

# Scalar i500 Site Planning Guide

## Product Overview

The Scalar® i500 is an intelligent library platform that gives growing midrange storage environments faster, easier, and more reliable data protection. The Scalar i500 combines modular design with continuous robotics to provide industry-leading scalability, performance, and reliability. Each library is based on Quantum's iLayer™ architecture, allowing for an advanced and streamlined management experience. iLayer's proactive monitoring and remote diagnostics can reduce service calls by 50% and shorten issue resolution times by 30%. Its Capacity on Demand scalability lets it grow non-disruptively with your data. And the Scalar i500 is designed to integrate easily with disk backup, making it the perfect library for next-generation backup architectures. With Scalar i500, you can be certain of reliable, high-performance backup, and effective long-term protection for years into the future, no matter how your storage needs evolve.



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# Included with Your Scalar i500

The Scalar i500 is fully configured to your specifications and pre-tested in the factory. Every Scalar i500 base system arrives on a pallet with all parts included and ready to install. Each system comes with a rackmount kit and an accessory kit containing the following:

- Getting Started Guide
- Module-to-module library cables (for systems larger than 5U)
- Power cable

Module terminators (2) are packaged separately in a plastic package and attached to the back of the control module with a plastic tie.

SCSI terminators are provided with SCSI tape drives.

## Installation

### Self-Installation

The Scalar i500 library was designed with midrange backup needs in mind. Its easy, self-guided installation and setup wizards make initial implementation simple. A single rackmount frame supports the entire library. When purchasing a 9U expansion module or any system larger than a 14U, Quantum professional installation service is required for installation and integration.

Basic installation instructions are included in the Getting Started Guide located in the accessory kit and also on the Documentation and Training CD that ships with the library.

The following skills are required to install the Quantum Scalar i500 in a standard environment:

- Ability to lift 50 lbs.
- System Administrator skills for the technologies being implemented.
- Basic understanding of SCSI, SAS, or Fibre Channel interfaces and connectivity.
- Basic understanding of the operating system(s) in the installation environment.
- Ability to use basic commands to transfer data (for example, tar, dd, or Windows backup).
- Ability to modify configuration files as necessary, including root/admin access privileges.
- Ability to install device drivers.
- Previous experience installing other storage devices (for example, tape or disk drive based storage).

- Ability to follow written instructions.
- Basic understanding of tape drive and library technology as well as their use.

Deploying the Scalar i500 into a storage area network (SAN) environment can increase complexity. We recommend that a deeper skills assessment be performed in these instances to determine the shortest path to a successful implementation.

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## Phone Support

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Phone support for the installation process is available via the Quantum Support number for your area. Customers in the U.S.A. and Canada may call 1-800-284-5101. For additional contact information and phone numbers, go to [www.quantum.com/support](http://www.quantum.com/support).

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## Professional Services

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If you desire on-site assistance with installation or deployment of the Scalar i500 into your backup environment, Professional Services from Quantum or an authorized service partner are available on a flat-fee basis. The fee includes travel, lodging, and overhead expenses for one trip. If installation is performed outside of normal business hours (8 to 5, Monday through Friday), an additional 50% uplift charge will apply. After-hours installation must be negotiated in advance. Please contact your local Quantum Sales representative for further information.

Please note that Quantum is not responsible for:

- Installation or configuration of operating systems or OS patches.
- Installation or configuration of backup, archive, HSM, or other software applications unless sold by Quantum.
- Installation or configuration of non-Quantum supplied hardware.
- Performance tuning.
- Host network connectivity.
- FC Switch, HBA, and/or cabling documentation.
- Project management and scheduling of other vendors and services.
- Customer facility modifications required to support Quantum equipment.
- Damage to Quantum-supplied equipment due to customer negligence or operation of equipment in an improper environment (for example, excessive dust, improper power or grounding, excessive heat, excessive vibration, etc.).
- Any items or services not specifically listed here, unless previously agreed to in an authorized written contract or purchase order between you and Quantum.

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## Base Systems and Module Positioning

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The Scalar i500 is available in both rack-mountable and free-standing configurations. Free-standing systems are available in 5U and 14U base systems only. In free-standing 14U base systems, the Scalar i500 control module (CM) can be positioned either above or below the expansion module (EM). See [Figure 1](#) below.

Figure 1 Free-Standing Base Systems



Any Scalar i500 system may be racked. In racked systems, the EM may be placed either above or below the CM. We recommend in all systems except for the 41U, however, that the CM is positioned on top of the EM at shoulder level where the interface can be easily viewed. In 41U systems, we recommend that the CM be placed below one EM and above the remaining 3 EMs. See [Figure 2](#) for recommended EM placement in racked configurations.

Figure 2 Racked Systems



All 9U expansion modules and any system larger than a 14U system will initially require Quantum installation. We recommend that all servers or other IT equipment be installed below the Scalar i500 in the rack.

### Rack Compatibility

Quantum does not sell equipment racks for the Scalar i500. Nearly all standard four-post EIA 19-inch server racks are compatible with the Scalar i500 rackmount kit. The main exception is a rack with threaded holes smaller than M6, such as racks with either M5 or 10-32 threaded holes. In order to mount the Scalar i500 in a rack with small threaded

holes, the threads must be drilled out of the appropriate holes to accommodate the Scalar i500 rackmount kit mounting studs, or the rack must be replaced. Do not remove the mounting studs from the Scalar i500 rackmount—this will compromise the stability and reliability of the system. Racks tested specifically by Quantum and shown to be compatible with the Scalar i500 rackmount are listed in the table below. Additional racks may be compatible with the Scalar i500. If your rack is not listed in the table below, contact Quantum to see if your rack is compatible with the Scalar i500.

Manufacturer	Model	Hole Type
IBM	Machine Type 9306, Model 900	Square
Dell	08P157 (P/N US-08P 157910-3AU-0900)	Square
HP	10K, P/N: 245169-001, ASM 10642U	Square
Emcor	10 Series	Round
Sun	38U NGR00R	M6 Threaded
Rittal	Cable Tester Rack Frame	Square
EMC	EMC CX500	Round

## Library Setup and Configuration

After you have installed the hardware, you are ready to configure your library's settings. A setup wizard is available to guide you through all the steps necessary to configure your library. The menu commands on both the operator panel and the Web client allow you to reconfigure your library at any time.

When you first power on the library, the operator panel displays the setup wizard, which walks you through the initial configuration of the library's basic operational settings, including network settings that enable you to access the library from the Web client. You must begin the setup wizard on the operator panel, but you have the option to complete the setup wizard on the Web client.

You and other administrative users can always return to the setup wizard on the Web client or use commands on the operator panel or Web client to modify all library settings, including network settings. Refer to the Scalar i500 User's Guide for additional information on initially configuring your library.

## Specifications

### Flexible Configuration Options

The Scalar i500 is designed to meet the industry's widest range of midrange backup needs, allowing you to create the right sized system for your environment and to easily expand it as your data needs change. A single rackmount frame can support the entire library as its capacity increases. Start with one of three base systems — 5U, 14U, or 23U — and add expansion modules as your storage requirements evolve. 9U EMs can be

installed quickly and easily to your base system. Contact your Quantum Sales representative to schedule installation for 9U EMs.

The Scalar i500's Capacity on Demand slot licensing lets you increase usable capacity easily and non-disruptively in 46-slot increments with a COD license key. For more information on purchasing additional slots, please contact your Quantum Sales representative.

[Figure 3](#) provides configuration specifications for all physical Scalar i500 configurations.

Figure 3 Scalar i500 Physical Configurations

	Scalar i500 Base Systems				Expansion Module(s)		Expanded Systems	
								
<b>Configuration</b>	<b>5U System*</b>	<b>14U System*</b>	<b>23U System</b>		<b>9U Expansion</b>		<b>32U System</b>	<b>41U System</b>
<b>Maximum Available Storage Slots**</b>	41	133	225		92		317	409
<b>Maximum Number of Tape Drives</b>	2	6	10	+	4	=	14	18
<b>I/E Station Slots Available</b>	0, 6	0, 6, 12, 18	0, 6, 12, 18, 24, 30		0, 12		0, 6, 12, 18, 24, 30, 36, 42	0, 6, 12, 18, 24, 30, 36, 42, 48, 54

\* Also available in free-standing configurations.

\*\* Includes I/E station slots. Authorized slots expand in increments of 46.

## Capacity

Table 1 Base System Capacity Options

Active Tape Position Options	5U System	14U System	23U System
41	X	X	X
87		X	X
133		X	X
179			X
225			X

**Note:** 9U expansion modules hold up to 92 tapes. At installation, you may select a slot activation level of 0, 46, or 92 tape positions.

Table 2 Total Library Capacity

Activated Tape Positions	Maximum Capacity* (TB) LTO-3	Maximum Capacity* (TB) LTO-4	Maximum Capacity* (TB) LTO-5	Maximum Capacity* (TB) LTO-6	Maximum Capacity* (TB) LTO-7
41	32.8	65.6	123.0	256.25	615
87	69.6	139.2	261.0	543.75	1305
92	73.6	147.2	276.0	575	1380
133	106.4	212.8	399.0	831.25	1995
179	143.2	286.4	537.0	1118.75	2685
225	180.0	360.0	675.0	1406.25	3375
271	216.8	433.6	813.0	1693.75	4065
317	253.6	507.2	951.0	1981.25	4755
363	290.4	580.8	1089.0	2268.75	5445
409	327.2	654.4	1227.0	2556.25	6135

\* Capacity assumes 2:1 compression. LTO-6 drives support 2.5:1 compression.

Table 3 Drive Capacity and Performance

Drive Type	Cartridge Capacity Native Compressed* (GB)	Drive Throughput Native/ Compressed* (MB/sec.)	Data Buffer (MB)	File Access Time** (sec.)
LTO-3	400 / 800	80 / 160	128	68
LTO-4	800 / 1600	120 / 240	128	51
LTO-5	1500/3000	140/280	256	52
LTO-6	2500/6250	160/400	512	50
LTO-7	6000/15000	300/750	1024	74

\* Assumes 2:1 compression. LTO-6 drives support 2.5:1 compression

\*\* File Access Time (sec.) is defined as load time plus average search time.

## Physical

Table 4 Dimensions and Weight

System	H x W x D	Weight*
5U Base System	8.6 in. x 17.4 in. x 31.4 in. (21.9 cm x 44.2 cm x 79.8 cm)	66 lbs (30 Kgs)
14U Base System	24.4 in. x 17.4 in. x 31.4 in. (61.9 cm x 44.2 cm x 79.8 cm)	125 lbs (56.8 Kgs)
23U Base System	40.1 in. x 17.4 in. x 31.4 in. (101.9 cm x 44.2 cm x 79.8 cm)	184 lbs (83.6 Kgs)
9U Expansion Module	15.8 in. x 17.4 in. x 31.4 in. (40 cm x 44.2 cm x 79.8 cm)	59 lbs (26.8 Kgs)
Tape Drive	8.9 in. x 13 in. x 16.4 in. (22.6 cm x 33 cm x 41.7 cm)	10 lbs (4.6 Kgs)
Power Supply	8.9 in. x 13 in. x 16.4 in. (22.6 cm x 33 cm x 41.7 cm)	5 lbs (2.3 Kgs)

\* Base system weights do not include power supplies, tape drives, or media.

Table 5 Maximum Point and Distribution Load (41U System)

Load calculations for a 41U racked system include maximum drive, power supply, and media capacity. Does not include the weight of the rack.

Maximum Weight	733 lbs. (332.49 Kgs)
Occupied Floor Space	546.36 sq. inches/3.79 sq. ft. (3524.90 sq. cm/0.35 meters)
Distributed Load	193.19 lbs. per sq. ft. (943.26 Kgs per sq. meter)
Point Load*	58.31 lbs. per sq. inch (4.1 Kgs per sq. meter)

\* Assumes 4 leveling pads, 2 inches or 5.08 cm in diameter each.

## Operational

Drive Interface	8 Gb/s FC and 6 Gb/s SAS with LTO-5 and higher 4 Gb/s FC and 3 Gb/s SAS with LTO-3 and LTO-4 SCSI LVD
Library Interface	8 Gb/s FC and 6 Gb/s SAS with LTO-5 and higher 4 Gb/s FC and 3 Gb/s SAS with LTO-3 and LTO-4 SCSI LVD
Inventory Speed	55 seconds for the average 5U configuration; 110 seconds for the average 14U configuration
Configuration	Auto-discovery and auto-calibration for installed/added components (modules, tapes, drives, magazines, etc.)
Import/Export	Up to 54 (LTO) positions in removable magazines

## Reliability

Library Mean Cycles Between Failures (MCCBF)	Greater than 2,000,000. <b>Note:</b> A cycle is defined as this sequence of events: removing a cartridge from a drive, storing the cartridge in a slot, retrieving another cartridge from a slot, and inserting it into a drive.
Library Mean Time to Repair (MTTR)	30 minutes.
Power	Optional 2N power for all systems and drives.
Diagnostics	Embedded monitoring of major subsystems, self-diagnostic procedures, and policy-based e-mail and pager alerts to system administrators and Quantum Global Services.
Module Upgrade	Any storage module may be added in less than 30 minutes; customer-installable components include drives, fans, power supplies, slot upgrades.

## Compatibility

Consult the most recent Quantum Software Compatibility Guide on [www.quantum.com](http://www.quantum.com) for a complete list of software and platforms compatible with Scalar i500.

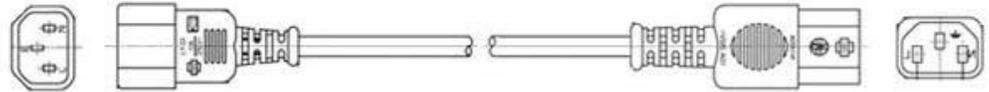
## Compliance and Certification

<b>Safety Standards</b>	IEC 60950 with worldwide country deviations
<b>Emissions Standards</b>	CISPR 22 Class A, EN55022 Class A, EN61000-3-2, EN61000-3-3
<b>Immunity Standards</b>	EN55024
<b>International Certifications</b>	CE (Europe), VCCI (Japan), TUV/GS (Germany), FCC (USA), ICES (Canada), cTUVus (USA and Canada), GOST (Russia), KC (Korea), BSMI (Taiwan)

## Electrical

The Scalar i500 ships with an IEC C13/C14 rack-compatible power cord. [Figure 4](#) below shows an example of the plug. One power cable is supplied with each power supply and each connects to a C13/C14 plug in the library. In a maximum size 41U system with redundant power supplies, 10 outlets are required.

Figure 4 C13/C14 Power Cable



Although each module is configured with a single AC power source, redundant power is an option that can protect your system from a single source power failure. With redundant power, or two power supplies in a module, each power supply has its own cable with a standard grounded plug and requires its own electrical outlet.

## Environmental

<b>Power</b>	100-240 VAC; 50-60Hz
<b>Temperature</b>	50° to 104° F (10 to 40°C) operating
<b>Humidity</b>	20 to 80% non-condensing operating

Table 6 Power Consumption and Heat Output

The typical library power consumption (Watts/hour) and heat output (BTU/hr) are listed below. "Typical" values for tape drives assumes tape drives are writing.

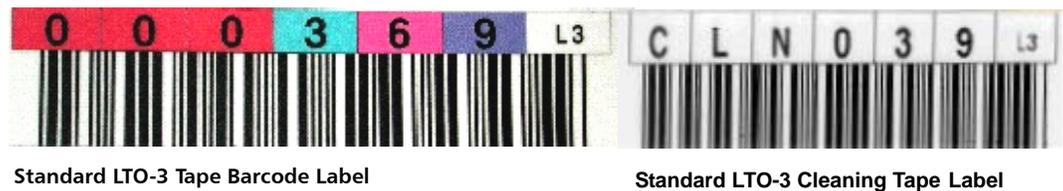
Library Configuration	Typical Power Consumption (Watts)	Typical Heat Output (BTU/Hour)
<b>Subassembly Power Consumption:</b>		
Scalar I500 Library with Robot and LCB (no tape drives installed; robot moving; LCB installed)	79	269
UDS3 IBM LTO-2 Drive Sled Module (SCSI)	29	99
UDS3 IBM LTO-2 Drive Sled Module (Fibre Channel)	32	109
UDS3 IBM LTO-3 Drive Sled Module (SCSI)	27	92
UDS3 IBM LTO-3 Drive Sled Module (Fibre Channel)	29	97
UDS3 IBM LTO-4 Drive Sled Module (SCSI)	40	135
UDS3 IBM LTO-4 Drive Sled Module (Fibre Channel)	42	143
UDS3 IBM LTO-4 Drive Sled Module (SAS)	43	148
UDS3 HP LTO-4 Drive Sled Module (Fibre Channel)	40	135
UDS3 HP LTO-4 Drive Sled Module (SAS)	37	127
UDS3 IBM LTO-5 Drive Sled Module (Fibre Channel)	42	143
UDS3 HP LTO-5 Drive Sled Module (Fibre Channel)	40	135
UDS3 HP LTO-5 Drive Sled Module (SAS)	37	127
UDS3 IBM LTO-6 Drive Sled Module (Fibre Channel)	42	143
UDS3 HP LTO-6 Drive Sled Module (Fibre Channel)	40	135
UDS3 HP LTO-6 Drive Sled Module (SAS)	37	127
UDS3 IBM LTO-7 Drive Sled Module (Fibre Channel)	35	119
Fibre-Channel I/O Blade	36	123
Ethernet Expansion Blade	5	17
<b>Control Module:</b>		
Minimum (no drives installed; robot not moving)	47	160
Maximum (2 drives writing; robot moving)	166	565

Library Configuration	Typical Power Consumption (Watts)	Typical Heat Output (BTU/Hour)
<b>Expansion Module:</b>		
Minimum (no drives installed; robot not moving)	12	41
Maximum (4 drives writing; 2 Fibre-Channel I/O blades installed; robot moving)	256	879

### Barcode Requirements

Quantum recommends a 6 + 2 barcode format (for example, 6 digits plus 2 characters assigned as the standard LTO media identifier) that follows the label standard ANSI MH10.8M-1983. For advanced uses, your Quantum library supports label lengths of up to 16 characters allowing you to create custom labels. See the Scalar i500 User's Guide for a description of all supported barcode formats. You may wish to use special labels on cleaning tapes to make them easier to distinguish from data tapes. [Figure 5](#) below shows an example of a standard LTO3 media label and bar code label.

Figure 5 Standard LTO3 Tape Labels



The use of high-quality labels is critical for trouble-free system operation. Quantum strongly recommends that you purchase pre-printed barcode labels from your media supplier or another trusted source. For added convenience, consider purchasing pre-labeled media.

If you wish to print the barcode labels, the individual media labels are supported if the labels meet the following requirements:

**Note:** Checksum characters are not supported on barcode labels.

- ANSI MH10.8M-1983 Standard.
- Type font: Code 39 (3 of 9).
- Characters: Only uppercase letters A to Z and/or numeric values 0 to 9.
- Number of digits: 5 to 16 (default for LTO is 6+2).

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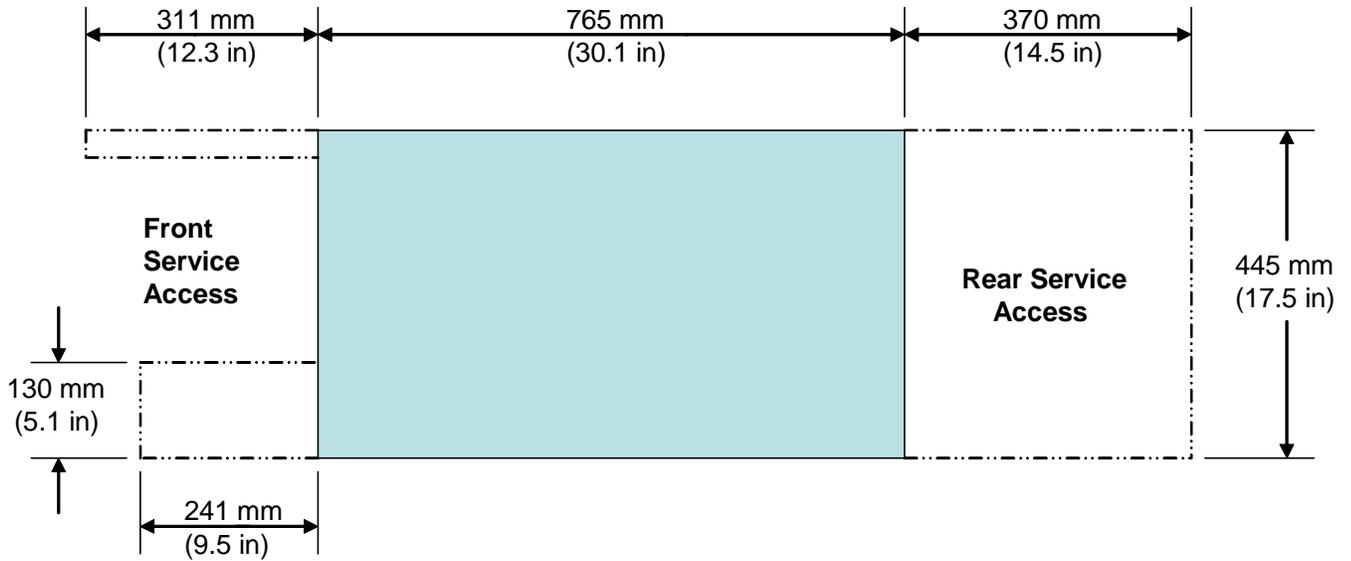
**Note:** A maximum of 12 characters is recommended. A barcode label with more than 12 characters may not be printable according to the Code 39 label specifications for the tape cartridge area to which the label is attached. The effective tape cartridge barcode label length, including any media ID, may be limited to a maximum of 12 characters.

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- Background reflection: greater than 25 percent.
- Print contrast: greater than 75 percent.
- Ratio: greater than 2.2.
- Module: .254 mm (10 mil).
- Print tolerance:  $\pm 57$   $\mu$ m.
- Length of the rest zones: 5.25 mm  $\pm$  0.25 mm.
- No black marks may be present in the intermediate spaces or rest zones.
- No white areas may be present on the bars.
- Bars should read in a uniform direction. Non-uniform reading directions are feasible in principle, but have a detrimental effect on performance.
- Each label should be applied in the upper right corner of the tape cartridge recess (when oriented vertically).

Compliance with these specifications can be checked and documented with the Ergilaser 3000 High Density barcode measuring device that is manufactured by the Laetus Company.

**Floor Plan**



**LIBRARY FLOOR PLAN**

For assistance, contact the Quantum Customer Support Center:  
USA: 1-800-284-5101 (toll free) or +1-720-249-5700  
EMEA: +800-7826-8888 (toll free) or +49-6131-3241-1164  
APAC: +800-7826-8887 (toll free) or +603-7953-3010  
Worldwide: <http://www.quantum.com/ServiceandSupport>

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**About Quantum**

Quantum is a proven global expert in Data Protection and Big Data management, providing specialized storage solutions for physical, virtual and cloud environments. From small businesses to major enterprises, more than 50,000 customers trust Quantum to help maximize the value of their data by protecting and preserving it over its entire lifecycle. With Quantum, customers can Be Certain they're able to adapt in a changing world—keeping more data longer, bridging from today to tomorrow, and reducing costs. See how at [www.quantum.com/BeCertain](http://www.quantum.com/BeCertain).