



# StorFacts™ Report

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## Fibre Channel Analysis

Fibre Channel is a scalable, high-performance interconnect standard that enables fast transfer of data between workstations, shared storage, peripherals and host systems. At up to speeds of 2 Gigabits per second this data transfer technology combines the attributes of a data channel with the attributes of a network. Fibre Channel is capable of supporting multiple protocols and a variety of topologies, making it the most versatile data transfer technology available. Fibre Channel combines storage I/O channels with networking to create a high-bandwidth networking technology suited for today's expanding data needs.

This StorFacts™ Report analyzes the past four generations of p5/pSeries Fibre Channel adapters. Features discussed include the following:

1. FC5716 ~ 400MB/s
2. FC1977 ~ 400MB/s
3. FC1957 ~ 400MB/s
4. FC6239 ~ 350MB/s
5. FC6228 ~ 300MB/s
6. FC6227 ~ 100MB/s



For more information - <http://www.gstinc.com/store/Fibre-C610.aspx>





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## Fibre Overview

The information explosion and the need for high-performance communications for server-to-storage and server-to-server networking have been the focus of much attention for this new millennium. Performance improvements in storage, processors, and workstations, along with the move to distributed architectures such as client/server, have spawned increasingly data-intensive and high-speed networking applications. The interconnect between these systems and their input/output devices demands a new level of performance in reliability, speed, and distance. Fibre Channel, a highly-reliable, one and two gigabit interconnect technology (the fastest interface on this planet) allows concurrent communications among workstations, mainframes, servers, data storage systems, and other peripherals using SCSI, IP and a wide range of other protocols to meet the needs of the data center.

### Why Fibre Channel?

Fibre Channel is the solution for IT professionals who need reliable, cost-effective information storage and delivery at blazing speeds. With development started in 1988 and ANSI standard approval in 1994, Fibre Channel is the mature, safe solution for one and two gigabit communications.

Today's data explosion presents unprecedented challenges incorporating a wide range of application requirements such as database and file management, transaction processing, data warehousing, imaging, integrated audio/video, networked storage, real-time computing, collaborative projects and CAD/CAE. Fibre Channel is simply the easiest, most reliable solution for information storage and retrieval.

Fibre Channel, a powerful ANSI standard, economically and practically meets the challenge with these advantages:

- Price Performance Leadership - Fibre Channel delivers cost-effective solutions for storage and networks delivering attractive return on investment (ROI).
- Solutions Leadership - Fibre Channel is the defacto standard for implementing Storage Area Networks (SANs) and provides versatile connectivity with scalable performance.
- Reliable - Fibre Channel, a most reliable form of communications, provides a variety of quality of service choices and sustains an enterprise with assured information delivery.



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## Why Fibre Channel....

- Gigabit Bandwidth Now – Both 1 and 2 gigabit solutions are in place today! Solutions are backward compatible and offer customers the highest bandwidth network interface technology in the industry.
- Multiple Topologies - Dedicated point-to-point, shared loops, and scaled switched topologies meet application requirements. This offers the customer the ability to develop a storage network with configuration choices at a range of price points, levels of scalability, and availability.
- Multiple Protocols - Fibre Channel delivers data. SCSI, IP, VI, ESCON and other storage and networking protocols to meet the customer needs for storage connectivity, cluster computing and network interconnect.
- Scalable - From single point-to-point gigabit links to integrated enterprises with hundreds of servers, Fibre Channel delivers unmatched performance and configuration flexibility.
- Congestion Free - Fibre Channel's credit-based flow control delivers data as fast as the destination buffer is able to receive it in order to meet high throughput data transfers. This facilitates applications like backup, restore, remote replication and other business continuance enabling capabilities.
- High Efficiency - Real price performance is directly correlated to the efficiency of the technology. Fibre Channel has very little transmission overhead. Most important, the Fibre Channel protocol is specifically designed for highly efficient operation using hardware accelerated implementations.

Information management is a key competitive factor for organizations, and Fibre Channel enhances IT departments' ability to access and protect it more efficiently.

- High-performance storage consolidation
- Centralized management of server and storage assets
- Large data bases, data warehouses, and data marts
- Storage backup systems and recovery with LAN-free and Serverless techniques
- SAN implementations with robust storage management virtualization, hierarchical storage management (HSM), and storage resource management
- Network Attached Storage (NAS) and Storage Area Networking (SAN) integration
- High-performance workgroups, data centers, and remote network implementations
- Campus backbones and wide area network deployments
- Edge networks for data replication and scalable



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**5716**

**2Gbit Fibre Channel Adapter, PCI-X ~ 400MB/s**

The 2 Gigabit Fibre Channel PCI-X Adapter is a 64-bit address/data, short form factor PCI-X adapter with an LC type external fiber connector that provides single or dual initiator capability over an optical fiber link or loop.

With the use of appropriate optical fiber cabling, this adapter provides the capability for a network of high speed local and remote located storage.

The 2 Gigabit Fibre Channel PCI-X Adapter will auto-negotiate for the highest data rate (either 1 Gbps or 2 Gbps) of which the device or switch is capable.

Distances of up to 500 meters running at 1 Gbps data rate and up to 300 meters running at 2 Gbps data rate are supported between the adapter and an attaching device or switch.

When used with IBM supported Fibre Channel storage switches supporting long-wave optics, distances of up to 10 kilometers are capable running at either 1 Gps or 2 Gps data rates.

The 2 Gigabit Fibre Channel PCI-X Adapter can be used to attach devices either directly, or by means of Fibre Channel Switches.

Max 6: 9111-520

Max 5: 9113-550, 9124-720

Max 24: 9117-570

Max 160: 9119-590

Max 192: 9119-595

***OS levels required:***

AIX 5.2 or AIX 5.3 or later

SUSE LINUX Enterprise Server 9 for POWER

Red Hat Enterprise Linux AS for POWER Version 3



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1977

## 2 Gigabit Fibre Channel PCI-X Adapter

The 2 Gigabit Fibre Channel PCI-X Adapter is a 64-bit address/data, short form factor PCI-X adapter with an LC type external fiber connector that provides single or dual initiator capability over an optical fiber link or loop.

This Feature was originally announced as FC 5716 for the 912x OpenPower Systems. However, it has since been re-numbered to FC 1977 and assigned a separate Marketing PN. Some IBM publications may still refer to the original FC.

The 2 Gigabit Fibre Channel PCI-X Adapter will auto-negotiate for the highest data rate (either 1GBps or 2GBps) of which the device or switch is capable.

Distances of up to 500 meters running at 1GBps data rate and up to 300 meters running at 2GBps data rate are supported between the adapter and an attaching device or switch. When used with IBM supported Fibre Channel storage switches supporting long-wave optics, distances of up to 10 kilometers are capable running at either 1 Gps or 2 Gps data rates.

The 2 Gigabit Fibre Channel PCI-X Adapter can be used to attach devices either directly, or by means of Fibre Channel Switches.

This adapter utilizes LC type connectors. If attaching a device or switch with a SC type fiber connector, FC #2456 LC-SC 50 Micron Fiber Converter Cable or FC #2459 LC-SC 62.5 Micron Fiber Converter Cable is required.

Requires: 1 empty PCI or PCI-X slot





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1957

2 Gigabit Fibre Channel PCI-X Adapter (Low profile)

The 2 Gigabit Fibre Channel PCI-X Adapter is a 64-bit address/data, low profile form factor PCI-X adapter with an LC type external fiber connector that provides single or dual initiator capability over an optical fiber link or loop.

With the use of appropriate optical fiber cabling, this adapter provides the capability for a network of high speed local and remote located storage.

The 2 Gigabit Fibre Channel PCI-X Adapter will auto-negotiate for the highest data rate (either 1Gbp/s or 2Gbp/s) of which the device or switch is capable.

Distances of up to 500 meters running at 1Gbp/s data rate and up to 300 meters running at 2Gbp/s data rate are supported between the adapter and an attaching device or switch.

When used with IBM supported Fibre Channel storage switches supporting long-wave optics, distances of up to 10 kilometers are capable running at either 1 Gps or 2 Gps data rates.

The 2 Gigabit Fibre Channel PCI-X Adapter can be used to attach devices either directly, or by means of Fibre Channel Switches.

If attaching a device or switch with a SC type fiber connector(s), one of the following Converter Cables is required: -

#2456 LC-SC 50 Micron Fiber Converter Cable

#2459 LC-SC 62.5 Micron Fiber Converter Cable

Requires: PCI or PCI-X Slot

Min OS levels:

AIX 5.2

SUSE LINUX Enterprise Server 9 for POWER

Red Hat Enterprise Linux AS 4 for POWER



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**6239**

**2Gbit Fibre Channel Adapter, PCI-X ~ 350MB/s**

64-bit PCI Bus (64-bit address/data), short form factor PCI-X adapter with LC type external fiber connectors that provides single or dual initiator capability over an optical fiber link or loop.

With the use of appropriate optical fiber cabling, this adapter provides the capability for a network of high speed local and remote located storage.

The adapter will auto-negotiate for the highest data rate (1Gbps or 2Gbps) of which the device or switch is capable.

Distances Supported:

1. Up to 500m at 1Gbps data rate.
2. Up to 300m at 2Gbps data rate.

When used with supported Fibre Channel storage switches supporting long-wave optics, distances of up to 10 Km are capable running at either 1Gps or 2Gps data rates.

The adapter can be used to attach devices either directly, or by means of Fibre Channel Switches.

If attaching a device or switch with a SC type fiber connector a converter cable is required:

- #2456: LC-SC 50 Micron Fiber Converter Cable
- #2459: LC-SC 62.5 Micron Fiber Converter Cable

Fibre Channel boot capability is supported with system firmware at the correct support level. Systems manufactured prior to November 30, 2001, may require a system firmware update. Refer to: <http://www.austin.ibm.com/support/micro/>

Fibre Channel boot requires AIX 5.1 at the September 2001 maintenance level or later - along with a disk subsystem on which this boot capability has been qualified.

Requires: PCI or PCI-X slot



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**6228**

**2Gbit Fibre Channel Adapter, 64-Bit PCI ~ 300MB/s**

64-bit PCI Bus (64-bit address/data), short form factor PCI adapter with LC type external fiber connectors that provides single or dual initiator capability over an optical fiber link or loop.

With the use of appropriate optical fiber cabling, this adapter provides the capability for a network of high speed local and remote located storage.

The adapter will auto-negotiate for the highest data rate (1Gbps or 2Gbps) of which the device or switch is capable.

Distances Supported:

1. Up to 500m at 1Gbps data rate.
2. Up to 300m at 2Gbps data rate.

When used with supported Fibre Channel storage switches supporting long-wave optics, distances of up to 10 Km are capable running at either 1Gps or 2Gps data rates.

The adapter can be used to attach devices either directly, or by means of Fibre Channel Switches.

If attaching a device or switch with a SC type fiber connector a converter cable is required:

- #2456: LC-SC 50 Micron Fiber Converter Cable
- #2459: LC-SC 62.5 Micron Fiber Converter Cable

Fibre Channel boot capability is supported with system firmware at the correct support level. Systems manufactured prior to November 30, 2001, may require a system firmware update. Refer to: <http://www.austin.ibm.com/support/micro/>

Fibre Channel boot also requires AIX 4.3.3 or AIX 5.1 at the September, 2001 maintenance level or later along with a disk subsystem on which this boot capability has been qualified.



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**6227**

**1Gbit Fibre Channel Adapter, 32-Bit PCI ~ 100MB/s**

32-bit PCI to NL-Port (Fibre Channel node port connected to an arbitrated loop) host bus adapter that provides Single initiator (one adapter for PCI bus per loop) capability over an optical fiber link or loop running up to 100MB/s.

With the use of optical fiber cabling, this adapter provides the capability for a network of high speed local and remote located storage.

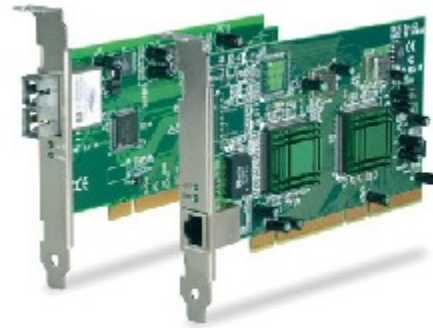
1.0625 Gbps (wire-speed) corresponds to approximately 100 MBps. Distances of up to 500 meters are supported.

When used with the IBM Fibre Channel Storage Hub, distances of up to 10km are supported. The Gigabit Fibre Channel for PCI Bus can be used to attach devices either directly, or by means of Fibre Channel Switches.

The supported media includes 50 and 62.5 micron multimode fiber.  
The supported transmitter is short-wave laser with open fiber control.

Fibre Channel boot capability is supported with this adapter provided the system microcode and adapter microcode are at the proper support levels.

Fibre Channel boot also requires AIX 4.3.3 or AIX 5.1 at the September, 2001 maintenance level or later along with a disk subsystem on which this boot capability has been qualified.





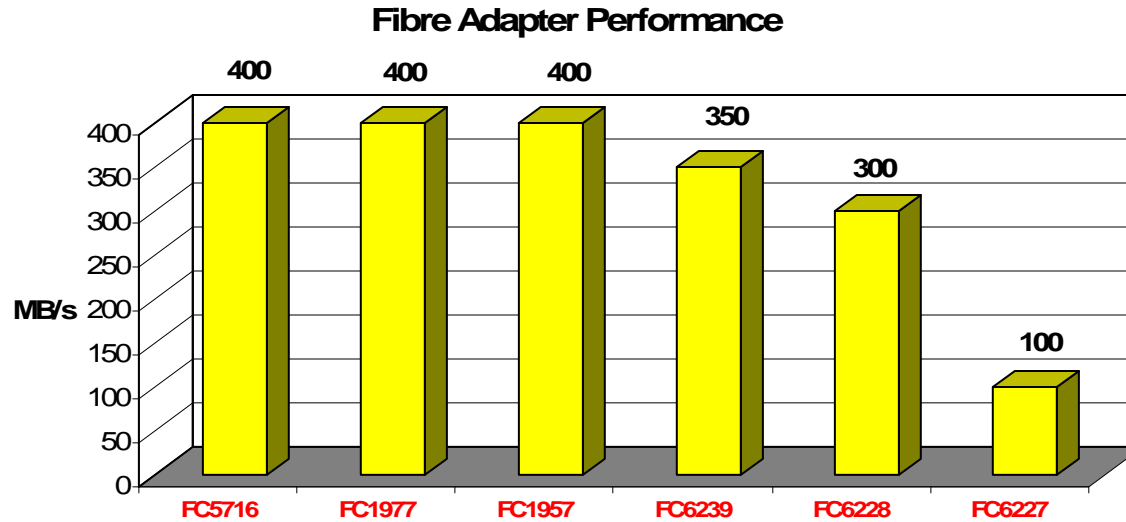
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## P5/pSeries Adapter Summary

Description	FC5716	FC1977	FC1957	FC6239	FC6228	FC6227
<b>Marketing</b>						
Availability	New	New	New	Used	Used	Used
Replacement Feature	-	-	-	FC5716	FC5716	FC5716
<b>Performance</b>						
Sustained	400MB/s	400MB/s	400MB/s	350MB/s	300MB/s	100MB/s
Burst	400MB/s	400MB/s	400MB/s	400MB/s	400MB/s	200MB/s
<b>Link Speed</b>						
1GB/s	Yes	Yes	Yes	Yes	Yes	Yes
2GB/s	Yes	Yes	Yes	Yes	Yes	-
<b>PCI Support</b>						
33MHz/32-bit	Yes	Yes	Yes	Yes	Yes	Yes
33Mhz/64-bit, 66Mhz/64-bit	Yes	Yes	Yes	Yes	Yes	-
<b>PCI-X Support</b>						
66Mhz/64-bit, 100Mhz/64-bit	Yes	Yes	Yes	Yes	-	-
133Mhz/64-bit, 266Mhz/64-bit	Yes	Yes	Yes	Yes	-	-
<b>AIX Support</b>						
4.3.3	-	-	-	-	Yes	Yes
5.1	-	-	-	Yes	Yes	Yes
5.2, 5.3	Yes	Yes	Yes	Yes	Yes	Yes



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p5, pSeries, OpenPower and IntelliStation . Fibre Adapters

Fibre Channel is a data transfer interface technology that combines several common protocols including IP and SCSI, allowing it to merge high-speed I/O and networking functions in a single technology. It is a high-performance interface technology designed for bi-directional, serial data communication between servers, mass storage subsystems and peripherals through hubs, switches and point-to-point connections.