Scalable, high-throughput switch technology for OC-48c and OC-192c applications

IBM

Packet Routing Switch 64G

Highlights

Large-scale functionality in a high-integration chip for compact designs

Multi-terabit growth within a common architecture

Link paralleling to support OC-192c applications

High reliability through proven lossless switchover capability

Comprehensive development support and tools help reduce time to market

High throughput and non-disruptive migration

The IBM Packet Routing Switch 64G (PRS64G) provides a powerful engine for high-throughput switch applications and port speeds up to OC-192c. The chip features fixed-size fast packet switching and is capable of supporting frame- and cell-based traffic. Protocol-independent, it enables non-blocking scalable switch fabrics offering 64-Gbps to 128-Gbps throughput.

The latest member of the IBM family of packet routing switch products, the PRS64G more than doubles the performance of previous-generation IBM switch chips. In addition, it features link paralleling, 32 ports, and enhanced support for low-priority traffic to satisfy the increasing demands of high-throughput, high-reliability applications. The IBM family of packet routing switch products provdes a highly integrated and scalable migration path for a wide range of applications, including enterprise and WAN edge, access, backbone switches, DSLAM products, and mobile base stations.

Manufacturers using the IBM PRS64G can benefit from advanced silicon technology and the proven reliability, redundancy and load balancing features of the IBM packet routing switch technology. The switch offers:

- 32 input ports and 32 output ports
- 64-Gbps aggregate chip throughput (4-Gbps port speed) for OC-48c support
- 64- to 128-Gbps throughput using single-stage speed expansion
- Link paralleling of four ports for OC-192c support
- Quality of service (QoS) with four levels of traffic priority
- Built-in broadcast and multicast support
- Packet lossless switchover capability
- Virtual output queuing with Grant method-based queue flow control

Speed and port expansion enable scalable designs

The IBM Packet Routing Switch 64G provides exceptional scalability, permitting configuration growth in speed per port, number of ports, and aggregate capacity. This allows non-disruptive migration as system requirements change.

The PRS64G supports two types of speed expansion: internal and external. Internal expansion doubles port speed by combining the chip's two subswitch elements, providing economical solutions for applications such as high-speed compact ATM switches operating at OC-48c port speed. Alternatively, two PRS64G chips can be externally combined to double the number of serial I/O data paths from four to eight. This approach improves overall switch throughput, allowing two switch chips to operate together at 128 Gbps, enabling protocol engine applications with 32 x OC-48c port speed.

The switch chip provides additional scalability through port expansion for single-stage and multistage switch designs. The single-stage method of port expansion is well suited for ATM
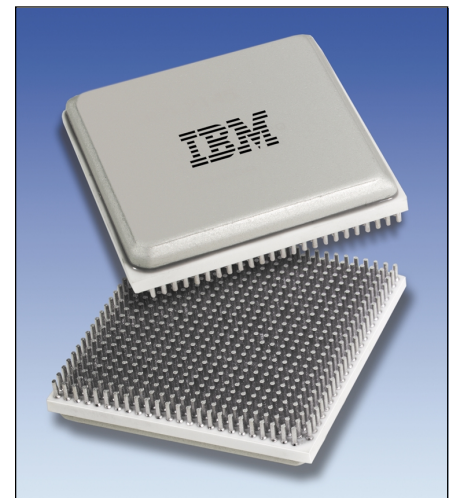
The IBM Packet Routing Switch 64G is a high-performance, scalable switch solution for diverse applications.

Specifications

Supply voltage	2.5 V +/- 5% and 1.8 V +/-5%
Power	25 W @ 100%
Max. junction temperature	0° C to 125° C
Package size	1088-pin CCGA

and IP switching where throughput is of prime importance. The multistage method is ideal for applications that require extensive connectivity and experience low average traffic.

Link paralleling supports OC-192c port speed

By grouping four physical ports to form a unique logical port, the powerful link paralleling feature can support a range of high-speed port requirements Manufacturers using this capability can migrate easily from OC-48c to OC-192c port speed and mix OC-48c and OC-192c port speeds on the same switch, while protecting their hardware and software investment. For example, four PRS64G ports (OC-48c-capable) can be bundled to form a unique OC-192c clear port.

The chip also features shared memory space among its ports to enable enhanced performance, and its Grant method-based flow control allows the traffic manager to perform virtual output queuing. The chip also provides four levels of traffic priority, enabling applications to give precedence to, for example, real-time traffic such as voice and video.

Redundancy support for high availability

To increase availability, switch fabrics are often designed with two redundant planes. If an element in one plane fails, the other plane is can take over; the PRS64G supports this crucial capability. Each switch element has a built-in filtering mechanism for redundancy control. The dual links from the switch-element access manager to the switch core provide the means for lossless switchover.

Highly efficient multicast support

Multicast with QoS is an increasingly valued capability in Internet applications. The PRS64G supports efficient multi-casting, simplifying the design of edge routers and other devices that provide these complex services. To enable multicasting and maximize product resource utilization, the PRS64G executes a scheme of share once and transmit multiple times. The packets are placed in shared memory and the memory-location indexes are stored in the output queues corresponding to the target output ports and associated priorities.

Serial interface chip available

To simplify the design of chassis-based systems requiring a high-speed interconnect across a backplane or short cable distances, IBM offers the IBM packet routing switch serial interface. This companion chip converts a data-aligned serial-link interface to a Utopia 3-like parallel interface. This chip allows traffic managers supporting 32-bit parallel interfaces to connect to redundant switch fabrics that are built on the PRS64G.

Enablement tools support expedited time to market

IBM offers packet-switch controller software and a reference switch core to help reduce development time and cost. The software offerings, which include the IBM primary switch controller (PSC) software and IBM secondary switch controller (SSC) software, operate the switch subsystem control layer. The 128-Gbps reference-switch core is well suited for a redundant 32-port OC-48c ATM switch or a layer-2 and above design that supports 32- to 128-port Gigabit Ethernet.

For more information, visit our website at **ibm.com**/chips.

IBM Microelectronics Division
2070 Route 52, Bldg. 330
Hopewell Junction, NY
12533-6351

The IBM home page can be found at **ibm.com**.

The IBM Microelectronics Division home page can be found at **ibm.com**/chips.

G522-0156-02