



Intelligent Storage™

Scalar® i500 Site Planning Guide

FROM ADVANCED DIGITAL INFORMATION CORPORATION



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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. Designed with ADIC's iPlatform architecture and iLayer management approach, the Scalar i500 makes backup easier to manage. Its 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 the Scalar i500, you can be assured you will have reliable, high-performance backup, certain restores, and effective long term protection for years into the future, no matter how your storage needs evolve.

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 an accessory kit containing a rack-mount frame, *Quick Start Guide*, User's Guide CD, Training CD, Module-to-Module library terminators (2), Module to Module library cables (for systems larger than 5U); US and European power cords and SCSI terminator.

Installation

Self-Installation

The Scalar i500 library was designed with midrange backup needs in mind. It's easy, self-guided installation and service wizards make initial implementation simple. A single rack-mount frame supports the entire library. To ensure the successful deployment of the 23U i500 and the 9U Expansion, ADIC will require that installation services be purchased from ADIC or an authorized service provider. ADIC has a strong commitment to ensuring customer satisfaction, and will proceed cautiously in allowing our customers to self-install the 23U configuration. ADIC will require installation for the first six months after GA for the i1 release. This will allow us the proper amount of time to ensure that our installation documentation, and quick start guides are easy to use and understand. After this initial 6 month period, we will determine if we will allow customers to self-install 23U configuration.

Basic installation instructions are included in the Quick Start Guide located on the *Scalar i500 Documentation and Firmware CD* that ships with the library. A hard copy of the *Quick Start Guide* is also included with the library.

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

- Ability to lift 50 lbs.
- System Administrator skills for the technologies being implemented
- Basic understanding of SCSI 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 (e.g. 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 (e.g. 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.

If you desire assistance with deployment of the Scalar i500 into your backup environment, Installation and Professional Services from ADIC or an authorized service partner are available. Please contact your local ADIC sales representative for further information. Refer to the *Professional Services* section below for additional information on these services.

Please note that ADIC 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 ADIC
- Installation or configuration of non-ADIC 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 ADIC equipment
- Damage to ADIC supplied equipment due to customer negligence or operation of equipment in an improper environment (e.g. 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 ADIC

Base Systems and Module Positioning

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 A** below.

FIGURE A

FREE-STANDING BASE SYSTEMS



In a 14U free-standing Base System, the CM may be placed above or below the EM as shown above.

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 is placed below one EM and above the remaining 3 EM. See **Figure B** for recommended EM placement in all racked configurations.

FIGURE B

RACKED SYSTEMS



5U Racked System 14U Racked System 23U Racked System 32U Racked System 41U Racked System

In 14U or larger racked systems, the Scalar i500 expansion module (EM) may be placed either above or below the control module (CM). The examples above display the recommended positions for the CM and EM for each configuration.

The initial rack position of the library should allow space for the addition of future 9U EMs, either above or below the base system. This will provide room for physical expansion without repositioning the existing library in the rack. All 9U expansion modules and any system larger than a 14U system will initially require ADIC installation. We recommend that all servers or other IT equipment be installed below the Scalar i500 in the rack.

Rack Compatibility

ADIC does not sell equipment racks. Nearly all standard four-post EIA 19” server racks are compatible with the Scalar i500 rack mount 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 rack kit mounting studs, or the rack must be replaced. Do not remove the mounting studs from the Scalar i500 rack mount—this will compromise the stability and reliability of the system. Racks tested specifically by ADIC and shown compatible with the Scalar i500 rack mount are listed in the table below. Additional racks are compatible with the Scalar i500. If your rack is not listed in the table below, contact ADIC 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-08P157910-3AU-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	Square

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 and 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 or use commands on the Setup and Operations tabs to modify all library settings, including network settings. Refer to the *Scalar i500 User's Guide* for additional information on initially configuring your library.

Professional Services

If you should require on-site assistance with installation, ADIC Professional Services are available on a flat-fee basis. Installation and Professional Services include travel, lodging, and overhead expenses for one trip. If installation is performed outside of normal business hours (8-5, M-F), an additional 50% uplift charge will apply. After hours installation must be negotiated in advance.

Phone support for the installation process is available via the ADIC support number for your area. Customers in US and Canada may call 1-800-827-3822.

Service

Scalar i500 Warranty

The Scalar i500's warranty includes one year next business day exchange of Customer Replaceable Units (CRUs) and one year next business day, on-site replacement of Field Replacement Units (FRUs). This warranty covers the library and all drives, and includes firmware downloads, telephone support, iLink™ technology (see the *iLink* section below for more information), E-mail Home, and Internet access to ADIC's online Customer Service Center (CSC) website. The CSC website features online service request processing, web-based event status tracking, and a comprehensive KnowledgeBase. ADIC's KnowledgeBase gives you 7X24 real-time electronic access to complete product and support resources and the expertise of ADIC's Global Services organization.

CRUs*: Library control blade, LCB flash memory, power supply, chassis to chassis communication cable, CAN bus terminator, drives, rack mount kit, control module, and expansion module (for systems larger than 5U).

FRUs*: Picker, display, cable spool, Y carriage asm, 5U and 9U chassis, I/E slide assembly, I/E lock assembly, and front bezel.

** The above lists may not be comprehensive. For additional information on CRUs and FRUs, please contact your ADIC sales representative.*

iLink

The Scalar i500 has built-in Relational Diagnostic™ logic and innovative iLink technology to reduce service incidents and speed resolution of any service issue. ADIC's iLink technology is the first diagnostic tool to extend remote problem solving beyond the tape library into the storage environment. Through a simple web interface, iLink securely links you, your Scalar i500 library or libraries, and disk-based backup systems with the diagnostics data from the surrounding storage ecosystem and ADIC's Global Services team. iLink allows service technicians to provide faster root cause identification, more accurate diagnosis, and faster resolution.

Integrated Relational Diagnostics logic in the Scalar i500 monitors more than 200 elements and over 1000 conditions in the library and the backup ecosystem to help prevent failures, reduce issue resolution time, and rapidly identify the source of a problem.

iSurety™ Smarter Service

ADIC's service philosophy is different than the conventional break/fix approach. Our iSurety comprehensive service approach leverages advanced data access and diagnostics technology with cross-environment, multi-vendor expertise to resolve backup issues faster and at lower cost. ADIC is committed to delivering better service through the smarter use of technology, not by building bigger and more costly support organizations. ADIC's smarter approach to service

includes integrating leading edge diagnostics and advanced management tools into our intelligent libraries like the Scalar i500.

Service Package Upgrades

ADIC's Global Services (AGS) organization is geared towards delivering the fastest possible response and root cause resolution, helping you maximize your backup investments, better manage processes, and make the best use of your resources. We ensure total customer satisfaction by providing comprehensive, responsive services on a worldwide basis.

A variety of support options are available to you via ADIC's tiered hardware support plans—Bronze, Silver, Gold, and Platinum—to meet a range of budget and availability requirements. Features of these plans include: 24-hour telephone support, on-site response, key account program manager, priority call handling, strategically located spares pools, online resources, preventative maintenance, and firmware upgrades. For more information on these service plans, please visit www.adic.com/support or contact your ADIC Sales Representative.

ADIC service engineers are available around the world and are deployed to respond to on-site service demands. In addition, spare part depots are strategically located around the globe so that service technicians have access to the parts and equipment necessary to maintain or repair your Scalar i500 library.

Scalar i500 Specifications

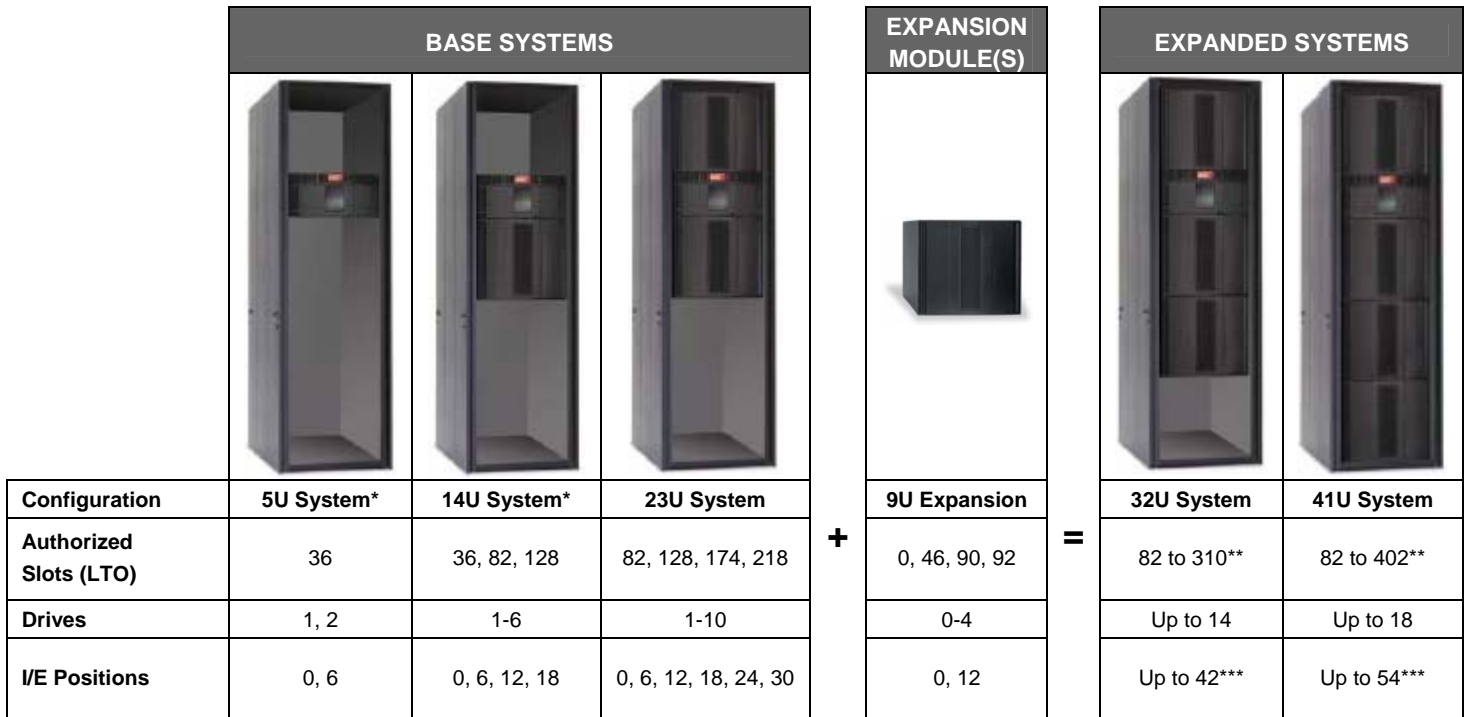
Flexible Configuration Options

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 rack-mount 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 ADIC sales representative to schedule installation for 9U EMs.

The Scalar i500's capacity-on-demand lets you to increase usable capacity easily and non-disruptively in 46-slot increments with a software authorization key. For more information on purchasing additional slots, please contact your ADIC sales representative.

Figure C provides specifications for all physical Scalar i500 configurations.

FIGURE C



* Also available in free standing configurations.
 ** Authorized slots expand in increments of 46.
 *** I/E positions expand in increments of 6.

Capacity Configurations

BASE SYSTEM CAPACITY OPTIONS			
Active Tape Position Options (LTO)	5U System	14U System	23U System
36	X	X	X
82		X	X
128		X	X
174			X
218			X

Note: 9U expansion modules hold up to 92 tapes. At installation, you may select slot activation levels of 0, 46, 90, or 92 tape positions.

TOTAL LIBRARY CAPACITY ¹					
Activated Tape Positions	Max. Cap. (TB) LTO-2	Max. Cap. (TB) LTO-3	Activated Tape Positions	Max. Cap. (TB) LTO-2	Max. Cap. (TB) LTO-3
36	14.4	28.8	218	87.2	174.4
82	32.8	65.6	266	106.4	212.8
92	36.8	73.6	310	124.0	248.0
128	51.2	102.4	358	143.2	286.4
174	69.6	139.2	402	160.8	321.6

¹ Assumes 2:1 compression.

Operation

Drive Interface: SCSI-2 LVD/SCSI-3 LVD; integrated FC option
 Library Interface: SCSI-2 LVD/SCSI-3 LVD; integrated FC option
 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 MCBF*: Greater than 2,000,000
 Library 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 ADIC Global Services
 Module Upgrade: Any storage module may be added in less than 30 minutes; customer-installable components include drives, fans, power supplies, expansion modules, and slot upgrade licenses

*MCBF: Mean Cycles Between Failure. 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.

**MTTR: Mean Time To Repair

Physical

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

Note: Base system weights do not include power supplies, drives, or media.

Maximum Point and Distribution Load* (41U system)

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)

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

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

Software and Platform Compatibility

Consult the most recent ADIC Software Compatibility Guide on www.adic.com for a complete list of software and platforms compatible with Scalar i500.

Compliance and Certification

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

Drive Capacity and Performance

Drive Type	Cartridge Capacity Native Compressed ¹ (GB)	Drive Throughput Native/ Compressed ¹ (MB/sec)	Data Buffer (MB)	File Access Time* (sec)
LTO-3	400 / 800	80 / 160	128	65
LTO-2	200 / 400	35 / 70	64	60

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

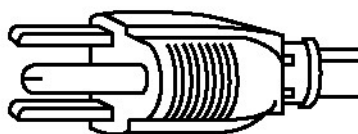
Environmental

Power:	100-240 VAC; 50-60Hz
Temperature:	10 to 40°C operating
Humidity:	20 to 80% non-condensing operating

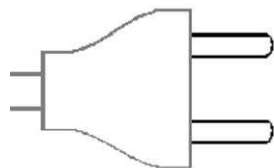
Electrical Specifications

The Scalar i500 ships with power cords for both North America and European use. The North America cord is equipped with a NEMA 5-15 plug and the European cord is equipped with a CEE 7/7 plug. **Figure D** below shows an example of each plug. One pair of power cords (NA and European) is supplied with each power supply and each connects to a C13 plug in the library. In a maximum size 41U system with redundant power supplies, 10 outlets are required.

FIGURE D



North American NEMA 5-15 plug.



European CEE 7/7 plug.

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 cord with a standard grounded plug and requires its own electrical outlet.

Scalar i500 Power Consumption—One Power Supply*

*Assumes one power supply per control module (CM) and expansion module (EM).

UNIT SIZE	CONFIGURATION		TYPICAL APPLICATION				MAXIMUMS			
	Drives	Power Supplies	Power (Watts)	Heat Output (BTU)	Amps @ 110V	Amps @ 220V	Power (Watts)	Heat Output (BTU)	Amps @ 110V	Amps @ 220V
5U	0	1	69	237	0.631	0.316	274	936.140	2.494	1.247
	1	1	99	338	0.900	0.450	334	1,141.175	3.040	1.520
	2	1	130	445	1.184	0.592	395	1,346.210	3.587	1.793
14U (5U CM + 9U EM)	3	2	183	625	1.664	0.832	481	1,640.922	4.372	2.186
	4	2	215	733	1.952	0.976	541	1,845.956	4.918	2.459
	5	2	246	840	2.239	1.120	601	2,050.991	5.464	2.732
	6	2	278	948	2.526	1.263	661	2,256.026	6.011	3.005
23U (5U CM + 2 9U EMs)	7	3	331	1,128	3.006	1.503	748	2,550.738	6.796	3.398
	8	3	362	1,236	3.294	1.647	808	2,755.773	7.342	3.671
	9	3	394	1,344	3.581	1.791	868	2,960.807	7.889	3.944
	10	3	426	1,452	3.869	1.934	928	3,165.842	8.435	4.217
32U (5U CM + 3 9U EMs)	11	4	478	1,632	4.348	2.174	1,014	3,460.554	9.220	4.610
	12	4	510	1,740	4.636	2.318	1,074	3,665.589	9.766	4.883
	13	4	542	1,848	4.923	2.462	1,134	3,870.623	10.313	5.156
	14	4	573	1,956	5.211	2.605	1,194	4,075.658	10.859	5.429
41U (5U CM + 4 9U EMs)	15	5	626	2,136	5.690	2.845	1,281	4,370.370	11.644	5.822
	16	5	658	2,244	5.978	2.989	1,341	4,545.405	12.190	6.095
	17	5	689	2,352	6.265	3.133	1,401	4,780.440	12.737	6.368
	18	5	721	2,459	6.553	3.276	1,461	4,985.474	13.283	6.641

Scalar i500 Power Consumption—Two Power Supplies*

*Assumes two power supplies per control module (CM) and expansion module (EM).

UNIT SIZE	CONFIGURATION		TYPICAL APPLICATION				MAXIMUMS			
	Drives	Power Supplies	Power (Watts)	Heat Output (BTU)	Amps @ 110V	Amps @ 220V	Power (Watts)	Heat Output (BTU)	Amps @ 110V	Amps @ 220V
5U	0	2	89	305	0.813	0.406	299	1,021.443	2.721	1.361
	1	2	119	406	1.081	0.541	359	1,226.478	3.268	1.634
	2	2	150	150	1.366	0.683	420	1,431.512	3.814	1.907
14U (5U CM + 9U EM)	3	4	223	761	2.028	1.014	531	1,811.527	4.826	2.413
	4	4	255	869	2.315	1.158	591	2,016.561	5.373	2.686
	5	4	286	977	2.603	1.301	651	2,221.596	5.919	2.960
	6	4	318	1,085	2.890	1.445	711	2,426.631	6.465	3.233
23U (5U CM + 2 9U EMs)	7	6	391	1,333	3.552	1.776	823	2,806.645	7.478	3.739
	8	6	422	1,441	3.839	1.920	883	3,011.680	8.024	4.012
	9	6	454	1,549	4.127	2.063	943	3,216.715	8.570	4.285
	10	6	486	1,657	4.414	2.207	1,003	3,421.750	9.117	4.558
32U (5U CM + 3 9U EMs)	11	8	558	1,905	5.076	2.538	1,114	3,801.764	10.129	5.065
	12	8	590	2,013	5.363	2.682	1,174	4,006.799	10.675	5.338
	13	8	622	2,121	5.650	2.825	1,234	4,211.833	11.222	5.611
	14	8	653	2,229	5.938	2.969	1,294	4,416.868	11.768	5.884
41U (5U CM + 4 9U EMs)	15	10	726	2,477	6.600	3.300	1,406	4,796.883	12.780	6.390
	16	10	758	2,585	6.887	3.443	1,466	5,001.917	13.328	6.663
	17	10	789	2,693	7.174	3.587	1,526	5,206.952	13.873	6.936
	18	10	821	2,801	7.462	3.731	1,586	5,411.987	14.419	7.210

Barcode Requirements

We recommend a 6 + 2 barcode format (e.g. 6 digits plus 2 characters assigned as the standard LTO media identifier) that follows the label standard ANSI MH10.8M-1983. You may wish to use special labels on cleaning tapes to make them easier to distinguish from data tapes. **Figure E** below shows an example of a standard LTO3 media label and barcode label.

FIGURE E



Standard LTO3 tape barcode label.



Standard LTO3 cleaning tape label.

The use of high-quality labels is critical for trouble-free system operation. ADIC 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 additional requirements.

- ANSI MH10.8M-1983 Standard
- Number of digits: 5 to 16
- Background reflection: at least 25 percent
- Print contrast: at least 75 percent
- Ratio: at least 2.2
- Module: 250 mm
- Print tolerance: ± 57 mm

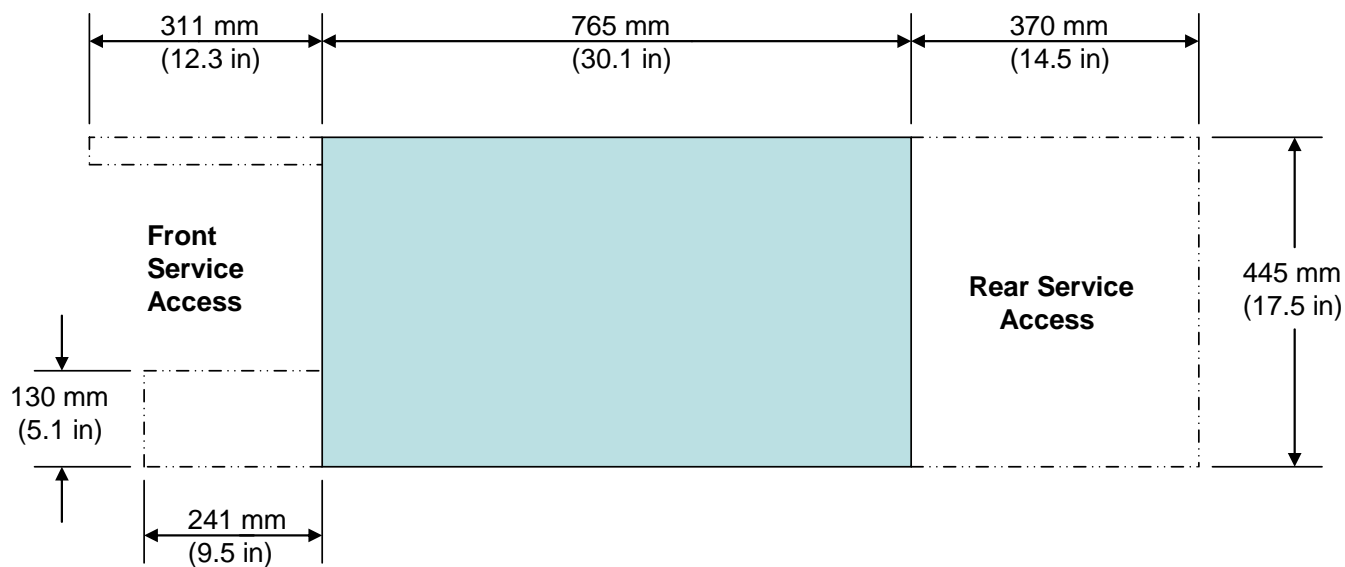
Additional Requirements:

- Length of the rest zones: 5.25 mm ± 0.25 mm
- No black marks can 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)

Quality Testing

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 Plans



LIBRARY FLOOR PLAN