



HYPERCHIP
CORE IP SYSTEMS

The PBR-1280 Core IP System *A New Era in IP Networking*

Next generation networks require core systems that assure service quality while providing a cost-effective platform for future growth. The critical challenge for carriers is establishing a single, cost-effective infrastructure that flawlessly supports today's revenue and mission critical services (such as ATM, frame relay, leased line, and voice), and ensures the ability to meet growth or changes in the nature of IP traffic. Hyperchip developed the PBR-1280 Core IP System based on simple fundamentals used in telecommunications for many years to address these challenges: simplicity, reliability, and scalability. The PBR-1280 introduces a dramatic new approach to routing technology that allows significant cost reductions within IP/MPLS based networks.



AQUA Assured QoS

Legacy IP networks offer a single, best effort class-of-service. Service providers adopted this network architecture due to the inherent limitations of current core IP routing platforms designed with inadequate QoS features and performance. The goal of Next Generation Networks alters this mindset, with QoS assurance being a necessity in the core infrastructure in order to migrate existing, disparate networks onto a common IP/MPLS backbone. Service providers can no longer afford to offer QoS through massive over-provisioning. The Hyperchip PBR-1280 core IP system addresses these QoS requirements through a sophisticated, ATM-grade approach to QoS. The PBR-1280 guarantees performance through unique, patented internal protocols (AQUA, SHARE) that prevent congestion within the switch fabric, and assure deterministic QoS system performance in the event of congestion. These intra-system protocols, coupled with advanced traffic management and packet-processing engines on each interface card, form the basis for the PBR-1280's class of service guarantee characteristics.

HeliOS Reliability

Traditional voice switches have set the standard for "reliability" in telecommunications for years. Hyperchip incorporated many of the reliability principles of such systems within the PBR-1280 Core IP System. Hardware system elements and switch fabric resiliency are provided through full physical redundancy or n+1 provisioning within the system. The absolutely unique development within the PBR-1280 is the approach to processing, and the fully redundant and scalable software environment provided by HeliOS – the Hyperchip Operating System. The distributed architecture of HeliOS simultaneously provides hitless forwarding and routing during the fail-over of any protocol or other system level failure and fine-grained, in-service software upgrades. In fact, on the PBR-1280, all software upgrades, hardware upgrades, and capacity changes are performed in-service.

Logical Routing

The Internet has been established on a point of presence (PoP) architecture designed to overcome the inabilities of legacy IP routers, specifically in the areas of reliability and processing. This has resulted in PoPs supporting more routing ports for intra-PoP interconnections than for edge or core facing connections. In most PoPs, more than 50% of the investment is wasted on such inefficient interconnections.

Hyperchip has established a new approach to this old problem – the Logical Router. The PBR-1280 is built on a scalable and 100% non-blocking switch fabric, to provide interconnection at a fraction of the cost of the legacy line card approach. A Logical Router is the combination of processing and line card resources within a PBR-1280, with each Logical Router supporting completely independent routing control planes. A PBR-1280 can support many Logical Routers within one system. The interconnection between Logical Routers is through the switch fabric, thus carriers can move forward with the security and integrity of proven network architectures, while dramatically reducing capital and operation costs associated with physical interconnections.



The PBR-1280 is based on a mid-plane design with a line capacity of 160 Gbps (full duplex) per chassis. The front of the chassis accommodates up to 16 cards — any mix of Line Cards (HLCs) or HELIX Controller Cards (HCCs). The rear of the chassis accommodates up to 16 Hyperchip Matrix Cards (HMCs – the switch fabric) and optionally 4 Optical Interconnect Modules (OIMs).



The OIMs enable parallel optic interconnection between chassis. Multi-chassis capability is available immediately. The PBR-1280 is easily configured to suit the capacity and performance required, and all upgrades are accommodated in-service:

- B160** Initial system configuration supporting up to 8 HLC/HCC cards (160 Gbps total, 80 Gbps full duplex), a minimum of 2 HCCs are recommended for fully redundant operation.
- B320** Expansion package providing additional switch fabric to support single chassis operation up to 16 HLC/HCC cards (320 Gbps total, 160 Gbps full duplex).
- BSCALE** Expansion package providing the OIMs for multi-chassis operation as well as additional switch fabric.

PBR-1280 Specifications

<p><u>Line Cards</u></p> <ul style="list-style-type: none"> ▪ 1 x OC-192 / STM-64 ▪ 4 x OC-48 / STM-16 ▪ 10 x GigE ▪ 1 x 10GigE 	<p><u>Routing Protocols</u></p> <ul style="list-style-type: none"> ▪ OSPF ▪ IS-IS ▪ BGP4 ▪ Multicast 	<p><u>MPLS</u></p> <ul style="list-style-type: none"> ▪ RSVP-TE, LDP ▪ OSPF-TE, IS-IS-TE ▪ MPLS Fast Reroute
<p><u>Advanced QoS</u></p> <ul style="list-style-type: none"> ▪ Classification (IP/MPLS) ▪ Traffic Regulation/Policing ▪ Scheduling (multi-stage, priority scheduler) ▪ Congestion & flow control (AQUA™, SHARE™, WRED) 	<p><u>OA&M</u></p> <ul style="list-style-type: none"> ▪ Industry-standard CLI ▪ SNMP v1, v2c support ▪ Radius, TACACS+ & SSH support ▪ Management interfaces per HCC: ▪ 10/100 Base-T autosensing RJ-45 Ethernet port ▪ 2 x RS232 (DB9) Async serial ports 	
<p><u>Physical:</u> Two chassis per 7' telco rack</p> <ul style="list-style-type: none"> ▪ Width: 17.5" (444 mm) or 21.5" (546 mm) ▪ Height: 38.5" (978 mm) ▪ Depth: 32" (813 mm) 	<p><u>Environmental</u></p> <ul style="list-style-type: none"> ▪ Temperature: 32-122°F (0-50°C) ▪ Altitude: 10,000 ft (3,048 m) ▪ Humidity: 5-90% non-condensing ▪ Seismic: Bellcore Zone 4 requirements 	
<p><u>Approvals</u></p> <p>Safety: UL60950/CSA C22.2 No. 60950, EN60950, EN60825-1, EN60825-2</p> <p>EMC: FCC P15 Class A, ICES-03 Class A, EN55022 Class A, AS/NZS 3548 Class A, CE Mark (LVD/EMC)</p> <p>Immunity: IEC-1000-4-3/EN55101/3, 1000-4-6/EN55101/6</p> <p>NEBS: GR-1089-CORE, GR-63-CORE, GR-78-CORE, SR-3580, SR-332</p> <p>ETSI: ETS-300386-2</p> <p>IEC: 1000-4-2/EN55101/2 (ESD), 1000-4-4/EN55101/4 (EFT), 1000-4-5/EN55101/5 (Surge), 1000-4-11/IEC77B (Voltage), 1000-3-2 (Harmonics)</p> <p>Other: FDA Part 1040.10, VCC Class II,</p>		