



## SOHO GATEWAY INTEGRATED COMMUNICATIONS PROCESSORS

### BACKGROUND/INTRODUCTION

Unlike the relatively recent phenomenon of SOHO gateways, the vast majority of offices have had high-speed broadband access for quite some time. However, this relatively well-established market is still being courted by a range of communications technologies, each vying to power the next generation of enterprise systems. Specifically, new wide area network (WAN) technologies such as ADSL are starting to replace relatively expensive T1/E1 technology, and other WAN technologies that promise even higher bandwidth, such as broadband wireless and fiber, are starting to emerge. Inside customer premises equipment, there is a significant increase in networking appliances wirelessly.

This market demands stable systems that are deployed for several years. Therefore, system builders looking to address this marketplace are starting to embed system flexibility into units, allowing the box to support new communications interfaces, without requiring the entire box to be switched out. This approach prolongs the viability of the system in the customer location, and improves the return on investment for the service provider.

IDT™ views the use of an industry-standard bus inside these systems as a suitable technique to add new technology into the system. The peripheral component interconnect (PCI) bus offers the broadest range of networking, storage and graphics peripherals supporting its interface. Driven by the desire to address the PC market, suppliers developing peripherals that incorporate new I/O technology will almost always offer a version with a PCI interface. Although the PCI interface has a relatively high pincount, the competitive nature and volume potential of the PC market ensures that these peripherals are very cost effective.

In addition, the processor managing the system needs to have enough horsepower to handle software upgrades in the field. For example, the application may require a device with 100 dhrystone MIPS of horsepower. The inclusion of a device capable of delivering twice this level of performance provides the system designer the opportunity to provide upgrades to units already deployed in the field. This would allow a system to track new standards and functions without relatively expensive recalls or in-field upgrades being required.

Unlike the home gateway market, end companies acquiring these gateways will tend to prioritize aspects such as performance, reliability, upgradeability/management and functionality (e.g. firewall and VPN support) over system price.

### IDT-BASED SOLUTION

At the heart of a SOHO gateway powered by IDT is the RC32332 or RC32334 integrated processor. These processors feature a high-performance 32-bit CPU core based on the MIPS Instruction Set Architecture (ISA), a flexible memory controller enabling direct connection to ROM, flash, SRAM, SDRAM and a PCI bridge.

The RC32332 and RC32334 have similar feature sets. However, as the RC32334 is packaged in a small ball grid array (BGA) package, optimized for space-sensitive applications. The RC32332 device allows the development of the lowest system cost for a PCI-enabled system.

The diagram outlined in Figure 1 provides an example as to how a particular small office gateway could be architected.

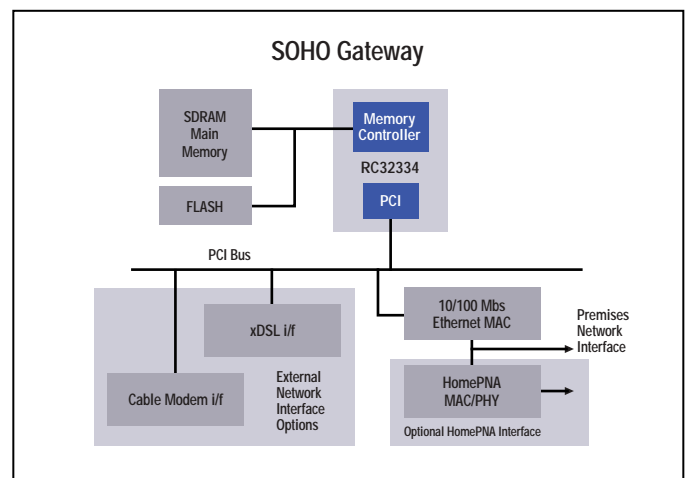


Figure 1. SOHO Gateway

From a software perspective, customers typically use a real-time operating system such as Wind River's VxWorks®, Nucleus® from Accelerated Technology or a version of Linux. IDT has worked with several software partners to ensure the availability of these operating systems for both the RC32332 and RC32334 integrated processors.

In addition to the low-level operating system, many customers, faced with tight time-to-market challenges, are looking for an off-the-shelf software solution. IDT has partnered with a company called Jungo™ Software Technologies, Inc. to provide a complete software solution optimized for IDT's integrated processors. The key software modules included in Jungo's OpenRG product are outlined in figure 2, and include security functional, remote system management/diagnostics and protocol stacks that support various wired and wireless WAN and LAN technologies.

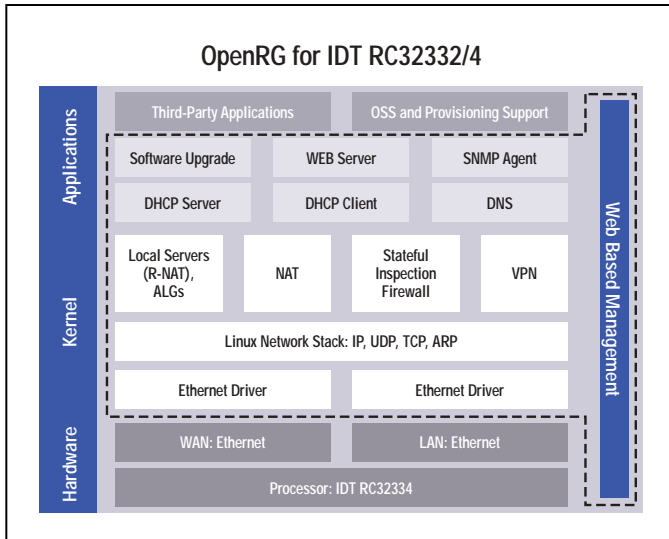


Figure 2. OpenRG for IDT Architecture

## BENEFITS TO SOHO DESIGNERS

### Short Development Cycle

- Integrated PCI bridge enables simple connection to low-cost networking peripherals.
- CPU core includes an in-circuit emulator (ICE) interface, allowing access to internal registers and caches, to simplify software development.
- Immediate availability of hardware and software development tools, including operating system/board support packages, software development tools, ICE equipment and Ethernet drivers, reduces internal development effort.

### System Flexibility/Upgradeability

- High-performance CPU to enable support of new system features via in-field software upgrades.
- Use of PCI enables new technologies to be simply connected to prolong the viability of the end system in the market.

### Low System Cost

- Use of PCI-based peripherals ensures cost-effective system solution.

## RELATED IDT DOCUMENTATION

### RC32332 datasheet

<http://www.idt.com>

### RC32334 datasheet

<http://www.idt.com>

### 79S334A evaluation board manual

<http://www.idt.com>

## THIRD-PARTY SUPPORT PARTNERS

### Wind River Systems

<http://www.windriver.com>

### Intel Ethernet controllers

<http://www.intel.com>

### Lineo's Embedded Linux software for the IDT RC32334 integrated processor

<http://www.lineo.com>

### Link to third-party support documentation for IDT's integrated processors

<http://www.idt.com>

### Jungo gateway software

<http://www.jungo.com/openrg>



**CORPORATE HEADQUARTERS**  
2975 Stender Way  
Santa Clara, CA 95054

**for SALES:**  
800-345-7015 or 408-727-6116  
fax: 408-492-8674  
[www.idt.com](http://www.idt.com)

**for Tech Support:**  
[riscHELP@idt.com](mailto:riscHELP@idt.com)  
408-492-8208