



## LOCAL AREA NETWORK (LAN) SWITCH

### INTRODUCTION

As networking becomes increasingly important in computing environments, network performance and Quality of Service (QoS) become the most crucial issues facing network administrators today. At this time, 100-Mbit connections to the desktop are common with Gigabit connections also becoming more and more prevalent. With this increase in network speed and bandwidth, intelligent network management is fast becoming a critical priority.

In the past, relatively slow 10-Mbit Ethernet networks were commonly used in many companies. A simple server was more than adequate to provide an acceptable level of performance for such simple tasks as email and central database access, even in large networking environments. As the business requirements for sharing information within companies has significantly increased, so has the demand for faster and more reliable networks. This increased traffic has created a need to manage network resources more effectively to not only reduce the inevitable bottlenecks that naturally occur in high-traffic situations, but also to ensure effective use of the bandwidth while providing the client with an acceptable QoS.

### MARKET TRENDS

There are many support challenges in today's networks – user-efficiency statistics, QoS, and network traffic flow are typically the most important. The need for a method to economically monitor and control these critical parameters has become one of the most challenging issues facing network administrators.

To address these concerns, LAN switch manufacturers are designing intelligent switches that offer advanced network management capabilities. Known as 'lightly managed' switches, these solutions offer advanced capabilities at a relatively low cost-per-port. The low cost makes these lightly managed switches ideal for networks ranging from a couple hundred to a thousand users. Lightly managed switches are also an excellent solution for tiered networks that are local to the desktop and are used in conjunction with heavily managed routers located close to the servers.

Lightly managed switches are ideal for situations where non-managed networks are no longer sufficient to the task at hand, but fully managed systems cannot be justified from a cost viewpoint. The challenge here is to offer a low cost-per-port solution that can address the needs of in-place systems while providing an economical roadmap for growing infrastructures.

### IDT SOLUTION

To address the need for low cost-per-port, lightly managed LAN switching equipment, IDT has developed the RC32332 communications processor. This device integrates communications functions such as a PCI bus interface and an Ethernet MAC with an embedded processor core. This integrated processor is capable of sustained high bandwidth of 133 MHz, with leading direct memory access (DMA) performance and on-chip peripherals to reduce the overhead on the CPU core. This frees the processor to perform additional software functions such as firewalling.

The RC32332 is the ideal vehicle for handling lightly managed traffic over a small to medium sized corporate network. The on-board processor and standard bus interfaces make it easy to design a cost-effective system with a clear roadmap to future expansion.

### Reference Design for lightly managed switch

Recognizing the need for an affordable networking solution incorporating lightly managed capabilities, IDT and Broadcom have designed the RC32332 into a single board 24+2 Ethernet LAN switch reference design called the BCM95615S. The BCM95615S LAN switch reference design enables network managers to monitor, control and bill for different types of traffic with application-appropriate priorities and bandwidth allocation. These functions result in more intelligent use of network resources and permit a new set of service applications, such as streaming video and Voice-over-Internet-Protocol (VoIP), that require high bandwidth, reliable data transmission, low latency and advanced QoS features.

Running at 133 MHz for sustained, high-speed throughput, this complete system-level design is ideal for lightly managed, next-generation Layer2/Layer 3 Ethernet LAN switch applications. The reference design is especially ideal for developers looking for a low-cost solution, and the board can be quickly implemented for a tight time-to-market schedule. The BCM95615S can also be leveraged for higher-port systems such as 48- and 96-port configurations.

## FEATURES & BENEFITS OF THE LAN SWITCH REFERENCE DESIGN

Using tightly coupled hardware, the BCM95615S is a low-cost, single board that can easily fit into a standard 19-inch, 1U height, rack-mount box. The design includes a feature set that is popular with a majority of communications customers. More specifically, the board consists of a highly leveraged integrated processor, Ethernet switch fabric, a serial I/O port, octal 10/100 PHYs as well as gigabit PHYs, and a memory subsystem including ROM, flash and DRAM. With the incorporation of Wind River's Tornado® for Managed Switches software, the BCM95615S becomes a production-ready system ideally optimized for switching and routing tasks.

### BCM95615S Detailed Features and Benefits

Feature	Benefit
RC32332 – High-performance integrated processor	Fully integrated core controller merges 175 MIPS CPU, SDRAM controller, PCI bridge, and common peripherals
BCM 5615/5616 – High-performance Ethernet switch fabric	<ul style="list-style-type: none"> <li>• Layer 2 or Layer 3 switch options.</li> <li>• Expandable beyond 24 ports 10/100</li> <li>• Wire speed L2 forwarding and L3 routing</li> <li>• Wire-speed classification and filtering</li> </ul>
RC32332/BCM56i5 device combination	<ul style="list-style-type: none"> <li>• Two-chip solution offering best combination of integration and overall system cost</li> </ul>
Board manufacturing kit <ul style="list-style-type: none"> <li>• Gerber files</li> <li>• Schematics</li> <li>• Bill Of Materials</li> </ul>	<ul style="list-style-type: none"> <li>• Allows system customization at very low cost and quick design time</li> <li>• Simplified system design reduces time to market</li> <li>• Reduces board real estate, system cost</li> <li>• Tested, validated proven design for Ethernet 24+2 switch</li> </ul>
Tornado® for Managed Switches (TMS)	<ul style="list-style-type: none"> <li>• Software bundle optimized for LAN switching market, enables designers to reduce overall software development effort and to focus engineering on areas of value add</li> </ul>
Enhanced JTAG interface <ul style="list-style-type: none"> <li>• Low-cost in-circuit emulation</li> <li>• Boundary scan JTAG interface</li> </ul>	<ul style="list-style-type: none"> <li>• Reduces debugging effort while enabling low-cost tools</li> <li>• Simplifies board-level testing in a production environment.</li> </ul>

The key highlights of the reference design for managed LAN switches are:

- High-performance CPU enables management of numerous I/O devices in real time.
- High-performance switch fabric enables managed Layer 2 or Layer 3 LAN switch systems.
- TMS allows quicker software development.
- Production-ready reference design leverages tested, validated system for quicker hardware development.

### Included with the BCM95615S Reference Design Product

In addition to the circuit board, the BCM95615S kit includes:

#### Technical Documentation

- Board User Manual
- IDT SIM Reference Manual
- List of 3rd parties supporting the evaluation board, including contact names, Web-site URLs, and specific product nomenclature.

#### Software

- VxWorks ROM (not populated on board)
- VxWorks BSD executable code on CDROM

#### Bill of Materials

#### Electronic Schematics

#### Fabrication Drawing of the Board

The design also includes a software solution that couples Wind River's Tornado for Managed Switches and VxWorks® real-time operating system (RTOS). These include specific application program interfaces (APIs) to enable programmers to write code at the higher layers of the International Organization for Standardization (ISO) software models.

## BLOCK DIAGRAM WITH INTERACTIVE LINKS

Figure 1 shows a block diagram of the BCM95615S reference design.

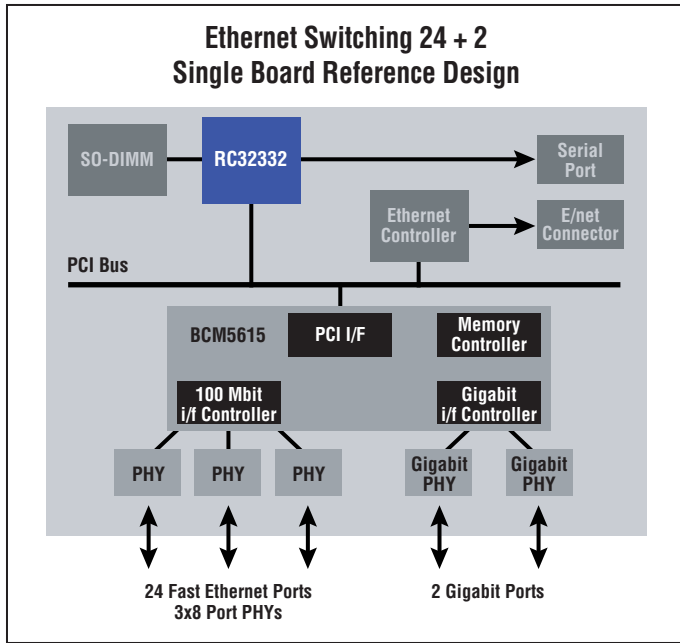


Figure 1. RC32332 integrated communications processor used in the BCM95615S reference design

## IDT RELATED DOCUMENTS

[RC32332 Integrated Communications Processor](#)

## THIRD-PARTY LINKS

**Wind River Tornado Development Tools**

<http://www.windriver.com/products/html/tornado.html>

## Broadcom Related Documents

*BCM5615 Integrated Multi-layer Switch*

<http://www.broadcom.com/products/5615.html>

*BCM5616 Integrated Multi-layer Switch*

<http://www.broadcom.com/products/5616.html>