

features

- 150 MFLOPS floating-point TMS320VC33 DSP (upward compatible with the industry-standard TMS320C31 DSP)
- up to 512Kx32 static RAM (SRAM)
- up to 1Mx8 FLASH/EPROM for stand-alone operation
- high-performance host PCI-bus interface for multichannel PCI-to-DSP and DSP-to-PCI communication:
 - access from PCI-bus to on-board SRAM, FLASH and PIOX resources
 - DSP-to-PCI access via bi-directional FIFO with PCI-bus mastering
 - multi-channel bidirectional mailboxes and interrupts
- software configurable external DSP interrupts
- stand-alone operation with external power
- watch-dog timer and reset monitor
- modular construction with PIOX/SIOX daughter-card modules
- half-size PCI card

I/O expansion

- two sites for SIOX rev.C and one site for enhanced SIOX rev.B serial I/O expansion I/F daughter-card modules
- one site for high-speed PIOX/PIOX-16 parallel I/O expansion I/F daughter-card module
- a variety of AD/DA daughter-card modules for multichannel speech, audio, fax/modem, telecom, digital radio, etc applications

multiprocessor expansion

- PIOX and SIOX DSP and I/O Coprocessors
- PIOX-Link daughter-card module with link ports

software development tools

- JTAG-IN port for external TI XDS510 and MicroLAB Systems *MIRAGE-510D* emulators
- JTAG-OUT port for emulaton of external JTAG daizy-chained TMS320C33 DSP
- optional on-board *ECC* emulation controller chip:
 - low-cost replacement for external JTAG emulator
 - plugs into dedicated on-board socket
 - runs under TI Code Composer IDE
- TI Floating-point DSP C/Assembler Compiler

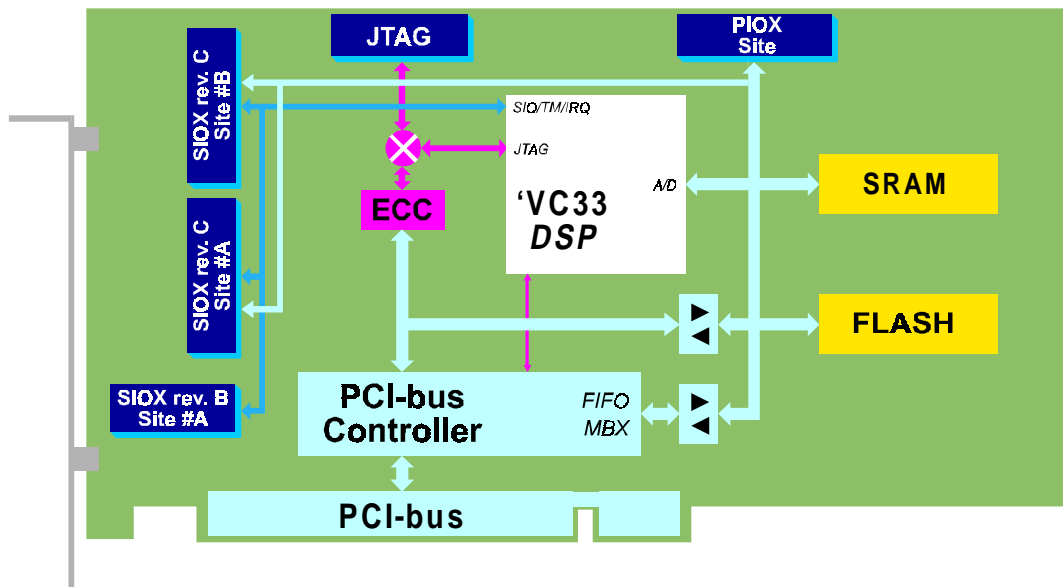
application software

- Hypersignal RIDE tools for DSP algorithm development and real-time simulation
- Virtuoso and Nucleus multitasking real-time OS tools
- vocoder/fax/modem function libraries
- DSP, math, etc function libraries
- host control utilities and drivers for DOS and Windows

applications

- vocoders and fax/modems
- instrumentation and industrial
- multimedia and audio processing
- acoustics and radar
- image processing
- digital radio
- biomedical
- DSP accelerators for PC with extensive PC-to-DSP communication





TORNADO-P33 is high performance DSP platform with flexible modular construction for real-time DSP and data acquisition for both PCI plug-in and stand-alone applications.

TORNADO-P33 is based around the TMS320VC33 DSP, which is the upward compatible upgrade for the industry-standard floating-point TMS320C31 DSP and features 150 MFLOPS performance and 34Kx32 on-chip memory. The on-board memory of *TORNADO-P33* comprises of static RAM (SRAM) and FLASH/EPROM for stand-alone operation.

An ultimate benefit of *TORNADO-P33* is the on-board multi-thread architecture, which is well suited for high-performance on-board data processing and in-parallel high-speed multichannel bidirectional data transfers between host PCI-bus and DSP while consuming virtually any DSP time. In-first, the on-board shared bus architecture allows access to the on-board SRAM, FLASH and PIOX resources from both PCI-bus and DSP masters with almost no arbitration delays. In-second, bi-directional FIFO with dual-channel DMA and PCI-bus mastering facilities allow access from DSP to all PCI-bus memory and I/O areas. Finally, multichannel bi-directional mailboxes provide mutual multi-source interrupt communication between PCI-bus and DSP.

Another benefit of *TORNADO-P33* is a modular construction with daughter-card options, which allows quick "off-the-shelf" system arrangement and to meet requirements of different DSP applications with real-time data acquisition. *TORNADO-P33* feature serial (SIOX) and parallel (PIOX/PIOX-16) I/O expansion interface sites compatible with a variety of AD/DA, digital I/O, DSP and IO coprocessor, multiprocessor and more.. daughter-card modules.

TORNADO-P33 comes ready for stand-alone operation without host PC. After the on-board DSP software has been debugged and programmed into the on-board FLASH memory, then *TORNADO-P33* can be unplugged from host PCI-bus and run in a stand-alone mode with external power. On-board reset monitor and watch-dog timer provide reliable system functionality for stand-alone operation.

The on-board JTAG-IN emulation port is compatible with external TI XDS510 and MicroLAB Systems *MIRAGE-510D* JTAG emulators, and is designed to debug both the on-board TMS320VC33 DSP and optional external TMS320 DSP via JTAG-OUT daizy-chain port. In case external JTAG emulator is not available, then optional on-board low cost *ECC* emulation controller chip for *TORNADO* DSP systems might be used. *ECC* plugs into the dedicated on-board socket of *TORNADO-P33* mainboard, is identical to XDS510/*MIRAGE-510D* emulators, and runs under the industry standard TI Code Composer IDE.

TORNADO-P33 resident software can be developed with the TI optimizing TMS320 Floating-point DSP Compiler tools, Hypersignal RIDE real-time DSP algorithm development and simulation tools, Virtuoso and Nucleus real-time OS tools, vocoder/fax/modem and DSP/math function libraries, which are available from multiple worldwide software vendors.

High floating-point DSP performance, flexible modular construction, a variety of AD/DA and multiprocessor expansion daughter-card modules, as well as the world class industry standard DSP software development tools make *TORNADO-P33* an ideal selection for high-speed DSP applications with extensive host-to-DSP communication.

Technical Specifications

DSP

TI TMS320VC33 floating-point DSP, 32 bits, 150 MFLOPS, 34Kx32 on-chip memory

on-board memory

- up to 512Kx32 1ws static RAM (SRAM)
- up to 1Mx8 FLASH/EPROM

host PCI-bus interface

Access from PCI-bus to SRAM/FLASH/PIOX and bi-directional mailboxes. Data transfer between PCI-bus and DSP via bi-directional FIFO with PCI-bus DMA mastering feature. Mutual multi-source interrupts between PCI-bus and DSP.

parallel I/O expansion (PIOX) interface sites

One site for PIOX/PIOX-16 daughter-card module. Includes SB address and data, SB control, DSP on-chip timer control, IRQ lines, reset, PC power lines.

serial I/O expansion (SIOX) interface sites

Two sites for SIOX rev.C and one site for SIOX rev.B daughter-card modules. Includes the DSP on-chip serial ports and timer control lines, IRQ lines, reset, PC power lines.

physical/power

Dimension: 215x95mm. Occupies one PCI slot. Maximum power consumption (with 128Kx32 SRAM): 5V@2.4A