iSCSI Boot from SAN

# Hardware Guide

*Version 1.0*

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*Version 1.0*

**Note**
Before using this information and the product it supports, read the @server information in "Notices," on page 9.

**First Edition (June 2006)**

This edition applies to Version 1.0 of IBM iSCSI Boot from SAN (product number 0000-000) and to all subsequent releases and modifications until otherwise indicated in new editions.

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# Preface

The iSCSI Boot from SAN Hardware guide supports Version 1.0 of the IBM® iSCSI Boot from SAN application. This application provides the capability to boot a blade server from an iSCSI target using the basic network interface cards (NICs) included on the blade. No additional hardware or adapters are required. When employing iSCSI Boot from SAN, you do not have to install an internal disk in the blade.

# About this guide

The purpose of this guide is to provide users of the iSCSI Boot from SAN application:

- Information related to hardware support and preparation.
- A list of hardware-related error messages.

# Who should read this guide

This guide is for system programmers and users working in an IBM BladeCenter environment and using iSCSI Boot from SAN on supported blades in an IBM® BladeCenter® chassis.

# Chapter 1. iSCSI boot hardware support

iSCSI boot hardware support can be found on the IBM Support home page.

## IBM support home page

You can download released materials from the IBM Support & downloads Web site (www.ibm.com/support/us/).

# Chapter 2. Chassis preparation

You prepare the chassis for iSCSI boot from SAN by updating the chassis MM or MM's and the network switches to the latest level of firmware.

# Chapter 3. Blade model 8843 preparation

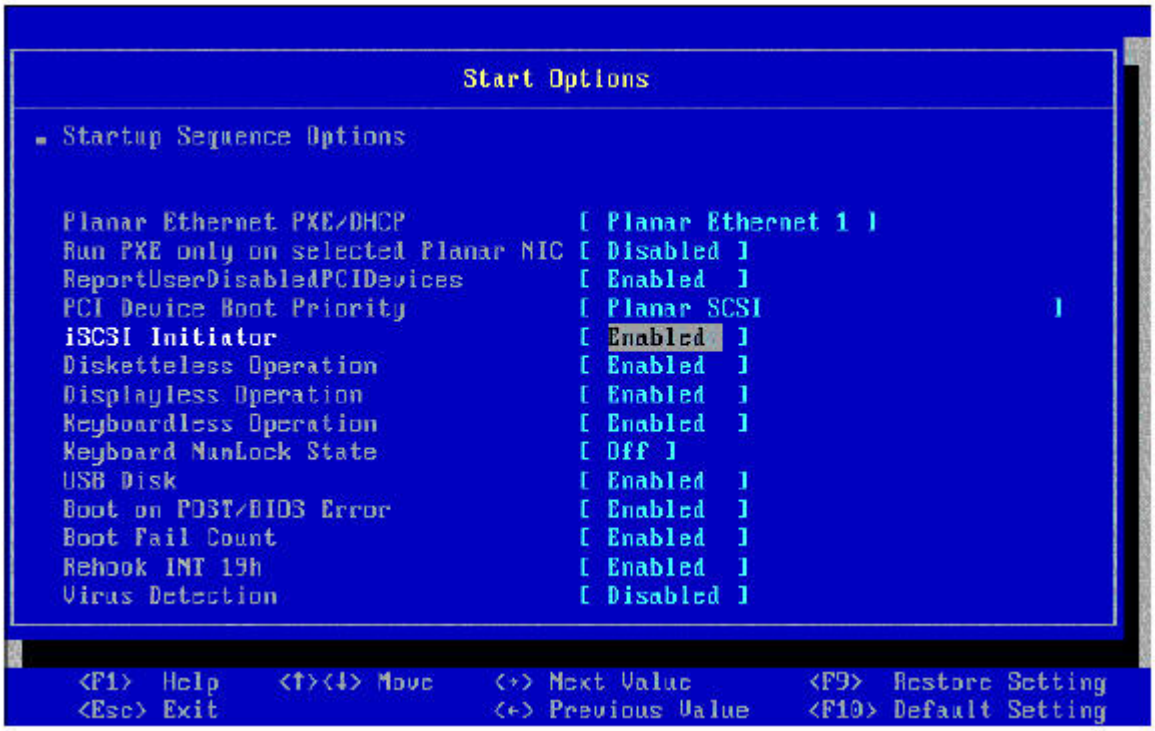


*Figure 1. Blade model 8843 preparation panel*

1. Update the system BMC to the latest level of firmware.
2. Update the system BIOS to the latest level of firmware.
3. Update the firmware on plug-in cards (if any).
4. For each Blade, configure BIOS setup:
   a. Power on the system. Press F1 to enter setup.
   b. Load default settings
   c. **Start Options -> iSCSI Initiator -> Enabled -> Esc**
   d. Save settings.

# Chapter 4. iSCSI firmware error messages

The displayed error code is four characters (two bytes):

- Upper byte: First target
- Lower byte: Second target

## Error codes

```
POST SUCCESSFUL              0x00
POST NO ATTEMPT TO CONNECT TO TARGET     0x01
UNEXPECTED                 0x02
UNABLE TO SEND DHCP PACKET         0x10
DIDNT GET ANY DHCP OFFER          0x11
DIDNT RECEIVE VALID DHCP ACK        0x12
DIDNT GET ANY VALID ISCSI DHCP OFFER     0x13
DHCP ACK IS NOT ISCSI VALID         0x14
DHCP INFORM INVALID DISCOVERY IP       0x15
DHCP INFORM FAILED GET DHCP2 MAC       0x16
DIDNT GET VALID DHCP INFORM ACK       0x17
MISSING OPTION 203             0x30
UNABLE TO GET INITIATOR MAC         0x31
INITIATOR NAME TOO LONG           0x32
TARGET OPTION FORMAT ERROR         0x33
TARGET OPTION INVALID IP          0x34
TARGET OPTION INVALID PROTOCOL        0x35
TARGET OPTION INVALID PORT         0x36
TARGET OPTION INVALID LUN          0x37
TARGET OPTION NAME TOO LONG         0x38
MISSING OPTION 17             0x39
MISSING OPTION HOSTNAME           0x3A
ERROR PARSING OPTION RETRY         0x3B
ERROR PARSING OPTION SCOPE         0x3C
BOTH DHCP OPTION 43 AND 17 DEFINED      0x3D
START UNIT FAILED             0x50
TEST UNIT READY FAILED           0x51
FIND BLOCK SIZE FAILED           0x52
PARAM SIGNATURE INVALID           0x60
PARAM VERSION INVALID            0x61
PARAM LEVEL INVALID            0x62
PARAM ROM LENGTH INVALID          0x63
ROM TABLE CHECKSUM ERROR          0x64
MISSING TARGET CHAP ID           0x65
MISSING TARGET CHAP PASSWORD        0x66
MISSING INITIATOR CHAP ID          0x67
MISSING INITIATOR CHAP PASSWORD       0x68
UNSUPPORTED SECURITY MODE          0x69
TARGET IP INVALID             0x6A
TARGET NAME INVALID            0x6B
IPV6 UNSUPPORTED              0x6C
LUN INVALID                 0x6D
NO TARGET PRESENT             0x6E
INVALID INITIATOR IP            0x6F
INVALID INITIATOR NAME           0x70
UNSUPPORTED S D TYPE            0x71
TARGET PORT INVALID            0x72
UNSUPPORTED DISCOVERY TYPE         0x73
GATEWAY REQUIRED              0x74
UNABLE TO CREATE TCP CONNECTION TO TARGET   0x80
SECURITY PHASE FAILED            0x81
OPERATIONAL PARAMS PHASE FAILED       0x82
CHAP AUTHENTICATION FAILED         0x83
```

## POST error codes

This section contains the POST error codes for iSCSI boot. The format of the error code is:

```
0018XYSS VVVV DDDD
```

Where:

**XY** is the specific 1800 series error code.

**SS** is the slot number of the device where the error occurred. Code 00 indicates the planar device.

**VVVV**
is the PCI vendor ID of the device where the error occurred.

**DDDD**
is the PCI device ID of the device where the error occurred, if applicable.

Table 1 lists the error code definitions.

*Table 1. POST error code definitions*

| XY Value | Error code definition |
|---|---|
| 80 | Invalid parameter structure |
| 81 | Unsupported parameter version |
| 82 | No network connection |
| 83 | No target response (timeout) |
| 84 | Target found, but not ready |
| 85 | No DHCP server response |
| 86 | No valid DHCP data found |
| 87 | Target rejected initiator IQN |
| 89 | CHAP login failure |
| 90 | Target CHAP identification failure |
| 91 | Other communication error |
| 94 | No iSCSI parameter data |
| 95 | Invalid hardware |
| 96 | Target not responding during SMI |
| 99 | Other SMI communication failure |

# Appendix. Notices

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# Glossary

## Terms

This glossary defines technical terms and abbreviations used in this iSCSI configuration manager document. If you do not find the term you are looking for, view the IBM Glossary of Computing Terms, located at: http://www.ibm.com/ibm/terminology.

*Selection of Terms:* A term is a word or group of words to be defined. In this glossary, the singular form of the noun and the infinitive form of the verb are the terms most often selected to be defined. If the term may be abbreviated, the abbreviation is indicated. The abbreviation is also defined in its proper place in the glossary.

**A**

**ASYNC**
See **asynchronous**. See also **synchronous**.

**asynchronous**
Pertaining to events that are not synchronized in time or do not occur in regular or predictable time intervals. See also. See also **synchronous**.

**B**

**Basic Input/Output System (BIOS)**
The code that controls basic hardware operations, such as interactions with diskette drives, hard disk drives, and the keyboard.

**baud** The number of changes in signal levels, frequency, or phase per second on a communication channel. If each baud represents 1 bit of data, baud is the same as bits per second. However, it is possible for one signal change (1 baud) to equal more than 1 bit of data.

**BIOS** See **Basic Input/Output System**.

**bits per second (bps)**
In serial transmission, the instantaneous bit speed with which a device or channel transmits a character.

**bps** See **bits per second**.

**C**

**cache** Memory used to improve access times to instructions, data, or both. Data that resides in cache memory is normally a copy of data that resides elsewhere in slower, less expensive storage, such as on a disk or on another network node.

**Carrier Sense Multiple Access with Collision Detection (CSMA/CD)**
A class of medium access procedures that allows multiple stations to access the medium at will, without explicit prior coordination, and avoids contention by way of carrier sense and deference. Contention is resolved by way of collision detection and transmission.

**CHAP** See **Challenge Handshake Authentication Protocol**.

**Challenge Handshake Authentication Protocol (CHAP)**
An authentication protocol that protects against eavesdropping by encrypting the user name and password.

**chassis**
The metal frame in which various electronic components are mounted.

**client/server**
Pertaining to the model of interaction in distributed data processing in which a program on one computer sends a request to a program on another computer and awaits a response. The requesting program is called a client; the answering program is called a server.

**collision avoidance**
In carrier sense multiple access with collision avoidance (CSMA/CA), the process of sending a jam signal and waiting for a variable time before transmitting data. The process is designed to avoid two or more simultaneous transmissions.

**CRU** See customer-replaceable unit.

**CSMA/CD**
See **Carrier Sense Multiple Access with Collision Detection**.

**customer-replaceable unit (CRU)**
An assembly or part that a customer can replace.

D

**device parity protection**
A function that protects data stored on a disk-unit subsystem from being lost because of the failure of a single disk unit in the subsystem. When a disk-unit subsystem has device parity protection and one of the disk units in the subsystem fails, the subsystem continues to run. The disk-unit subsystem reconstructs the data after the disk unit is repaired or replaced. See also Redundant Array of Independent Disks.

**DHCP** See **Dynamic Host Configuration Protocol**.

**DIMM**
See **dual inline memory module**.

**document type definition (DTD)**
The rules that specify the structure for a particular class of SGML or XML documents. The DTD defines the structure with elements, attributes, and notations, and it establishes constraints for how each element, attribute, and notation can be used within the particular class of documents.

**drive bay**
A receptacle in an appliance for a hard-disk-drive module. The drive bays are in storage units that can be located in a different rack from the appliance.

**DTD** See **document type definition**.

**Dynamic Host Configuration Protocol (DHCP)**
A communications protocol that is used to centrally manage configuration information. For example, DHCP automatically assigns IP addresses to computers in a network.

**dual inline memory module (DIMM)**
A small circuit board with memory-integrated circuits containing signal and power pins on both sides of the board.

E

**EISA** See Extended Industry Standard Architecture.

**electrostatic discharge**
An undesirable discharge of static electricity that can damage equipment and degrade electrical circuitry.

**engine**
The unit that contains the processors that respond to requests for data from clients. The operating software for the IBM TotalStorage appliance resides in the engine. See also storage port.

**Ethernet**
A packet-based networking technology for local area networks (LANs) that allows multiple access and handles contention by using Carrier Sense Multiple Access with Collision Detection (CSMA/CD) as the access method. Ethernet is standardized in the IEEE 802.3 specification.

**expansion slot**
In personal-computer systems, one of several receptacles in the rear panel of the system unit into which a user can install an adapter.

**Extended Industry Standard Architecture (EISA)**
The PC bus standard that extends the AT bus (ISA bus) to 32 bits and provides support for bus master. It was announced in 1988 as a 32-bit alternative to the Micro Channel that would preserve investment in existing boards. PC and AT adapters (ISA adapters) can plug into an EISA bus.

**extensible markup language (XML)**
A standard metalanguage for defining markup languages that is based on Standard Generalized Markup Language (SGML).

F

**File Transfer Protocol (FTP)**
In the Internet suite of protocols, an application layer protocol that uses TCP and Telnet services to transfer bulk-data files between machines or hosts.

**FTP** See **File Transfer Protocol**.

G

**GBIC** See gigabit interface converter.

**gigabit interface converer (GBIC)**
An encoding/decoding device that is a class-1 laser component assembly with transmitting and receiving receptacles that connect to fiber-optic cables. GBICs perform a serial optical-to-electrical and electrical-to-optical conversion of the signal. The GBICs in the switch can be hot-swapped.

## H

**host** In TCP/IP, any system that has at least one Internet address associated with it.

## I

**iLUN** See iSCSI client logical-unit number.

**initiator**
In Small Computer System Interface (SCSI) technology, the part of a host computer that communicates with its attached targets.

**Internet Protocol (IP)**
A protocol that routes data through a network or interconnected networks. This protocol acts as an intermediary between the higher protocol layers and the physical network.

**interrupt request (IRQ)**
An input found on a processor that causes it to suspend normal instruction execution temporarily and to start executing an interrupt handler routine.

**IP** See **Internet Protocol**.

**IRQ** See **interrupt request**.

**iSCSI client logical-unit number (iLUN).**
A unique number that is assigned to each virtual logical unit number (VLUN). The iLUN for a single client starts at zero and increments sequentially.

**iSCSI configuration manager**
A standalone Java application you can use to configure initiators on supported blades in an IBM BladeCenter chassis.

## J

**Java** An object-oriented programming language for portable interpretive code that supports interaction among remote objects. Java was developed and specified by Sun Microsystems, Incorporated.

**Java virtual machine (JVM)**
A software implementation of a processor that runs compiled Java code (applets and applications).

**jumper**
A connector between two pins on a network adapter that enables or disables an adapter option, feature, or parameter value.

**JVM** See **Java virtual machine**.

## L

**LAN** See **local area network**.

**local area network (LAN)**
A network that connects several devices in a limited area (such as a single building or campus) and that can be connected to a larger network.

**logical drive**
A unit of virtual storage that is made available to the network through virtual logical unit numbers (VLUNs) and iSCSI client logical-unit number (iLUNs). A logical drive consists of one or more physical disks that are combined using Redundant Array of Independent Disks (RAID) technology.

**logical unit (LU)**
An access point through which a user or application program accesses the SNA network to communicate with another user or application program.

**logical unit number (LUN)**
In the Small Computer System Interface (SCSI) standard, a unique identifier used to differentiate devices, each of which is a logical unit (LU).

**LU** See **logical unit**.

**LUN** See **logical unit number**.

## M

**megahertz (MHz)**
A unit measure of frequency.

**MHz** See **megahertz**.

**modulation**
(1) The process by which a characteristic of a carrier is varied in accordance with a characteristic of an information-bearing signal. (2) The process by which a message signal is impressed upon a carrier signal so that the carrier is altered to represent the message signal.

**multicast address**
A type of IP address that identifies a group of interfaces and permits all of the systems that are in that group to receive the same packet of information.

## N

**N** See **newton**.

**network interface controller (NIC)**
Hardware that provides the interface control between system main storage and external high-speed link (HSL) ports.

**newton (N)**
The unit of force required to impart an acceleration of one meter per second per second to a mass of one kilogram.

**NIC** See **network interface controller**

**Nonvolatile Random Access Memory (NVRAM)**
Random access memory (storage) that retains its contents after the electrical power to the machine is shut off.

**NVRAM**
See **Nonvolatile Random Access Memory**.

**P**

**path** (1) In a network environment, the route between any two nodes. (2) The route through a file system to a specific file. (3) In VSAM, a named logical entity that is composed of one or more clusters and provides access to the records of a base cluster either directly or through an alternate index.

**path group**
A collection of equivalent paths. Storage devices may have one - n path groups.

**PCI** See **Peripheral Component Interconnect**.

**Peripheral Component Interconnect (PCI)**
A local bus that provides a high-speed data path between the processor and attached devices.

**R**

**RAID** See **Redundant Array of Independent Disks**. See also **device parity protection**.

**Redundant Array of Independent Disks (RAID)**
A collection of two or more disk physical drives that present to the host an image of one or more logical disk drives. In the event of a single physical device failure, the data can be read or regenerated from the other disk drives in the array due to data redundancy. See also **device parity protection**.

**S**

**SAN** See **storage area network**.

**SCSI** See **Small Computer System Interface**.

**Service Location Protocol (SLP)**
An Internet protocol that identifies and uses network hosts without having to designate a specific network host name.

**Simple Network Management Protocol (SNMP)**
A set of protocols for monitoring systems and devices in complex networks. Information about managed devices is defined and stored in a Management Information Base (MIB).

**SLP** See Service Location Protocol.

**Small Computer System Interface (SCSI)**
An ANSI-standard electronic interface that allows personal computers to communicate with peripheral hardware, such as disk drives, tape drives, CD-ROM drives, printers, and scanners faster and more flexibly than previous interfaces.

**SNMP**
See **Simple Network Management Protocol**.

**storage area network (SAN)**
A dedicated storage network tailored to a specific environment, combining servers, storage products, networking products, software, and services.

**storage client network**
A classic, interconnected, fibre-channel fabric with a single, fibre-channel, fabric name.

**storage controller**
A device, such as a Redundant Array of Independent Disks (RAID) controller, that creates and manages other storage devices.

**storage network**
An arrangement that provides shared access to a set of logical unit numbers (LUNs) across one - n storage client networks.

**storage port**
An engine's connection point to a storage client network. A storage port is a member of a single fabric. See also engine.

**storage unit**
Hardware that contains one or more drive bays, power supplies, and a network interface. Some storage units contain Redundant Array of Independent Disks

(RAID) controllers; in this case, the storage unit is accessed by the appliance.

**synchronous**
Pertaining to two or more processes that depend upon the occurrences of specific events, such as a common timing signal. See also asynchronous.

## T

**Target** A collection of logical units (LUs) that are directly addressable on the network. The target corresponds to the server in a client-server model.

**Telnet** In TCP/IP, a protocol that provides remote-terminal connection service. It allows users of one host to log on to a remote host and interact as if they were directly attached terminal users of that host.

## U

**UDP** See **User Datagram Protocol**.

**Universal Serial Bus (USB)**
A serial-interface standard for telephony and multimedia connections to personal computers.

**USB** See **Universal Serial Bus**.

**UFiT** See **User Friendly Instance Tag**.

**User Datagram Protocol (UDP)**
An Internet protocol that provides unreliable, connectionless datagram service. It enables an application program on one machine or process to send a datagram to an application program on another machine or process.

## V

**virtual local area network (VLAN)**
A logical association of switch ports based upon a set of rules or criteria, such as Medium Access Control (MAC) addresses, protocols, network address, or multicast address. This concept permits the LAN to be segmented again without requiring physical rearrangement.

**vital product data (VPD)**
A structured description of a device or program. For devices, it is recorded in the device at manufacture and includes at least the type, model, serial number, and installed features. It may include the manufacturer's ID and other fields. For programs, it is compiled as a data area accompanying the program and includes the name of the licensed program or Licensed Internal Code group, the release and modification, the program module names, the national language or languages selected, and possibly other fields. Vital product data is transferred from the device to the system and stored for display. Vital product data is also visible on the device name plate or a similar tag.

**virtual logical unit number (VLUN)**
A subset of a logical drive.

**VLAN** See **virtual local area network**.

**VLUN** See **virtual logical unit number**.

**VPD** See **vital product data**.

## X

**XML** See **Extensible Markup Language**.

# Index

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