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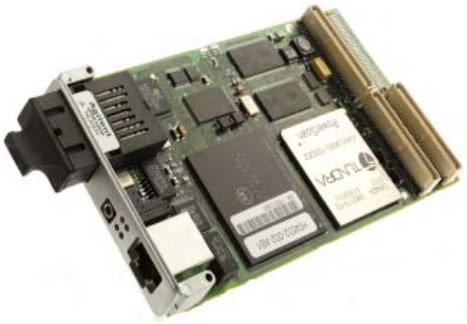

*i*SPAN® 4532 PMC ATM over OC-3c/STM-1 Communications Controller

Industry's first intelligent OC-3/STM-1 card features the Interphase "gateway-on-a-card" technology for bridging ATM and Ethernet networks.

FEATURES

- Motorola MPC8260A (PowerQUICC II™) on-board processor @ 300 MHz
- "Gateway-on-a-card" technology enables interworking of ATM and Ethernet protocols for seamlessly bridging dissimilar networks
- Connects directly to SONET/SDH facilities with no additional line termination equipment necessary
- Supports up to 64,000 simultaneous Virtual Connections (VCs)
- Single software selectable OC-3/STM-1 interface (front or rear access)
- Single Fast Ethernet interface (front access)
- Telecom clock management, master or slave synchronization modes
- Slave UTOPIA2 bus on P3 connector allows for extending ATM services to other modules
- ATM protocol support for VBR, CBR, and UBR Quality of Service classes
- Support for ATM AAL0, AAL2, and AAL5 Adaptation Layers
- Support for ATM layer functionality: UPC (policing) traffic shaping, per VC queuing
- Modular PMC form factor suits CompactPCI, VME, and proprietary platform architectures
- Pre-integrated protocol stacks available using Interphase lower layers and various 3rd party upper layer stacks

APPLICATIONS

3G Wireless BSCs/RNCs and BTSs/Node Bs
Broadband Optical Networks
Broadband Access
Routers
PDSNs
Voice over ATM
Softswitches
SGSNs (Wireless Gateways)
GGSNs

The *i*SPAN® 4532 PMC ATM Over OC-3/STM-1 Communications Controller is designed for carrier-class telecommunication networks supporting the most demanding ATM applications including broadband Internet access, second and third generation wireless, 'converged' next generation networks (i.e. softswitch environments), and integrated voice and data over carrier and enterprise ATM backbones. Its support for ATM to Ethernet interworking capability provides telco system OEMs with a gateway-on-a-card solution for bridging dissimilar technologies. This capability allows carriers to cost-effectively migrate existing communications infrastructure to newer technologies and enables future-proofing of new equipment deployments.

This ready-to-use, intelligent OC-3/STM-1 ATM line interface is fully standards-compliant and features software development tools to facilitate immediate integration into CompactPCI®, VME, or custom telecommunications platforms. In addition, the 4532 allows direct connection to SONET or SDH facilities, eliminating the need for additional line termination equipment. Featuring a powerful MPC8260A on-board RISC processor, high performance architecture, and advanced ATM functionality, the 4532 is the industry's best choice for a 155 Mbps PMC I/O solution in high-availability servers driving next-generation wireless, convergence, and broadband access telecom applications.

03/02/05

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4532 Software

Reduce time-to-market with robust software development tools

Interphase offers a robust suite of software development tools to help shorten the learning curve and design cycle for integration projects based on the 4532 communications controller. Interphase provides three types of development tools, each tailored to the needs of different intergrations. The Basic Board Support Package (BBSP) allows software developers to write software applications that run on a specific operating system embedded on the MPC8260A CPU. The Board Development Kit (BDK) facilitates development of device drivers, embedded protocol firmware and applications for the 4532 hardware module. The *i*WARE® Software Development Suite offers developers a set of Interphase-developed firmware protocol stacks, accessible via APIs provided by Interphase.

Summary

- Board Development Kit (BDK)
- VxWorks® Basic Board Support Package (BSP)
- VxWorks Software Development Suite (SDS)

Board Development Kit

The 4532 BDK is specific to the 4532 hardware, but it is not tied to a particular operating system environment. The kit contains the following main components:

- Setup Utility: Allows the user to modify the content of the various programmable elements of the board, especially the Flash EEPROM memory.
- Boot Firmware: Provides power-on self test, power-on boot sequence, built-in self test (described below), configuration capability via a command line interface, and boot firmware source files as an example of how to program the card.
- Board Installation and Maintenance Manual: Provides procedures for installing and maintaining the module.
- Hardware Reference Manual: Provides information for developing embedded software and/or host drivers for the module.
- Interactive Built-in Self Test Utility and Monitor Manual: Allows management of the card such as, reset/run action, memory and register dump, memory and DMA tests, line parameter manipulation, and more. Manual provides high-level information for using the boot firmware.

Basic Board Support Package

The 4532 Basic Board Support Package (BBSP) consists of documentation compiled as a Board Support Guide for VxWorks. This document provides valuable information on how to configure and install VxWorks on the 4532. Once the BSP is installed, the 4532 can be connected to an Ethernet network and development can be done directly from the particular RTOS development environment, such as Tornado. The 4532 BSP also includes the files required to make an RTOS run embedded on the 4532 CPU. The standard BSP is free of charge, but must be ordered separately.

The package provides source files for:

- Interrupt controller
- Flash memory management
- True Flash File System (TFFS) support
- TTY driver
- Ethernet driver (broadcast and multicast support)
- Timestamp driver
- Auxiliary timer support

Also available via the Interphase Professional Services Group:

- Framer device driver framework
- AAL1, 2 and 5 driver framework
- PCI driver framework

*i*WARE® Software Development Suite

The 4532 *i*WARE Software Development Suite (SDS) reduces software development time and facilitates faster time to market by supplying embedded protocol support for ATM, base drivers for a selected operating system, configuration and diagnostic utilities, and sample programs. The 4532 is offered with an *i*WARE Software Development Suite for the following operating systems:

- Linux
- For other operating systems, please call for availability

The *i*WARE Software Development Suite enables easy integration with tools and diagnostics to simplify development. The SDS also provides Interphase's own lower layer stacks for various network protocols (contact your Interphase representative for specific protocols). Complete, pre-integrated stacks using Interphase lower layers and third party upper layers are also available.

The *i*WARE Software Development Suite consists of software programs and utilities running on the host CPU and embedded software ("firmware") which runs on the on-board 8260A processor. Software elements are separated into four modules:

- The base drivers for each supported Operating System (executed by the host processor)
- The configuration and diagnostic utilities
- Sample programs
- The embedded firmware executed by the MPC8260A on the 4532 board

These modules interact with each other through well-defined and documented interfaces. A common *i*WARE WAN API is defined at the interface between the embedded firmware and the various drivers. A complete documentation set is also provided describing Interphase's *i*WARE WAN API (Wide Area Network Application Programmer's Interface), the Base Driver's API, sample programs, and tool guides.

Custom Development

Custom software development, integration, and consulting services are also available via the Interphase Professional Services Group. With over 150 man years of development experienced amassed, the professional services team offers everything from completely custom development to merely customizing standard Interphase products to meet your specific needs.

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4532 Hardware

Powerful Features for Next-Generation Telecom Applications

4532 Architecture

The *i*SPAN 4532 PMC ATM Over OC3/STM-1 Communications Controller is a member of the Interphase line of MPC8260A-based controllers for carrier-class telecommunications environments. The software selectable interface for SONET OC-3c or SDH STM-1 makes the 4532 a universal interface module and enables maximum flexibility to support multiple international standard variants with just one board.

The 64-bit, 66 MHz 60x data bus connects the core RISC CPU to the 64-bit wide SDRAM memory and the local side of the Tundra PowerSpan PCI bridge. I/O transfers across the bridge to the PCI bus are executed at 32-bits, 33 MHz or 66 MHz. Also connected to the 60x data bus is an 16-bit 8 MB downloadable Flash memory (4 MB of 8-bit Flash on original 4532 models) that can be used to store boot code and operational firmware.

The MPC8260A CPM co-processor interfaces to the SONET/SDH ATM framer via a master UTOPIA bus interface, which in turn connects to the optical transceiver that connects to the transmission line. The MPC8260A CPM performs all ATM layer functions, including ATM layer, and up to the Common Part Convergence Sublayer (CPCS) AAL functionality. The CPM has separate and unimpeded access to a second block of 8 MB of SDRAM memory, which can be used for storing virtual connection lookup tables and traffic descriptors.

A second slave-mode UTOPIA interface from the 8260A CPM coprocessor is available to a carrier card via the PMC P3 connector, and can carry ATM traffic to and from the carrier card. In this mode, the 4532 can be used as the front-end to an ATM switch as a peripheral I/O card. Furthermore, the 8260A core RISC CPU can be disabled, in which case the 4532 utilizes the CPM co-processor and the ATM framer only to act as the physical I/O interconnect to an ATM link.

Processor/Memory

- PowerQUICC II (MPC8260A) 64-bit RISC processor allows full support of various communications protocols, reducing host CPU processing
  - Dual bus architecture: 64-bit 60x bus and 32-bit local CPM bus
  - 300 MHz core, 200 MHz CPM, 570 MIPs CPU
  - 128 MB 64-bit SDRAM memory
  - 8 MB downloadable 16-bit Flash memory
- 8 MB 32-bit Connection Memory

Interfaces

- One front access or rear access software selectable OC-3/STM-1 interface (rear access via PCI Interface Module (PIM))
- Long-range single-mode, intermediate-range single-mode and short-range multi-mode fiber interfaces available:
  - Long-range single-mode fiber: Up to 24.85 miles/40 km
  - Intermediate-range single-mode fiber: Up to 12.4 miles/20 km
  - Short-range multimode fiber: Up to 1.24 miles/2 km
- ATM over WAN SONET framer supports direct connection to long haul optical network
- Support for SONET and SDH overhead channels, including facility Data Link channels, alarms and indications, error and performance monitoring; connects directly to SONET/SDH facilities
- One Fast Ethernet interface on the front panel for remote boot or LAN capability with 10/100 Base-T transceiver
- One front access RS-232 TTY port provided on a 2.5 mm stereo jack
- Optional JTAG debug port

Optional Rear Access via PCI Interface Module (PIM)

- Standard PCI Interface Module (PIM) design
- Single OC-3/STM-1 interface supporting long range single-mode, intermediate range single-mode, and short-range multimode fiber interfaces available (see above)
- Designed for use with any VITA 36-199x PIM-compatible Rear Transition Module (RTM)

PCI Interface

- 32-bit, 33 MHz or 66 MHz PCI interface on P1 & P2 connectors
- PCI 2.2 master/target bus interface with I^2O messaging unit and four linked list DMA
- 32-bit DMA exchanges for high-transfer performance

Telecom Clock Management

- The line interface can be configured in LT (clock slave) or NT (clock master) mode.
- Three line synchronization sources:
  - Free running internal clock
  - Recovered clock (loop back timing)
  - Network reference (via P3)
- The recovered line clock is available to the carrier board via the P3 connector.

Tech Specs

Architecture	
Bus Type	PMC (PCI 2.2 Compliant)
Bus Data Transfer	32-bit, 33/66 MHz
Open Boot Interface	IEEE 1275
Memory	128 MB SDRAM
Mechanical	
Length	149 mm (5.86 in.)
Width	74 mm (2.9 in.)
Indicators	Board Operational, Link active
Operating Environment	
Power Dissipation	5 V: 0.4 A, 3.3 V: 1.7 A
Temperature	0 to 55 ˚C (32 to 131 ˚F)
Storage Range	–40 to 80 ˚C (–40 to 176 ˚F)
Relative Humidity	5% to 95% non-condensing
Altitude	0 to 15,000 ft.

*i*SPAN 4532 PMC ATM over OC-3c/STM-1 Communications Controller

Configuration Options

The following configurations have MPC8260A @ 300 MHz, 128 MB SDRAM, and front access ports:

CONFIGURATION	DESCRIPTION
4532-029	Single-mode fiber
4532-030	Intermediate-range single-mode fiber
4532-031	Multimode fiber
4532-032	Single-mode fiber, JTAG
4532-033	Intermediate-range single-mode fiber, JTAG
4532-034	Multimode fiber, JTAG

The following configurations have MPC8260A @ 300 MHz, 128 MB SDRAM, and rear access ports (requires 3032 PIM):

CONFIGURATION	DESCRIPTION
4532-035	Rear Access (requires 3032 PIM)
4532-036	Rear Access (requires 3032 PIM), JTAG

The following configurations are PCI Interface Modules (PIMs):

CONFIGURATION	DESCRIPTION
3032-000	Long-range single-mode fiber
3032-001	Intermediate-range single-mode fiber
3032-002	Short-range multimode fiber

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Notes