# Lithium

Virata
Product Profile

Data Sheet June 2000

## KEY FEATURES

- **PCI interface for internal modem applications**
- **ATM switching and layer 2/3 processing device**
- **Utopia—1/2 and ADSL T1.413 interfaces**
- **Dual ARM RISC processor architecture**

## Product Applications

- xDSL modem
- Cable modem
- ATM line cards
- ATM access
- ATM CSU/DSU
- Bridging and routing
- Set-top-boxes

## Description

Lithium is a single chip, highly integrated ATM switching and layer 2/3 processing device, integrating a PCI interface and DMA controller. A general purpose RISC Protocol Processor runs higher layer protocols, while a high performance microcoded RISC Network Processor is used for cell and frame handling at up to 75Mbps switched traffic.

Integrating many common interface function, Lithium is designed for flexible, low cost, high functionality, high performance products. It may be used in a PCI modem or ATM process de vice, customer premises equipment (CPE) or central office (CO).

Lithium contains a Network Processor that controls the direct connections to PCI, as well as physical interfaces for Utopia 1 and 2, and ADSL T1.413

The Network Process has 8K bytes of microcode SRAM and a high-speed interface to external SDRAM. This supports both ATM cells and packets, OAM cell handling, policing, accounting and shaping.

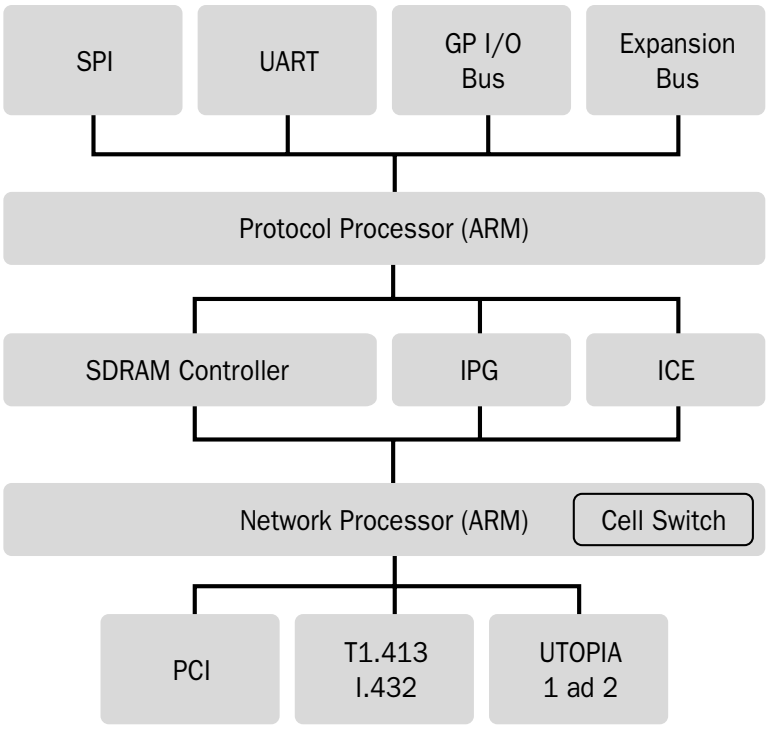


**Figure 1. Lithium System Interfaces**

The two processors communicate via the inter-processor gateway IPG.

Lithium is the third member of Virata's ATOM architecture and runs the complete suite of ATMOSTM software, including support for routing, bridging, signaling, and SNMP Management.

Software flexibility, high integration, and built-in hardware debugging (ICE) support allow rapid product development.

This combination of hardware and software, Integrated Software on Silicon (ISOSTM), provides a unique time-to-market advantage.

## Reference Platform

The BD 2500 is the development reference platform for Lithium, providing a wealth of hardware and software debug tools to assist partners in rapid development and deployment of their products. Training, documentation, and support are also available.

## Specifications

### Processors

- Protocol Processor (PP) is a 48 MHz ARM720T RISC core, which includes an 8K byte cache providing:
  - Modem PHY Management (depending on application)
  - Initialization code
  - Soft real-time tasks
- Network Processor (NP) is a 48 MHz ARM7TDMI RISC core with 8K bytes of SRAM performing:
  - Data Transfer
  - Framing
  - Interleaving
  - CRC Generation
  - Switching
  - Hard real-time tasks

### PCI

PCI interface, 32-bit bus master/slave operation conforming to version 2.1. The PCI interface supports DMA transfers as a bus master.

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## Interfaces

- PCI
- Utopia 1/2
- T1.413
- GPIO
- Expansion bus
- UART
- SDRAM
- Flash PROM
- EEPROM

### Utopia

Utopia 1 and 2 (master/slave) interfaces with 14 ports, configuration

- 8 ports dual-latency, or
- 2 ports dual-latency and 12 ports single latency

### ADSL

ADSL full duplex data interface to external ADSL PHY. Lithium implements all the framing requirements 1.432 of T1.413.

### GPIO

The General Purpose I/O bus contains 7 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 chip selects when used with the Expansion bus.

### SDRAM

SDRAM interface conforms to JEDEC requirements, supporting address space from 2 to 32 Mbytes with selectable 16- or 32-bit wide data 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 Lithium from memory, ROM or Flash PROM. Up to 4 devices supported (using 4 GPIO pins as chip select) or more with additional decoder.

### Boot Options

- PCI interface
- Serial EEPROM
- UART
- Flash PROM

## Software

Lithium's Protocol Processor runs Virata's extensive networking software suite, including:

- ATM device driver
- IP routing
- Bridging
- PPTP, L2TP
- 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, BOOTP
- AAL5 SAR
- ATM pacing, policing, and OAM
- NDIS
- ATMOS lightweight real-time kernel

## Package

240 pin PQFP

## Environmental

Supply 3.3V, +/-5%
Commercial temperature range of 0 to +70 degrees Centigrade

## Ordering Information

VC6510-PQC, Lithium IC
BD2500, Lithium Development Board
Data book available on request
DO-007351-PS




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