

Designed for easy-to-manage, highly scalable, high-performance enterprise SAN solutions



IBM TotalStorage SAN140M



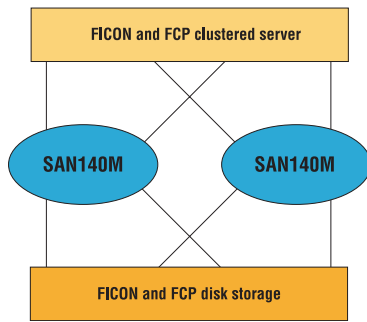
Space-saving design with 140 ports in 12U rack height

IBM System Storage and TotalStorage enterprise solutions

A wide range of IBM System Storage™ and TotalStorage® enterprise storage area network (SAN) infrastructure simplification and business continuity solutions can be created with the IBM TotalStorage SAN140M director. Infrastructure simplification solutions for IBM System i, System p and System x Fibre Channel servers and IBM System z mainframe FICON servers include storage consolidation and highest-availability server clustering with IBM TotalStorage DS4000™ series and disk storage arrays. Business continuity solutions include data protection with IBM TotalStorage Ultrium® 2 Linear Tape-Open (LTO) or IBM TotalStorage 3590 and 3592 Tape Drives and IBM Tivoli® Storage Manager data protection software.

Highlights

- **Easy-to-manage enterprise infrastructure simplification and business continuity solutions for IBM System i™, System p™, System x™, and System z™**
- **Highly scalable, 16- to 140-port switching backbone for advanced enterprise infrastructure simplification and business continuity solutions, including mainframe IBM FICON® disk and tape storage**
- **Designed to provide high availability of all IBM SAN switches through redundancy of active components, including hot-swappable processors, fans and power supplies; HotCAT online code activation; and call-home capability with Enterprise Fabric Connectivity Manager (EFCM) software**
- **Enterprise Fabric Connectivity Manager, FICON Management Server (CUP) and Open Systems Management Server software designed to help simplify management of complex SAN infrastructures**



High-availability server clustering solution with redundant directors

Infrastructure simplification solutions

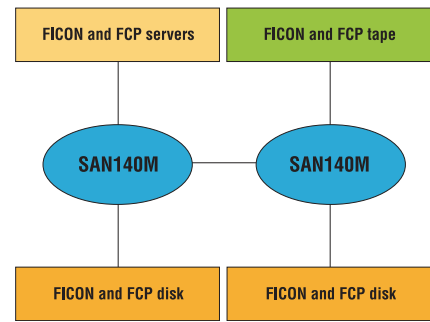
High-availability server clustering storage consolidation solutions can be created with redundant directors. A typical entry-level server clustering solution consists of up to 28 Fibre Channel Protocol (FCP) and FICON servers, each with dual-channel adapters, and four disk storage arrays, each with dual adapters cross-connected to two 32-port IBM TotalStorage SAN140M directors.

This server clustering solution can be scaled up to 132 servers and eight disk arrays, cross connected to two 140-port directors by non-disruptively adding 4-port cards. Additional IBM TotalStorage SAN m-type switches can be added for almost unlimited scalability.

An entry-level data protection solution consists of up to 30 servers attached to one 32-port SAN140M director, with one disk storage array and a library with one tape drive.

An expanded Metro Mirror solution, designed to help protect data and provide disaster tolerance, can be created with a 140-port local site director and cascaded with a 140-port recovery site director. The local site and recovery site directors are connected with two or more longwave Inter-Switch Links (ISLs) to support resiliency. These ISLs can support up to 35 km distances at 2 Gbps, up to 10 km at 4 Gbps and up to 40 km at 10 Gbps with standard director features.

The local site and the remote site can support a combination of up to 140 FICON and Fibre Channel servers, disk storage array, tape library drive and ISL connections. Additional IBM TotalStorage SAN m-type switches can be added for almost unlimited scalability (mainframe FICON director cascading is limited to ISLs between two directors).



Metro Mirror solution with up to 100 km between sites

IBM System Storage and TotalStorage enterprise solutions

A wide range of IBM System Storage and TotalStorage enterprise SAN infrastructure simplification and business continuity solutions can be created with the IBM TotalStorage SAN140M director. Enterprise-to-edge SAN management features are offered for advanced enterprise infrastructure simplification solutions including disk and tape SAN island consolidation. IBM TotalStorage SAN140M switch data protection solutions with the IBM TotalStorage 3590 or IBM TotalStorage tape drives with Fibre Channel-Arbitrated Loop (FC-AL) attachment can be consolidated with IBM TotalStorage SAN m-type switch and director infrastructure simplification solutions. Tape and disk SAN consolidation can be especially attractive when extended-distance links between local and remote sites

can be combined. For example, IBM System Storage and TotalStorage Business Continuity Metro Mirror solutions and solutions designed to help protect data and provide disaster tolerance can share links in an enterprise SAN environment.

High-availability features

Enterprise SAN users require high-availability switch backbone solutions. The high-availability capabilities of the IBM TotalStorage SAN140M director are designed to provide redundancy for critical active electronic components, supporting data access and high performance in the event of a single component failure.

The SAN140M director is designed with redundant power supplies and cooling fans, along with redundant processors that help support automatic failover. It is designed to provide hot swapping capability for all field-replaceable units, HotCAT online code activation and automatic fault detection and isolation. Together, these capabilities help support non-disruptive maintenance and upgrades without loss of data access.

In addition, call-home and e-mail capabilities can alert support and maintenance personnel to help accelerate problem resolution. Redundant directors are commonly deployed for highest-availability clustering applications.

Enterprise Fabric Connectivity Manager

Enterprise Fabric Connectivity Manager (EFCM) software is designed to support interconnection of multiple IBM TotalStorage SAN m-type switches and directors for the creation of enterprise-to-edge SANs.

The **SAN140M Element Manager** feature is designed to enable enterprise-to-edge management of SAN140M directors when interconnected with multiple IBM TotalStorage SAN m-type switches and directors in an enterprise SAN solution. EFCM software, with the 1U Rack Mount Management Server, is designed to centralize the management of multiple, distributed switches and directors in an enterprise-wide Fibre Channel fabric.

EFCM software is designed to provide advanced functions such as non-disruptive code activation, call-home and e-mail alerts as events occur. The director is connected through an Ethernet hub to the 1U Rack Mount Management Server with EFCM software.

Open Trunking is designed to optimize the total throughput between two switches automatically by redirecting traffic from high utilization links to links with available bandwidth. Open Trunking is designed to continuously monitor loads on all links, detect congestion and automatically balance traffic across available ISLs without operator interaction. Based on constant traffic monitoring, Open Trunking acts to help improve throughput and reroute traffic efficiently.

Open System Management Server

(OSMS) is an ANSI (American National Standards Institute)-based feature (standard with firmware 6.2 or later) that supports SAN management software from vendors such as VERITAS, Tivoli and BMC. OSMS is designed to extend

the switch's capability to include in-band management with an open systems host-based application. OSMS allows the director and devices attached to it to be "discovered," or seen in a fabric through a framework software application.

SANtegrity™ Security Suite is designed to help enhance business continuity by reducing the impact of human influences on networked data. SANtegrity Zoning, a standard capability of Enterprise Operating System (E/OS) 5.0, provides hardware-enforced world wide name (WWN) and port zoning. SANtegrity Secure Management Zone (SMZ) is designed to secure the management access to local and remote SAN devices over a secure connection. **SANtegrity Binding** creates multiple layers of access control, including port, switch and fabric binding.

Standards-based **SANtegrity Authentication** is designed to force each device in the SAN to prove what it is in order to avoid unauthorized access and unauthenticated devices. SANtegrity Binding is required in order to use the Authentication feature.

FICON In-Band Management Server supports management of the SAN140M switch using System Automation for IBM z/OS® and System Automation for IBM OS/390® and IBM zSeries® 900 servers. IBM 9032 ESCON® directors are a type of dynamic, in-band management. System Automation—for z/OS or OS/390—is designed to concurrently manage IBM 9032 ESCON directors as well as McDATA® FICON directors.

N_Port ID Virtualization (NPIV) feature provides support for attached IBM System z9™ Fibre Channel Protocol (FCP) channels and is designed to allow the sharing of a single, physical FCP channel among operating system images, whether in LPARs or as IBM z/VM® guests in virtual machines.

NPIV helps to improve I/O performance with increased resource sharing and channel utilization of FCP channels among operating system images in LPARs or virtual machines and helps to facilitate infrastructure simplification with virtual channel administration and management.

Preferred Path Option is designed to allow a customer to define routes across a fabric. The Preferred Path feature (standard with firmware 5.0 or later) modifies the behavior of Open Trunking by providing guidance for the balancing function. The Preferred Path configuration helps address user preference regarding exit port assignment but is subject to the standard rules regarding the Fabric Shortest Path First (FSPF) protocol.

Full Volatility is designed to support high-security environments, which require no customer data be retained after power-off. The Full Volatility feature is designed to configure a switch or director so that no frame data is stored after a power-off.

High performance

The IBM TotalStorage SAN140M director provides 1, 2 and 4 Gbps ports. Each director port auto-negotiates to 1, 2 or 4 Gbps, depending upon the device attachment. Serial cross-bar technology is designed to deliver scalable, 140-port non-blocking performance. The unique single-stage switching architecture is designed to

provide consistently low latency across all ports. Up to full 4 Gbps throughput at extended distances up to 60 km (37 miles) and up to full 2 Gbps throughput at extended distances up to 125 km (65 miles) is enabled with longwave optics, with 125 buffer credits per port and repeaters.

Configuration flexibility

The IBM TotalStorage SAN140M director provides a wide range of configuration options. The universal port module, **UPM**, features provide four Fibre Channel ports. Shortwave and longwave 10 kilometer 2 Gbps UPMs are offered. **QPM**, 4 Gbps capable features provide four Fibre Channel ports. QPM features may be configured as two 4 Gbps; four 2 Gbps; or one 4 Gbps and two 2 Gbps ports, Shortwave and longwave 4 and 10 kilometer QPMs are offered. You can combine UPM and QPM features for scalability from 16 to 140 ports. High-performance **XPM Blade** features provide one 10 Gbps inter-switch link, ISL port with either

shortwave or longwave XFP fiber optical transceivers. The XPM blade with longwave optics supports distances up to 10 km; and up to 100 km (with repeaters) with full performance. Four or more 2 Gbps ISLs may be consolidated with one XPM blade. This can help simplify management and reduce TCO—especially for business continuity solutions over metro distances. Other features include extended-distance 20 km and 35 km, 2 Gbps longwave optical transceivers.

Flexible Fibre Channel connectivity

The TotalStorage SAN140M director is designed to provide Fibre Channel connectivity to:

- *IBM System x*
- *Other Intel® processor-based servers running Microsoft® Windows NT®, Windows® 2000, Windows Server™ 2003, Red Hat Enterprise Linux® 3, SUSE Linux or Novell NetWare*
- *IBM System p*
- *IBM System i*

- *IBM System z FICON systems*
- *Selected Sun and HP servers*
- *IBM TotalStorage Enterprise Storage Server® systems*
- *IBM System Storage DS4000 series*
- *IBM TotalStorage 3590* and 3592 Tape Drives and IBM TotalStorage 3494 Tape Library*
- *IBM TotalStorage 3582* and 3583* Tape Libraries and IBM TotalStorage 3584* Tape Library*
- *IBM TotalStorage NAS Gateway 500*
- *IBM TotalStorage SAN Volume Controller*
- *IBM TotalStorage SAN m-type switches, McDATA Sphereon switches and McDATA Intrepid directors*

For the most current and complete information, refer to ibm.com/storage/san/m_type.

IBM TotalStorage SAN140M director at a glance

Physical characteristics

Height (rack-mount)	529 mm/20.8 in (12U)
Width	445 mm/17.5 in
Depth	613 mm/24.1 in
Weight	75.9 kg/167 lbs

Operating environment

Temperature	4.40° C to 40° C/40° F to 104° F
Relative humidity	8% to 80%

Electrical requirements

Power	200–240 V AC, 47–63 Hz
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Product numbers

2027 Model 140—IBM TotalStorage SAN140M director with minimum of four 4-port UPMs and/or QPMs (16 ports) and up to 35 UPMs and/or QPMs (140 ports); embedded SANpilot™ management; dual, hot-pluggable processors, power supplies and fans

FC 1568—Longwave 10 Gbps 40 km XPM optical transceiver

FC 3220—Extended longwave 20 km transceiver

FC 3235—Extended longwave 35 km transceiver

FC 6210—UPM, 2 Gbps with four shortwave transceivers

FC 6211—UPM, 2 Gbps with four longwave transceivers

FC 3421—Longwave 4 Gbps 4 km transceiver

FC 3422—Longwave 4 Gbps 10 km transceiver

FC 6236—QPM, 4 Gbps short wave port module with four SFPs

FC 6237—QPM, 4 Gbps long wave 4 km port module with four SFPs

FC 6238—QPM, 4 Gbps long wave 10 km port module with four SFPs

FC 6003—FICON In-Band Management Server

FC 6007—SANtegrity Binding

FC 6120—Open Trunking

FC 6140—SAN140M Element Manager

FC 6145—SAN140M N_Port ID Virtualization

FC 6150—Full Volatility

FC 6224—SANtegrity Authentication

FC 1106—SNS Open System Package with Open Trunking, SANtegrity Binding and SANtegrity Authentication

FC 1126—SNS Mainframe Cascading Package with SNS Mainframe Package features and Open Trunking, SANtegrity Binding and SANtegrity Authentication

FC 1130—SNS Mainframe Package with FICON Management Server, FICON CUP Zoning and N_Port ID Virtualization

FC 6231—XPM Blade with shortwave optics

FC 6232—XPM Blade with longwave optics

Fiber optic cables

FC 1800—Fibre Channel SC male/SC female coupling cable, multimode optical, 50 µm

FC 1801—Fibre Channel SC male/SC female coupling cable, single-mode optical, 9 µm

FC 1805—Fibre Channel cable, LC/SC, single-mode optical, 9 µm, 3 meters

FC 1810—Fibre Channel cable, LC/SC, multimode optical, 50.0 µm, 10 meters

FC 1811—Fibre Channel cable, LC/LC, multimode optical, 50.0 µm, 10 meters

For more information

Contact your IBM representative or IBM Business Partner or visit:

ibm.com/storage/san/m_type



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* IBM 3592 and 358x 2 LTO fabric tape drives and the IBM Enterprise Tape Controller 3590-A60 FICON tape subsystem can be directly attached. The IBM TotalStorage SAN24M-1 switch is required for attachment of IBM 3590 and 358x (with FC-AL) tape drives.