INTERPHASE
Designed To Perform. Designed To Last.

*i*SPAN® 4538 PMC T1/E1/J1 Communications Controller

"Gateway-on-a-card" multiprotocol interworking technology for network migration & future-proofing next generation networks

APPLICATIONS

VPNs
HLRs/VLRs
Serving GPRS Support Nodes (SGSNs)
Media Gateways
Wireless Base Station BSCs/RNCs and BTSs/Node Bs
Gateway GPRS Support Nodes (GGSNs)
Softswitches
Routers
SCPs, STPs, & SSPs

FEATURES

Motorola MPC8264A (PowerQUICC II™) on-board processor, featuring:
- 300 MHz RISC CPU, 570 MIPS
- 64-bit, 66 MHz local data bus
- 64 MB SDRAM (upgradable to 128 MB)

Two individually software selectable T1/E1/J1 interfaces on front panel. Rear access interfaces available using the sister product 4539

On-board support for multiple network protocols and multiprotocol interworkings:
- ATM
- Q.SAAL/GR-2878
- SS7 (MTP1 & MTP2)
- Frame Relay
- HDLC
- Narrowband SS7 to Broadband SS7 (SS7 over ATM) interworking
- Custom interworking of multiple protocols

Pre-integrated protocol stacks available using Interphase lower layers and various 3rd party upper layer stacks

Fast Ethernet on the front panel

Modular PMC form factor suits CompactPCI®, VME, and proprietary environments

TDM and UTOPIA interfaces provide access to other CompactPCI slots

Integrated CSU on T1 lines with support for Facility Data Link saves the need for additional line termination equipment

The growth of the Internet has significantly spurred the growth of data over the PSTN and has resulted in the need to dramatically re-architect the traditional telephone network. One solution is a converged switching architecture that couples packet switching technology with SS7 intelligence, allowing service providers to utilize conventional Internet access equipment as a cost-effective means of provisioning enhanced Internet services.

The *i*SPAN® 4538 PMC T1/E1/J1 Communications Controller from Interphase provides a powerful "best in class" communications I/O solution for the emerging generation of SS7/Ethernet gateways, intelligent peripherals, and softswitches driving the convergence of circuit-switched telephony traffic and IP data-packet traffic in the public network. Reliable features make the 4538 a powerful solution for decreasing costs and development time for deployment for telecom integration projects.

02/07/05

4538 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 4538 communications controller. Interphase provides three types of development tools, each tailored to the needs of different intergrations. The Board Development Kit (BDK) facilitates development of device drivers, embedded protocol firmware and applications for the 4538 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® Board Support Package (BSP)
- Software Development Suites (SDSs) for:
  - Linux®
  - Solaris™

Board Development Kit

The 4538 BDK is specific to the 4538 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.

Board Support Package

The 4538 Board Support Package (BSP) 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 4538. Once the BSP is installed, the 4539 can be connected to an Ethernet network and development can be done directly from the particular RTOS development environment, such as Tornado. The 4538 Board Support Package also includes the files required to make an RTOS run embedded on the 4538 CPU. The standard BSP is free of charge.

*i*WARE® Software Development Suite

The 4538 *i*WARE Software Development Suite reduces software development time and facilitates faster time to market by supplying embedded protocol support for various protocols, base drivers for a selected operating system, configuration and diagnostic utilities, and sample programs.

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 8264A communications 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
- The sample programs
- The embedded firmware executed by the 8264A on the 4538 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 (a Wide Area Network Application Programmer's Interface), the Base Driver's API, sample programs, and tool guides.

Custom Development

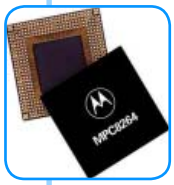
Custom software development, integration, and consulting services are also available via the Interphase Professional Services Group. With over 150 man years of development experienced amassed, the professional services team offers everything from completely custom development to merely customizing standard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

4538 Hardware

Powerful Features for Next-Generation Telecom Applications

4538 Architecture

The *i*SPAN 4538 PMC T1/E1/J1 Communications Controller is one of the flagship products in the Interphase line of MPC8264A-based communications controllers for carrier-grade telecommunications environments. The software selectable interfaces enable maximum flexibility to support multiple national signaling variants with just one board, and the modular PMC form factor suits CompactPCI, VME, and proprietary environments.



The MPC8264A Core CPU is a PowerPC™ 603e CPU connecting to a 64-bit, 66 MHz local memory bus for SDRAM memory access and PCI I/O transfers via the Tundra PowerSpan PCI bridge. Also connected to the 64-bit local bus is a 4 MB downloadable FLASH Memory that can be used to store boot code. The MPC8264A Communications Processor Module (CPM) interfaces to the world class T1/E1/J1 framers.

The 4538 front access T1/E1/J1 ports contain RJ-48C connectors for standardized connectivity. The 4538 is equipped with a 10/100Base-T full duplex RJ-45 Fast Ethernet port on the faceplate connected to an LXT971 full duplex Ethernet transceiver which can be used for a variety of bridging/routing and protocol interworking applications. The 4538 is also equipped with an RS-232 compliant TTY serial interface on the board which is available for debugging purposes.

With the ability to support a variety of network protocols such as SS7, Frame Relay, ATM, and HDLC, the 4538 offers advanced protocol processing and gateway-on-a-card capability. These services will enable network migration to preserve existing carrier infrastructure investments and will future-proof equipment as new packet-based technologies proliferate.

Telecom Clock Management

- The line interface can be configured in Line Termination (clock slave) or Network Termination (clock master) mode
- Recovered clock available via optional P4 PCI Interfaces
- Three line synchronization sources:
  - Free running internal clock
  - Recovered clock (loop back timing)
  - Network reference (via optional P4)

PCI Interface

- 32-bit, 33 MHz PCI interface on P1 and 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

Processor/Memory

- PowerQUICC II™ (MPC8264A) 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
- 64 MB SDRAM memory
- 4 MB downloadable 8-bit Flash Memory
- 300 MHz core, 200 MHz CPM, 570 MIPS CPU

Line Interfaces

- Two individually software selectable front access T1/E1/J1 interfaces with no component changes between T1, E1, or J1 terminations
- Each RJ-48C line is software configurable in Line Termination or Network Termination mode
- QuadFALC™ framer supports long haul or short haul interfaces, AMI, HDB3, or B8ZS line coding and various superframe formats
- Available with JTAG and TTY debug interfaces
- One Fast-Ethernet interface on the front panel for remote boot or LAN capability with 10/100Base-T transceiver
- One TTY console port on front panel via 2 mm audio jack

Other Features

- Local TDM buses provided on PMC connector P4 for time slots switching on the card available for special order
- "Pass through" capability (Line 1 to (or from) line 2) for snooping applications

Tech Specs

Architecture	
Bus Type	PMC (PCI 2.2 Compliant)
Bus Data Transfer	32-bit, 33 MHz
Open Boot Interface	IEEE 1275
Buffer RAM	64 MB upgradable to 128 MB
Mechanical	
Length	149 mm (5.86 in.)
Width	74 mm (2.9 in.)
Indicators	Board Operational, Link active
Operating Environment	
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 4538 PMC T1/E1/J1 Communications Controller

Configuration Options

The 4538 PMC T1/E1/J1 Communications Controller is available in the following configurations, each with two front access T1/E1/J1 ports:

CONFIGURATION	DEBUG PORTS
4538-015	No
4538-016	JTAG, TTY

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