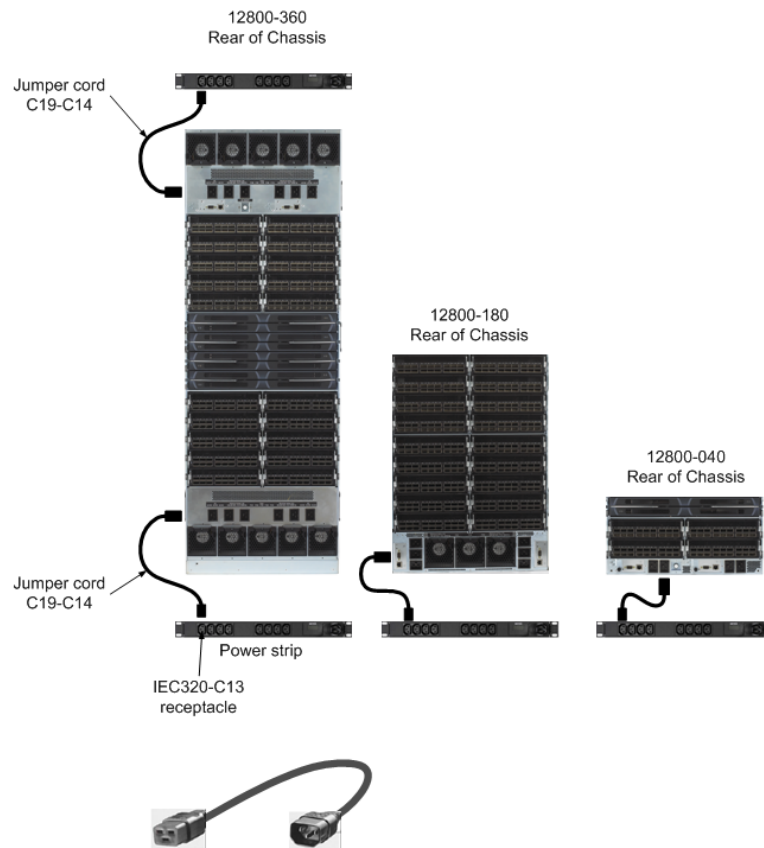
The following section details power distribution guidelines and recommendations for the QLogic 12800 Series switches.

- The power supplies for the 12800 series have a maximum inlet current of 15amps at 110volts and 6amps at 220volts. Observe power outlet, power strip, and extension cable ratings.
- Do not exceed 80 percent of the ampere rating limit of the power outlet, power strip, or an extension cable that the equipment is plugged into. For any given system, the power delivery system/power supplies cannot exceed the maximum amperage. For the 12800-360 and 12800-180, it is recommended to power the systems over 220 volts.

CAUTION!

High-powered systems, such as the 12800-120, 12800-180 and 12800-360 can place significant loads on power distribution units (PDUs) and UPSs. It is recommended to calculate the total amperage and power that a PDU or UPS needs to handle.

Figure 2-1. 12800-Series Power Distribution Examples



NOTE:

Power strips are not supplied by QLogic.

Table 2-1. AC Plug Types

Region/Country	Voltage Rating	Plug Type	Notes
North America	100-127	NEMA 5-20P	—
North America	200-240	NEMA L6-20P	—
North America	200-240	NEMA L15-30P	Three phase AC

Table 2-1. AC Plug Types

Region/Country	Voltage Rating	Plug Type	Notes
Europe (Schuko)	200-240	CEE 7/7	Used in Austria, Belgium, Finland, France, Germany, Greece, Hungary, Indonesia, the Netherlands, Norway, Poland, Portugal, Russia, Spain, Sweden.
International	200-240	IEC 309	3-wire (two-phase & earth). Connector size and color variations indicate the amperage rating. This plug is utilized in Switzerland for 16A applications.
International	200-240	IEC 309	4-wire (three-phase & earth). Connector size and color variations indicate the amperage rating.
International	200-240	IEC 309	5-wire (three-phase, earth & neutral). Connector size and color variations indicate the amperage rating.

Cabling

Cable Requirements

Cable Distances

When planning the location of the switches, consider the distance limitations for signaling, EMI, and connector compatibility. It is recommended that the user does not exceed specified transmission rate and distance limits.

Cable Guidelines

NOTE:

Building and electrical codes vary depending on the location. Comply with all code specifications when planning the site and installing cable.

When running cable to the equipment, consider the following:

- Do not run cables where they can be stepped on or rolled over.
- Be sure cables are intact with no cuts, bends, or nicks.
- If the user is making a cable, ensure that the cable is properly crimped.
- Provide proper strain relief for InfiniBand cables.
- Support cables using a cable manager mounted above connectors to avoid unnecessary weight on the cable bundles.
- Bundle cable using velcro straps to avoid injuring cables.
- Keep all ports and connectors free of dust.
- UTP cables can build up ESD charges when being placed into a new installation. Before installing category 5 UTP cables, discharge ESD from the cable by plugging it into a port on a system that is not powered on.
- When required for safety and fire rating requirements, plenum-rated cable can be used. Check the local building codes to determine when it is appropriate to use plenum-rated cable, or refer to IEC standard 850.

Cable Handling and Bend Radius

Provide proper strain relief by adhering to the guidelines in [Table 2-2](#):

Table 2-2. IB Copper Cable Guidelines

IB Copper Cable Bend Radii	
American Wire Gauge (AWG) Size Cable	Bend Radius
26	2.43 inches
28	2.28 inches
30	1.98 inches

For copper cable, the temporary 90-degree bend can never be more than 0.5 inch tighter than the values listed in [Table 2-2](#) for any assembly. This is the absolute minimum sustained bend radius for each cable AWG size. This measurement is the distance from the switch panel to the point where the cable makes a 90-degree bend. In other words, this number includes the distance from the connector stand-off from the panel surface.

Figure 2-2. Copper Cable Bend Radius

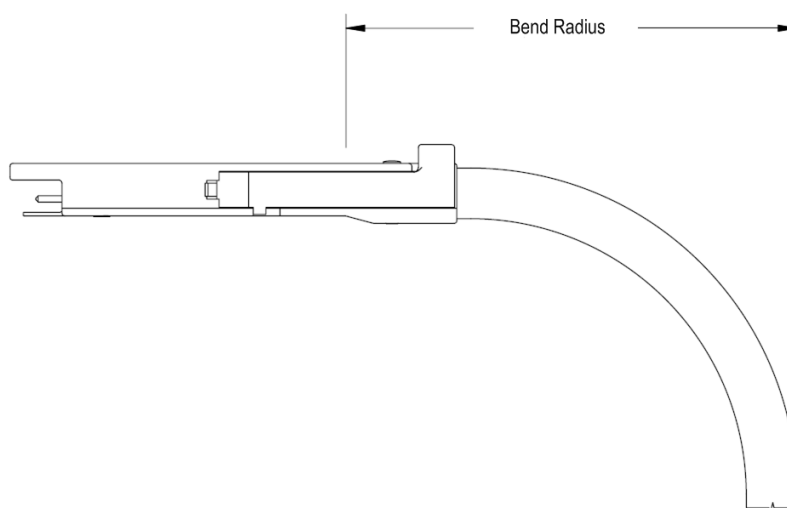
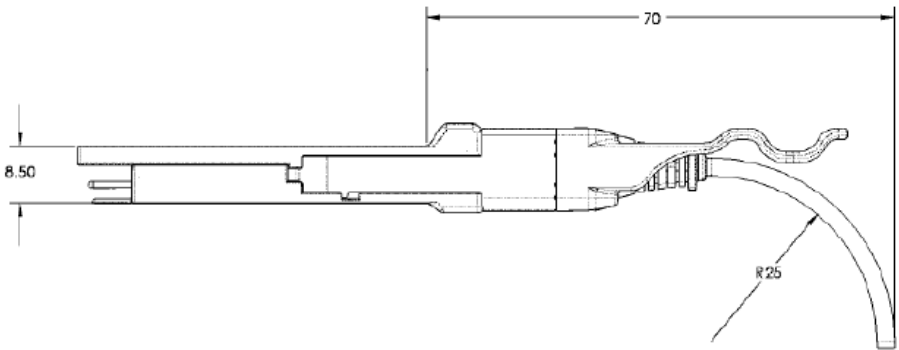


Table 2-3. IB Fiber Optic Cable Guidelines

IB Fiber Optic Cable Bend Radii	
Cable Type	Bend Radius
Fiber optic standard cable	25 millimeters NOTE: A 50mm diameter is the smallest circle limit.

Figure 2-3. Fiber Optic Bend Radius



3 Installation

This section describes how to install the QLogic 12000 switches.

NOTE:

For detailed installation information, refer to the QLogic 12000 Hardware Installation Guide.

Planning the Installation

The 12000 is designed to be installed in an existing 19-inch equipment rack or server rack.

NOTE:

These switches are designed for a four-post server cabinet. Do not mount the switches in a two-post telco cabinet.

Racks conform to conventional standards. Use the American National Standards Institute (ANSI)/Electronic Industries Association (EIA) standard ANSI/EIA-310-D-92 and International Electrotechnical Commission (IEC) 297 standard.

Racks should meet the following mechanical recommendations:

- Four-post, 19" rack to facilitate easy maintenance
- Universal mounting rail hole pattern identified in IEC Standard 297
- Mounting holes flush with the rails to accommodate the chassis

NOTE:

Operation is subject to the following conditions:

Use a rack grounding kit and a ground conductor that is carried back to earth or to another suitable building ground. Ground the equipment rack to earth ground.

Provide enough room to work on the equipment. Clear the work site of any unnecessary materials. Make sure the equipment will have enough clearance for front and rear access.

Installation Tasks Checklist

To perform the actual switch installation, the site implementation engineer must perform the following tasks:

1. Check the installation site to verify the installation of cabinet power feeds, rails, and grounding.
2. Unpack the equipment and inspect for any shipping damage. Any shipping damage should be reported to the shipping company.
3. Verify that the equipment shipped matches the packing list.
4. Mark the rack and install the mounting rails.
5. Physically install the switch in the rack.

Tools and Equipment Required

- An ESD wrist strap
- A #2 Phillips screwdriver
- An M6 HEX nut wrench
- Pen (felt-tip) to mark the mounting holes
- Lifting device (for example, a pallet jack) for the 12800-360 and 12800-180

Check the Installation Site

The switches must be installed in an existing server cabinet (not a telco cabinet), where they can be mounted in a standard equipment rack.

Be sure that:

- The cabinet has a full earth ground to provide reliable grounding.
- There is enough room to work on the equipment.
- The equipment will have enough clearance for front and rear access.
- The IB cables can be accessed easily.
- Water or moisture cannot enter the switch.
- The ambient temperature stays between 50°–113°F (5°–40° C).
- Cabinet doors do not interfere with front-to-back air flow.

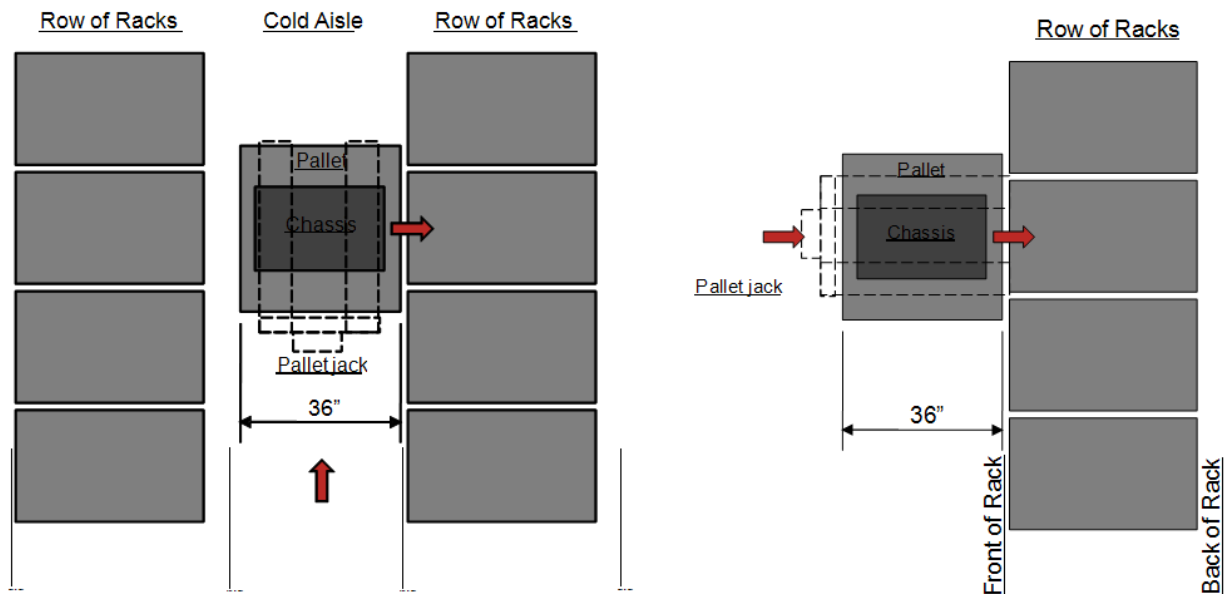
The cabinet should have its own switchable power distribution. If the switch has two power supplies, use a cabinet with dual power distribution units.

It is recommended that cabinet anti-tip devices are used, especially if installing or removing a switch in the upper half of the cabinet when the lower half is empty.

Aisle Width

Position the chassis on front of the rack: Use a pallet jack to move the chassis. Orient the chassis on the pallet in front of the rack as shown in [Figure 3-1](#) The chassis rear should be facing the front of the rack. For installations in racks arranged in rows, the distance between adjacent rows of racks (that is, the width on a cold aisle) should be greater than 36" to be able to move the chassis on a pallet through a cold aisle.

Figure 3-1. Positioning the Switch





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