features

- ultra-high performance 32-bit fixed-point DSPs:
  - TMS320C6202 (2000 MIPS, 3 Mbit on-chip RAM)
  - TMS320C6203 (2400 MIPS, 7 Mbit on-chip RAM)
- up to 512Kx32 synchronous static RAM (SBSRAM)
- up to 8Mx32 synchronous dynamic RAM (SDRAM)
- up to 1Mx8 FLASH/EPROM for stand-alone operation
- high-performance host PCI-bus interface for multi-channel PCI-to-DSP and DSP-to-PCI communication:
  - 32Kx32 or 64Kx32 dual-port RAM (DPRAM) between PCI-bus and DSP for shared data access
  - DSP-to-PCI access via bi-directional FIFO with PCI-bus mastering
  - access from PCI-bus to all DSP memory and I/O areas via DSP on-chip HPI port
  - multi-channel bi-directional mailboxes and interrupts
- software configurable multi-source external DSP interrupts
- stand-alone operation with external power
- watch-dog timer and reset monitor
- modular construction with 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
- application specific PIOX/SIOX I/O coprocessors daughter-card modules

multiprocessor expansion

- PIOX/SIOX DSP coprocessors
- PIOX-Link daughter-card module with link ports

software development tools

- JTAG-IN port for external TI XDS510 and MicroLAB Systems *MIRAGE-510DX* emulators
- JTAG-OUT port for JTAG daisy-chaining
- optional on-board *ECC* emulation controller chip:
  - low-cost replacement for external JTAG emulator
  - runs under TI Code Composer Studio IDE
- TI optimizing 'C6x 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

- multichannel vocoders and fax/modems
- multichannel telecommunication and telephony
- multimedia and audio processing
- instrumentation and industrial
- image processing and tomography
- acoustics and radar
- multichannel digital radio
- DSP accelerators for PC with extensive PC-to-DSP communication
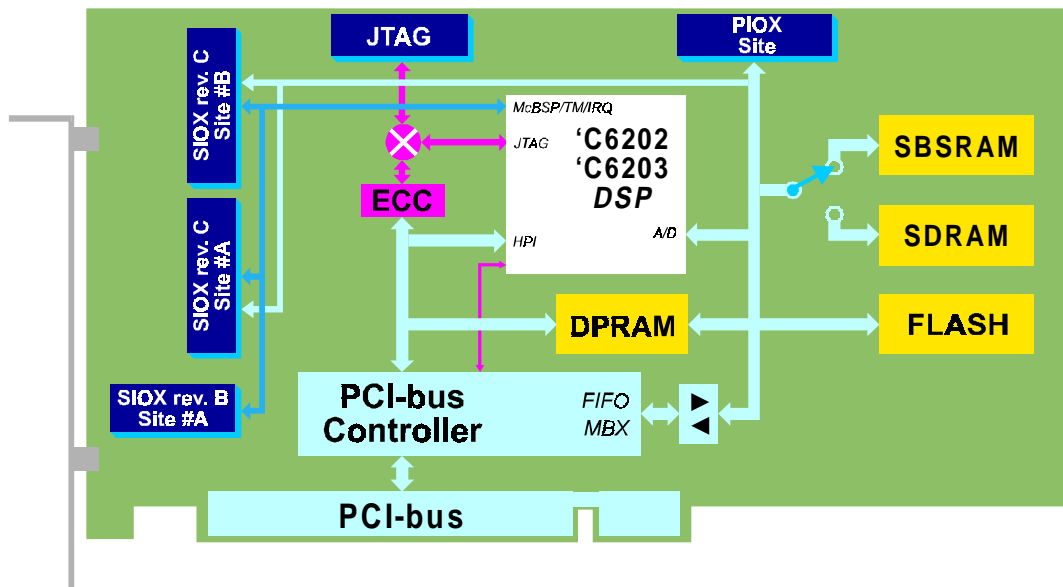
TORNADO-P6202/P6203 are ultra-high performance DSP platforms with flexible modular construction for real-time DSP and data acquisition for both PCI plug-in and stand-alone applications.

TORNADO-P6202 and TORNADO-P6203 utilize compatible revolutionary fixed-point TI TMS320C6202 (2000 MIPS) and TMS320C6203 (2400 MIPS) DSP, which are optimized for on-chip parallel computing and have 3 Mbit and 7 Mbit on-chip RAM.

An ultimate benefit of TORNADO-P620x 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 dual-port RAM (DPRAM) with hardware semaphores and mutual interrupts offers shared memory area for both PCI-bus and DSP without arbitration delays. In-second, the DSP on-chip HPI port delivers access from host PCI-bus to all DSP memory and I/O areas including SBSRAM/SDRAM, FLASH/EPROM, PIOX and DSP on-chip memory and peripherals. In-third, 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 multi-source interrupt communication between PCI-bus and DSP.

Another benefit of TORNADO-P620x is a modular construction with daughter-card options, which allow quick "off-the-shelf" system configuration and to meet requirements of different DSP applications with real-time data acquisition. TORNADO-P620x features serial (SIOX) and parallel (PIOX/PIOX-16) I/O expansion interface sites compatible with a variety of AD/DA, digital I/O, DSP and I/O coprocessor, multiprocessor and more.. daughter-card modules.

TORNADO-P620x 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-P620x 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 TMS320C6x 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-P620x mainboard, is identical to XDS510/MIRAGE-510D emulators, and runs under the industry standard TI Code Composer Studio IDE.

TORNADO-P620x resident software can be developed with the TI optimising 'C6x 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.

Ultra-high 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-P620x an ideal selection for high-speed DSP applications with extensive host-to-DSP communication.

Technical Specifications

DSP
- *TORNADO-P6202*: TMS320C6202 (2000 MIPS)
- *TORNADO-P6203*: TMS320C6203 (2400 MIPS)

on-board memory
- up to 512Kx32 synchronous burst RAM (SBSRAM)
- up to 8Mx32 synchronous dynamic RAM (SDRAM)
- up to 1Mx8 FLASH/EPROM
- 32Kx32 or 64Kx32 dual-port RAM (DPRAM)

host PCI-bus interface
Access from PCI-bus to DPRAM, bi-directional mailboxes and HPI port of DSP. 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 SBSRAM and 4Mx32 SDRAM): 5V@3.2A

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