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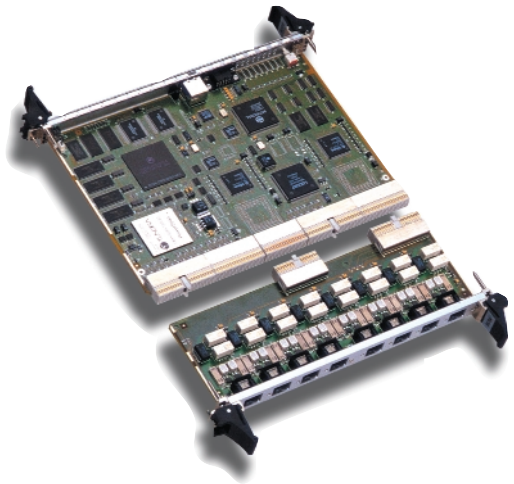
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INTERPHASE

6535 CompactPCI T1/E1/J1 Communications Controller

The Industry's Most Advanced CompactPCI Controller for Telecommunications



Wireless Base Stations Controllers/RNCs • Internet Access Servers • Wireless InterworkingFunctions • Internet Gateway Devices • L2, L3 Switches • Internet IP Routers • AIN SCPs and IPs

FEATURES

- Motorola's MPC8260 (PowerQUICC II) on-board processor, featuring:
  - 200MHz RISC CPU, 280MIPS
  - 64-bit, 66MHz local data bus
  - Up to 700Mbps CPM protocol engine
- 64-bit, 33MHz (upgradeable to 66MHz) PCI bridge, supporting multiple transfer modes
- 64MB of on-board SDRAM for high-performance, high-capacity local segmentation and reassembly
- 4MB of downloadable Flash EPROM
- 8MB of CPM connection memory
- Both front and rear access (via passive Rear Transition Module) options available
- Either 4 or 8 port software selectable T1/E1/J1 interfaces
- One Fast Ethernet interface and mini-DIN TTY port (front panel)
- Integrated CSU on T1 lines with support for Facility Data Link
- Full hot swap capability
- Telecom clock management, master or slave synchronization modes
- H.110 bus, 512 timeslots local-to-H.110 bus,1024 local-to-local timeslots
- Support for ATM AAL0, AAL2, and AAL5 Adaptation Layers
- Multiprotocol support for SS7, ATM, Frame Relay, X.25, ISDN, HDLC and PPP
- Optional Inverse Multiplexing for ATM (IMA), with support for up to 8 T1/E1/J1 lines, and support for IMA over fractional T1/E1/J1

The Internet and corporate global network infrastructures have changed the way that companies do business. The new world packet technologies, IP and ATM, have drastically increased the speed of connectivity and flexibility of services at greatly reduced costs, and enabled a new generation of applications. In response, service providers are turning to equipment suppliers who provide cost-effective solutions that provide more functionality and faster time-to-market. Interphase designed the 6535 to drive its customers to market faster, with carrier-class hardware and software designed for the most demanding environments.

The Interphase 6535 T1/E1/J1 Communications Controller sets the standard for high-performance and reliability as the industry's most advanced CompactPCI T1/E1/J1 communications controller for telecommunication applications. The 6535 outshines its competition with the industry's best performance, a comprehensive array of protocol and operating system support, and robust development tools to simplify the integration process. Featuring a powerful MPC8260 RISC on-board processor, a high-performance architecture, and enhanced ATM capabilities, the 6535 provides a robust, easy-to-integrate solution for the new generation of high-availability systems being deployed today.

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6535 Hardware

Powerful Features for Next-Generation Telecommunications

6535 Architecture

The 6535 CompactPCI T1/E1/J1 Communications Controller is the flagship product in the Interphase line of MPC8260-based communications controllers for carrier-class telecommunication environments. The software selectable interfaces for either 4 or 8 T1/E1/J1 ports enable maximum flexibility to support multiple national variants with just one board.

The T1/E1/J1 framers feed DS0 traffic to an on-board H.110 TDM switch module, which then feeds multiple DS0s to the 8260 for internal processing or to the H.110 TDM bus for I/O to/from other slots. The T1/E1/J1 framers can also simultaneously feed any number of DS0s to the Inverse Multiplexer over ATM (IMA) chip on the 6535, which then aggregates the DS0s in full or fractional T1 streams into a single ATM pipe to be processed by the 8260's CPM.

With this powerful functionality, the 8260 Communications Processor Module (CPM) can simultaneously support multiple protocols including ATM, SS7, Frame Relay and others via the internal timeslot assigner and the internal UTOPIA bus interface. The 8260 CPM has access to its own 32-bit local bus, where the 32K entry look-up Content Addressable Memory (CAM), and 8MB SDRAM are available for unimpeded read/write access to connection and routing tables.

The 8260 features a 64-bit, 66MHz local data bus connecting up to 128MB of SDRAM, up to 4MB of boot code FLASH EPROM, and a 64-bit wide PowerSPAN PCI bridge. The PowerSPAN bridge operates at 33MHz (upgradeable to 66MHz) on the backplane, supporting several DMA transfer modes for enhanced interprocess communications.

The 6535 is also equipped with a Fast Ethernet port on the faceplate. The 10/100BT port supports full duplex 100 Mbps traffic, and therefore may be used for a variety of bridging/ routing purposes, protocol interworking purposes, or simply to download/communicate with the 8260 CPU. A mini-DIN TTY port is also provided on the front panel.

Processor/Memory



- PowerQUICC II (MPC8260) 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
  - 200MHz core, 133MHz CPM, 280MIPS CPU
- 64MB or 32MB 64-bit SDRAM memory
- 4MB downloadable 8-bit Flash EEPROM
- 8MB 32-bit Connection Memory

Line Interfaces

- Either four or eight individually software selectable front or rear access T1/E1/J1 interfaces (rear access via passive universal Rear Transition module)
- No component changes between T1, E1 or J1 terminations
- Each RJ-48C line is software configurable in Line Termination or Network Termination mode
- Integrated Channel Service Unit (CSU) in T1 mode
- Rear Transition Module includes line protections to comply with ETS300 046-3, UL1459, FCC68, and Bellcore TR-NWT-001089
- QuadFALC framer supports long haul or short haul interface, AMI, HDB3, or B8ZS line coding and various Super-Frame Formats
- One Fast-Ethernet interface on the front panel for remote boot or LAN capability with 10/100 Base-T transceiver
- One TTY console port on front panel

CPCI Interfaces

The board is connected to the host through a CPCI compliance bus. This connection is done through CPCI connectors J1, J2, J4, and J5.

- Connector J1 is used for 32-bit PCI signals.
- Connector J2 is used for 64-bit PCI signals.
- Connector J4 is used for computer telephony bus compliant with the H.110 specification.
- Connectors J3 and J5 are used for access to the Rear Transmission Module.
- Hot Swappable

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 (loopback timing)
  - Network reference (via H.110 on J4)
- Recovered clock available on H.110 bus (J4)

On-Board H.110 Bus

The H.110 TDM bus on the 6535 controller allows multiple I/Os to share resources across multiple system slots:

- Enables services to expand to multiple slots within same chassis
- Up to 512 H.110-to-local timeslot switch capability
- Up to 1024 local-to-local timeslot switch capability

Inverse Multiplexing for ATM (IMA)

- Supports up to 8 T1, E1, or J1 lines into a single ATM pipe
- Allows a mix of IMA and non-multiplexed DS0 channels to co-exist on the same facilities (ex. IMA or fractional T1/E1/J1)
- Up to 4 IMA groups

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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 6535 communications controller. Because integrators and equipment providers have diverse development environments, Interphase provides three types of development tools, each tailored to the needs of different integration types. The Board Development Kit (BDK) facilitates development of device drivers, embedded firmware protocol and applications for the 6535 hardware module. The Board Support Package (BSP) allows software developers to write software applications that run on a specific operating system embedded on the MPC8260 CPU. And the Software Development Kit (SDK) offers developers a set of firmware protocol stacks developed by Interphase, and accessible via APIs provided by Interphase.

Board Development Kit

The 6535 BDK is specific to the 6535 hardware, but it is not tied to a particular operating system environment.

The kit contains the following main components:

- *Board Development Guide* - provides valuable information and software implementation directives, as well as source examples
- *Setup Utility* - allows the user to modify the content of the various programmable elements of the board, and especially the FLASH EEPROM memory
- *Interactive Built-In Test Utility* - allows the management of the card such as reset/run action, memory and registers dump, memory and DMA tests, line parameters manipulation, and more…

Board Support Package

The 6535 Board Support Package 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 6535. Once the BSP is installed, the 6535 can be connected to an Ethernet network and development can be done directly from the particular RTOS development environment, such as Tornado. The 6535 Board Support Package (BSP) also includes the files required to make an RTOS run embedded on the 6535 CPU.

The package provides source files for:

- TTY driver
- Ethernet driver (broadcast and multicast support)
- Interrupt controller
- Timestamp driver
- Auxiliary timer support
- Flash Memory Management
- True Flash File system (TFFS) support
- MMU support

Software Development Kit



The 6535 Software Development Kit reduces software development time and facilitates faster time to market by supplying embedded protocol support for ATM and SS7, base drivers for a selected operating system, configuration and diagnostic utilities, and sample programs.

The 6535 is initially offered with an SDK for **Solaris 2.6, 2.7, and 2.8**. The SDKs enable easy integration and tools and diagnostics to enable faster time to market. The SDKs also provide Interphase's own ATM and SS7 protocol support for SS7 MTP2, AAL0, AAL2, and AAL5, with ATM Quality of Service classes of service for Constant Bit Rate (CBR), Unspecified Bit Rate (UBR), and Variable Bit Rate (VBR).

The Software Development Kit supplied with the 6535 module consists of software programs and utilities running on the host CPU, and embedded software ("firmware") which runs on the on-board 8260 networking 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 8260 on the 6535 board

These modules interact with each other through well-defined and documented interfaces. A common 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 WAN API (WAN Application Programmer's Interface), the Base Driver's API, sample programs, and tools guides.

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6535 Compact PCI T1/E1/J1 Communications Controllers

Telecom and Industry Standards Compliance

- CompactPCI 2.1
- Peripheral Component Interconnect (PCI) Local Bus Specification, Revision 2.2
- ITU-T G.703 General Aspects of Digital Transmission Systems
- ITU-T G.704 General Aspects of Digital Transmission Systems
- ANSI T1.403-1995
- ANSI T1.107-1995
- EIA-232-D Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange
- ETS-300 046-3
- Bellcore TR-NWT-001089
- CompactPCI PICMG 2.0 R3.0

Agency Certifications

- FCC part 15 class A
- CE class A
- EN 55022
- EN 50082-1
- EN 60950
- FCC part 68
- CS03
- CE165X
- UL 1459
- UL 1950

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SPECIFICATIONS

Specifications

Bus Type..... CompactPCI, H.110
Bus Access..... 32-bit, 33MHz, can be configured for 64-bit, 66MHz
Processor..... 200MHz Motorola MPC8260
Memory..... 32/64MB SDRAM

Mechanical

Form Factor .....6U CompactPCI
Length..... 266.7 mm
Width..... 215.9 mm
RTM Length..... 266.7 mm
RTM Width..... 134.5 mm

Operating Environment

Temperature.....0 to 55° C
Relative Humidity..... 5% to 95% non-condensing
Altitude..... 0 to 15,000 ft.

Driver Support - *(check Web for availability)*

Solaris Software Development Kit (SDK)
VxWorks Board Support Package (BSP)

CONFIGURATION OPTIONS

The 6535 CompactPCI T1/E1/J1 Communications Controller is available in the following configurations with rear-access provided by a Rear Transition Module:

6535-001: 6535 Compact PCI T1/E1/J1 Communications Controller - 4 T1/E1/J1 ports, 32MB SDRAM, Rear Access

6535-002: 6535 Compact PCI T1/E1/J1 Communications Controller - 4 T1/E1/J1 ports with Inverse Multiplexing for ATM (IMA), 32MB SDRAM, Rear Access

6535-003: 6535 Compact PCI T1/E1/J1 Communications Controller - 8 T1/E1/J1 ports, 64MB SDRAM, Rear Access

6535-004: 6535 Compact PCI T1/E1/J1 Communications Controller - 8 T1/E1/J1 ports with Inverse Multiplexing for ATM (IMA), 64MB SDRAM, Rear Access

6535-005: 6535 Compact PCI T1/E1/J1 Communications Controller - 8 T1/E1/J1 ports, 64MB SDRAM, Front Access

6535-006: 6535 Compact PCI T1/E1/J1 Communications Controller - 8 T1/E1/J1 ports with Inverse Multiplexing for ATM (IMA), 64MB SDRAM, Front Access

6535-007: 6535 Compact PCI T1/E1/J1 Communications Controller - 4 T1/E1/J1 ports with Inverse Multiplexing for ATM (IMA), 32MB SDRAM, Front Access

6535-008: 6535 Compact PCI T1/E1/J1 Communications Controller - 4 T1/E1/J1 ports, 32MB SDRAM, Front Access

6535-901: Board Support Package for VxWorks

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