

July 2001

## KEY FEATURES

- ▶ **Single-Chip Broadband Access Modem**
- ▶ **G.992.1 and G.992.2 interoperable and compatible**
- ▶ **Ethernet and USB interfaces for external modem applications**
- ▶ **PCI interface for internal PC applications**

## Product Applications

- ADSL Modem
- ATM Access
- Bridging and Routing
- Gateways
- Residential Edge Router

## Description

Beryllium is a single-chip solution for fast Internet access. It extends Virata's ATOM device technology by delivering a product-on-a-chip that enables highly integrated G.992.1 and G.992.2 interoperable and compatible ADSL equipment.

Beryllium integrates many common network equipment features and functions such as: G.992.1 and G.992.2 DMT processor, PCI, Ethernet, USB, and Fax. Beryllium is designed for flexible, low-cost, high-functional, high-performance products. Its interfaces allow Ethernet, PCI or USB connectivity to high-speed ADSL services in the home or office.

Beryllium contains three processors: a protocol processor, a network processor and a DMT processor. The network processor controls a 10/100 Ethernet MAC, USB and PCI interface. It also controls a physical DMT processor that acts as a modulator, encryptor and data pump.

Beryllium is connected to the POTS line with the addition of a simple, low-cost line driver and an Analog Front End (AFE) that performs the necessary A/D, D/A, and filtering.

Beryllium runs the complete suite of Integrated Software on Silicon™ (ISOS™) software including support for routing, bridging, signaling, and SNMP Management. It handles both ATM cells and Ethernet frames and may be used as a gateway or ATM access device.

Software flexibility, high-integration and built-in hardware debugging support (ICE) allow rapid product development. This combination of hardware and software provides a unique time-to-market advantage.

## Reference Platform

The BD4000 is the development reference platform for Beryllium, providing a wealth of hardware and software debug tools to assist customers in rapid development and deployment of their products. Training, documentation and support are also available.

## Specifications

### Processors

- Protocol Processor (PP) is a 60 MHz ARM7TDMI RISC core which includes a 4K cache providing:
  - Modem PHY Management (depending on application)
  - Initialization code
  - Soft real-time tasks
- Network Processor (NP) is a 60 MHz ARM7TDMI RISC core with 8K of SRAM performing:
  - Data Transfer:
    - Framing
    - Interleaving
    - CRC Generation
    - Switching
  - Hard real-time tasks
  - G.Lite Processor Control
- DMT Processor (DP) interfaces to external analog front ends (AFEs) for ADSL. The G.992.1 and G.992.2 interoperable and compatible processor performs:
  - Training
  - Showtime (DMT)
  - Management
  - Error Correction
  - ATM TC

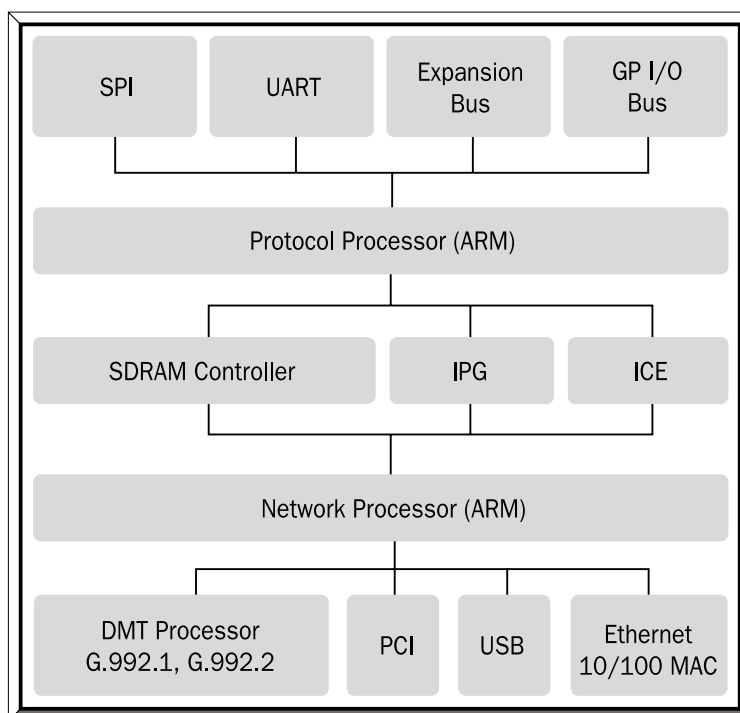


Figure 1. Beryllium System Interfaces

### Interfaces

- DMT Processor to AFE
- 10/100 Ethernet MAC
- USB 1.1
- PCI 2.2
- GPIO
- Expansion Bus
- UART
- SDRAM
- Flash PROM
- EEPROM

### SDRAM

SDRAM interface conforms to JEDEC requirements, supporting address space from 2 to 32 Mbytes with a selectable 16-bit or 32-bit wide data bus.

### USB

USB slave interface —12Mbps using Control, Interrupt, Bulk and Isochronous endpoints and transfers.

### PCI

PCI interface, 32-bit bus master/slave operation conforming to version 2.2. The PCI interface supports DMA transfers as a bus master.

### 10/100 Ethernet

Beryllium contains a 10/100 MAC and presents a MII interface for external PHYs including HPNA.

### GPIO

The General Purpose I/O bus contains 15 pins. Of these pins, two are used for the UART serial interface (Tx and Rx at a speed of 38,462 baud) and three for the serial boot EEPROM (data in, data out and clock). Four of the GPIO pins can be used as address lines when used with the expansion bus.

### Expansion Bus

Configurable as 8- or 16-bit peripheral bus, which can support 8-bit Motorola, 16-bit Intel or 16-bit multiplexed modes. Mainly used to control external devices and boot Beryllium from memory, ROM or Flash PROM. Up to 4 devices or more supported with additional decoder.

### Boot Options

- USB interface
- PCI interface
- Serial EEPROM
- UART
- Flash PROM
- Ethernet Network Boot

### Software

Beryllium's processors run Virata's extensive networking software suite including:

- ATM device driver
- IP routing
- Bridging
- PPTP, L2TP, NAT
- RFC1483 PVC/SVC
- Classical IP PVC/SVC
- PPP over ATM PVC/SVC
- Q.2931
- SSCOP
- UNI 3.0, 3.1, 4.0 signaling
- SNMP, TFTP, telnet and BOOTP
- AAL5 SAR
- ATM pacing
- NDIS 5
- ADSL (G.992.1 and G.992.2)
- ATMOS lightweight real-time kernel

### Package

316 PBGA

### Environmental

Supply 3.3V and 2.5V +/- 10%  
Commercial temperature range of  
0 to +70 degrees Centigrade

### Ordering Information

VC7510-PBC, Beryllium IC  
BD4000, Beryllium Dev Board  
Data book available on request

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For more information,  
please contact us:

E-mail: [info@virata.com](mailto:info@virata.com)  
Web site: [www.virata.com](http://www.virata.com)

#### VIRATA, USA

Corporate Headquarters  
2700 San Tomas Expressway  
Santa Clara, CA 95051  
USA

Tel. 408-566-1000  
Fax 408-566-1194

#### VIRATA, UK

230 Cambridge Science Park  
Milton Road  
Cambridge CB4 0WB  
United Kingdom

Tel. +44-1223-707400  
Fax +44-1223-707447

#### VIRATA, Taiwan

17F-2 No.77 Hsin Tai Wu Road  
Sec. 1  
Hsichih, Taipei County  
Taiwan

Tel. +886-2-2698-3500  
Fax +886-2-2698-3566

#### VIRATA, Israel

11 Shenkar Street  
Herzeliya Pituach 46725  
Israel

Tel. +972-9-9717-400  
Fax +972-9-9717-444