

features

- ultra-high performance compatible DSPs:
 - ❑ TORNADO-P62: TMS320C6201 (32 bits, fixed point, 1600 MIPS)
 - ❑ TORNADO-P67: TMS320C6701 (32 bits, floating point, 1000 MFLOPS)
- up to 512Kx32 synchronous static RAM (SBSRAM)
- 4Mx32 synchronous dynamic RAM (SDRAM)
- 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:
 - ❑ 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 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
- application specific SIOX and PIOX-16 I/O coprocessor daughter-card modules

multiprocessor expansion

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

software development tools

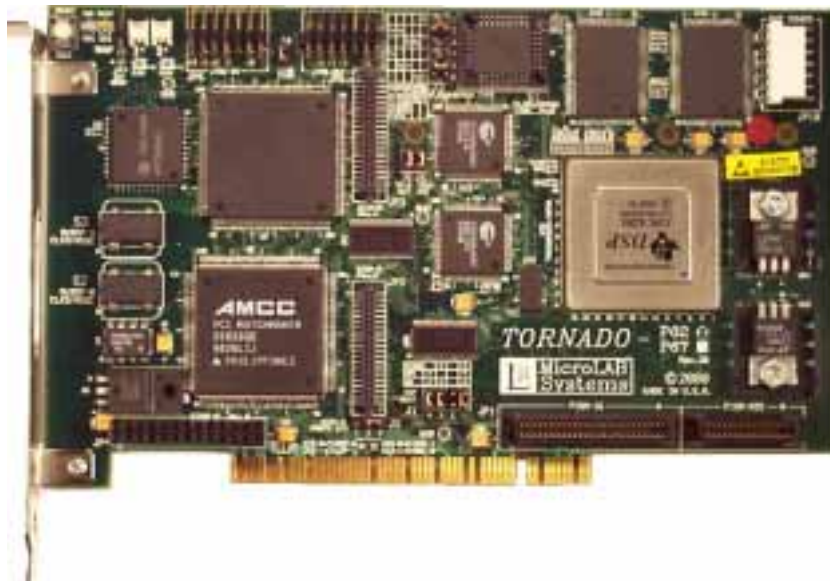
- JTAG-IN port for external TI XDS510 and MicroLAB Systems *MIRAGE-510D* emulators
- JTAG-OUT port for emulation of external JTAG daizy-chained TMS320C6x DSP
- optional on-board *ECC* emulation controller chip:
 - ❑ low-cost replacement for external JTAG emulator
 - ❑ plugs into dedicated on-board socket
 - ❑ runs under TI Code Composer Studio IDE
- TI optimizing 'C6x C/Assembler Compiler

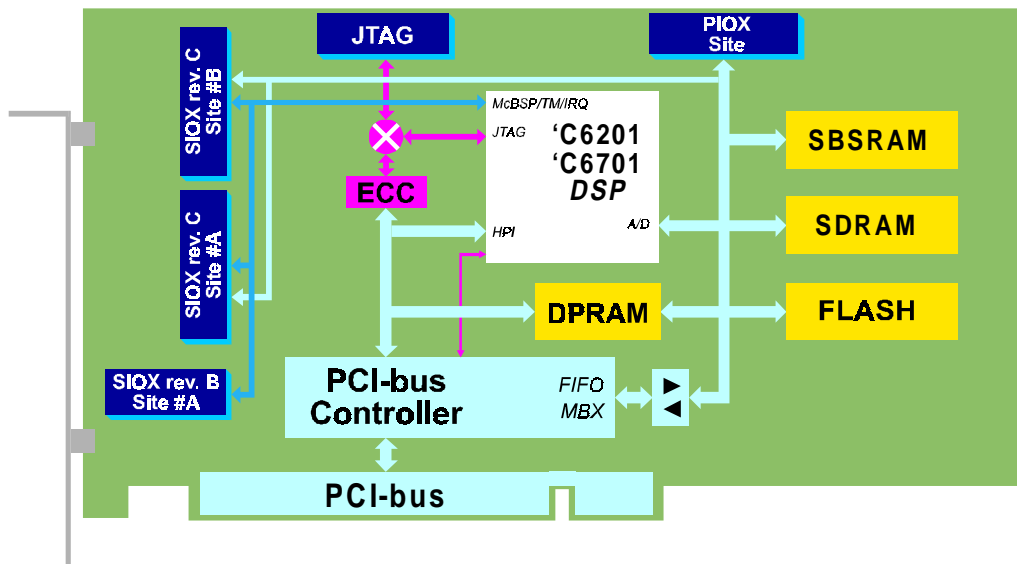
application software

- 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-P62/P67 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-P62 and *TORNADO-P67* utilize compatible revolutionary fixed-point TMS320C6201 (1600 MIPS) and floating-point TMS320C6701 (1000 MFLOPS) DSP correspondingly, which are optimized for on-chip parallel computing.

An ultimate benefit of *TORNADO-P62/P67* 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, 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 multi-source interrupt communication between PCI-bus and DSP.

Another benefit of *TORNADO-P62/P67* 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-P62/P67* 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 I/O coprocessor, multiprocessor and more.. daughter-card modules.

TORNADO-P62/P67 come 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-P62/P67* can be unplugged from host PCI-bus and run in a stand-alone mode with external power. On-board reset monitor and watchdog 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-P62/P67* mainboard, is identical to XDS510/*MIRAGE-510D* emulators, and runs under the industry standard TI Code Composer Studio IDE.

TORNADO-P62/P67 resident software can be developed with the TI optimizing '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-P62/P67* an ideal selection for high-speed DSP applications with extensive host-to-DSP communication.

Technical Specifications

DSP

- *TORNADO-P62*: TMS320C6201 (1600 MIPS)
- *TORNADO-P67*: TMS320C6701 (1000 MFLOPS)

on-board memory

- up to 512Kx32 synchronous burst RAM (SBSRAM)
- 4Mx32 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