

LAN-to-WAN Bridge Router

Overview

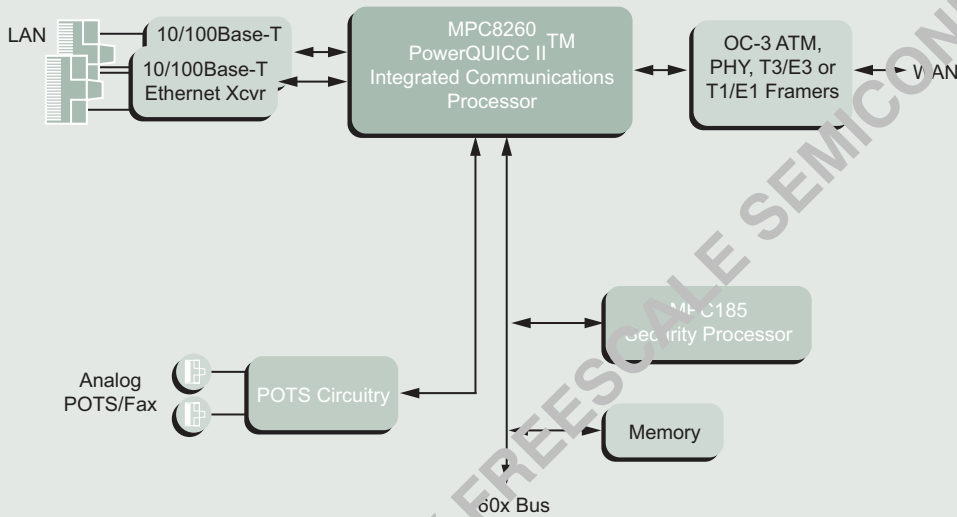
The LAN-to-WAN bridge is designed to link customer premise equipment (CPE) networks to a wide area network (WAN). This bridge typically supports 10/100Base-T Ethernet or other peer-based network

protocols on the LAN side and 155 Mbps ATM on the WAN side, but several other LAN-to-WAN bridge configurations are also used.

Key Benefits

- > Supports several LAN-to-WAN bridge configurations
- > Provides a flexible, cost-effective design
- > Provides accelerated time-to-market for router equipment suppliers

LAN-TO-WAN BRIDGE ROUTER BLOCK DIAGRAM



Freescale Ordering Information

Part Number	Product Highlights	Additional Information
MPC8255 MPC8260 MPC8264 MPC8265	<ul style="list-style-type: none"> > System core microprocessor supporting frequencies of 133 to 300 MHz > System integration unit (SIU) > High performance communications processor module (CPM) with operating frequency of 133, 166, or 200 MHz > Two bus architectures: one 64-bit 60x bus and one 32-bit PCI or local bus > Two UTOPIA level-2 master/slave ports with multi-PHY support > Three MII interfaces > Eight TDM interfaces (T1/E1); two TDM ports can be seamlessly integrated to T3/E3 > 1.8 V or 2.0 V internal and 3.3 V I/O > 300 MHz power consumption: 2.5 W > 480 TBGA package (37.5 mm x 37.5 mm) 	www.freescale.com/smartnetworks
MPC862 MPC860 MPC855T MPC857T MPC857DSL MPC850	<ul style="list-style-type: none"> > Embedded MPC8xx core > Instruction and data MMUs > Up to 32-bit data bus (dynamic bus sizing for 8, 16, and 32 bits) > 32 address lines > Complete static design (040 MHz operation) > Memory controller (eight banks) > General-purpose timers > System integration unit (SIU) > Interrupts > Communications processor module (CPM) > On-chip 16x16 multiply accumulate controller (MAC) > Four baud-rate generators > Four SCCs (serial communication controllers) > Two SMCs (serial management channels) > One SPI (serial peripheral interface) > One I²C (inter-integrated circuit) port > Time-slot assigner > Parallel interface port > PCMCIA interface > Low power support > Debug interface > 3.3 V operation with 5V TTL compatibility 	
MPC190	<ul style="list-style-type: none"> > Derived from security technologies Freescale Semiconductor has developed over the previous thirty years > Flexible, scalable, and powerful addition to any networking or computing system that supports PCI > Designed to remove computationally intensive security functions from Freescale Semiconductor host processors, integrated processors, and network processors, or from any processor through the use of a PCI bridge chip > Optimized to process the algorithms associated with IPSec, IKE, WTLS/WAP and SSL/TLS, which includes RSA, RSA signature, Diffie-Hellman, elliptic curve cryptography, DES, 3DES, SHA-1, MD-4, MD-5, and ARC-4 > The only security processor on the market (in addition to the Freescale Semiconductor MPC180) capable of accelerating elliptic curve mathematics, which is especially important for secure wireless communications 	
MPC185	<ul style="list-style-type: none"> > Supports the 60x bus protocol > Designed to remove computationally intensive security functions, such as key generation and exchange, authentication, and bulk encryption from processors such as Freescale Semiconductor's PowerQUICC II™ communications processors or any processor that implements the PowerPC instruction set architecture > Typical applications include edge routers, DSLAMS, broadband access equipment, e-commerce servers, wireless base stations, and WAP gateways 	

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Design Challenges

To achieve the required data rates, designers must quickly provide several serial interfaces for the physical layer devices while performing OSI layer 2 protocol processing. The combination of a complex board layout to accommodate separate communication peripherals, the interconnect logic required for multiple serial interfaces, and the processor power necessary to process the data link layer of the OSI model make this a particularly difficult endeavor. Doing these operations exclusively in software is slow—but doing them exclusively in hardware is expensive.

Freescale Semiconductor Solution

The PowerQUICC™ and PowerQUICC II™ families of integrated communications processors offer a unique solution of integrating serial communications ports with a dedicated RISC microprocessor on the same silicon chip that includes a

microprocessor and a system interface unit (SIU). The communications processor (CPM) consists of a RISC microprocessor associated with single-cycle access, dual-port static RAM that is dedicated to service serial communications ports that use direct memory access (DMA) to transfer serial data to external memory. On the other side of the dual-port RAM is a microprocessor for the data link layer and maintenance processing and the SIU that consists of a versatile programmable memory controller, reset circuitry, PLL, and timers.

There are specific family members that satisfy your data rate requirements and provide the benefits of a flexible, cost-effective design. In addition, the established code base and broad third-party support from Freescale Semiconductor's Smart Network Alliance Program members further enable cost-

efficient solutions and accelerated time-to-market for router equipment suppliers.

The MPC8260 PowerQUICC II can support a WAN connection of 155 Mbps full-duplex ATM (using the UTOPIA interface), 10/100Base-T fast Ethernet (with MII interface), or a high-speed serial channel. In ATM mode, the local bus stores connection tables for active ATM connections. Additional ports remain available for system management functions.

Network security protocols involve processing sophisticated, computationally intensive algorithms that can reduce system performance by monopolizing the host processor. The MPC180 security processor is easily integrated into systems already using Freescale Semiconductor's processors, and because it utilizes existing system memory, it results in significant savings of both board space and system cost.

Development Tools Note

Tool Type	Product Name	Vendor	Description
Software	CWEPPC	Metrowerks	CodeWarrior Development Studio for PowerPC ISA
Software	CWLINPPC	Metrowerks	CodeWarrior Development Studio. Linux Application Edition for PowerPC ISA
Development Kit	MPC8260ADSKIT	Freescale Semiconductor	MPC8260 Application Development System Kit
Hardware	MPC8260ADS-L2C	Freescale Semiconductor	MPC8260 Application Development System (with L2 cache) (discontinued)
Hardware	MPC8260ADS-PQ2	Freescale Semiconductor	MPC8260 Application Development System
Development Kit	MPC8266ADS-KIT	Freescale Semiconductor	MPC8266 Application Development System Kit
Hardware	MPC8266ADS-PCI	Freescale Semiconductor	MPC8266 Application Development System (for PCI Host Mode)
Hardware	MPC8266ADS-PCIAI	Freescale Semiconductor	MPC8266 Application Development System (Add-In Card)
Hardware	MPC8xxFADSMB	Freescale Semiconductor	MPC8xx Family Application Development System Motherboard

Note: For detailed information, go to www.freescale.com and click on Tools. Search for tools by product or technology, family or function, and product number.

Notes

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SG2112
REV 1
12/2004

December2004