MicroLAB Systems

Ultimate DSP Development Solutions

TORNADO-548/549/5402/5410/5416

High-performance TMS320C548/C549/C5402/C5410/5416 Fixed-point DSP Systems and TMS320 DSP Emulators for ISA-bus Host PC

features

- TMS320C548/C549/C5402/C5410/5416 fixed-point DSP, 16 bits, 80..160MIPS
- on-board static RAM (SRAM) 256Kx16 comprizing of two 64Kx16 PROG memory pages and either four 32Kx16 or two 64Kx16 DATA memory pages
- on-board shared bus (SB) architecture with shared SRAM/PIOX-16 resources and SB masters comprising of on-board DSP and host ISA-bus memory I/F
- SRAM/PIOX-16 access from host ISA-bus memory I/F via ISA bus UMB memory mapped page
- host access to the DSP on-chip HPI port
- flexible modular construction with I/O expansion via SIOX/PIOX-16 daughter-card modules
- upward compatible with *TORNADO-542L* DSP system
- universal development system for TMS320 DSPs
- build-in device serialisation code
- compact size

I/O expansion

- two sites for serial I/O expansion (SIOX) I/F daughter-card modules
- one site for high-speed parallel I/O expansion (PIOX-16) I/F daughter-card module
- a variety of AD/DA/DIO PIOX-16/SIOX daughter card modules for speech/fax/modem, telecom, telephony, audio, etc. signal processing applications
- application specific SIOX and PIOX-16 I/O coprocessor daughter-card modules

software development tools

- JTAG port for TI XDS510 and MicroLAB Systems *MIRAGE-510D* emulators
- optional low cost *UECM* daughter card module:
  - ❑ identical to XDS510 and *MIRAGE-510D* emulators
  - ❑ emulation of the on-board TMS320C54x DSP
  - ❑ optional MPSD/JTAG active buffer pod facility for emulation of any external TMS320 DSPs
  - ❑ TI C5000 Code Composer Studio IDE and C54x HLL Debuggers
- TI C54x Fixed Point DSP C/Assembler Compiler tools

application software

- Virtuoso, SPOX, Nucleus real-time OS tools
- Hypersignal tools for DSP algorithm development
- vocoder/fax/modem function libraries
- DSP, math, vector and communication functions
- host control utilities

applications

- speech/fax/modem
- telecom and telephony
- audio
- instrumentation and industrial
- biomedical
- education
- TMS320 DSP systems development and diagnostics

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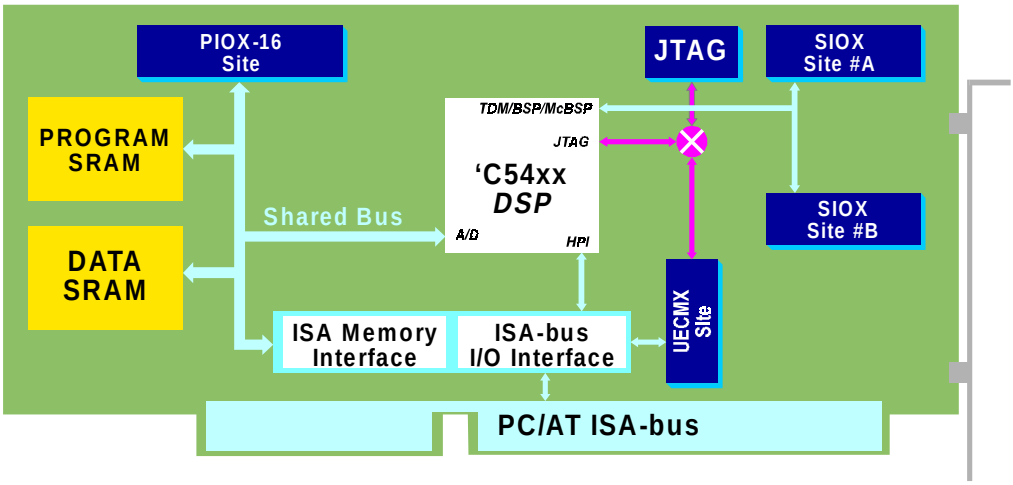

TORNADO-548/549/5402/5410/5416 are high performance DSP platforms for real-time DSP and universal TMS320 DSP emulators for ISA-bus host PC. Flexible modular construction and a wide selection of AD/DA/DIO expansion daughter-card modules make *TORNADO-548/549/5402/5410/5416* an ideal selection for telecom, telephony, speech/fax/modem, audio, instrumentation and biomedical application as well as for OEM, education and TMS320 DSP systems development and diagnostics.

TORNADO-54x are based around the state-of-art TI fixed point TMS320C548/C549/C5402/C5410/C5416 DSP, which are the members of TI TMS320C5000 DSP product line and are optimized for telecom applications. On-board static RAM is as large as 256Kx16 and comprizes of two 64Kx16 program and either four 32Kx16 (*TORNADO-548/549/5410/5416*) or two 64Kx16 (*TORNADO-5402*) data memory pages.

An ultimate benefit of *TORNADO-54x* is the on-board shared bus (SB) architecture that has been optimized for high performance on-board data processing and in-parallel high speed data transfers between the on-board SRAM/PIOX-16 resources and host ISA bus memory interface (I/F) without consuming virtually any DSP time. Host software can easily access any SRAM/PIOX-16 data via ISA-bus UMB mapped memory page.

TORNADO-54x also provide direct access from host ISA-bus I/F to the DSP on-chip HPI port in order to upload/download the DSP on-chip SRAM data or in case the simulation of communication between host and on-board TMS320C54x DSP in the customer designed hardware is required.

In order to meet requirements of real-time data acquisition, *TORNADO-54x* provide two serial (SIOX) and one high-speed parallel (PIOX-16) I/O expansion I/F connectors for optional compatible AD/DA/DIO and DSP coprocessor daughter card modules.

TORNADO-54x provides the on-board JTAG emulation port, which is compatible with the TI XDS510 and MicroLAB Systems *MIRAGE-510D* scan-path emulators and is used to debug the on-board TMS320C54x software. Also, optional low cost *UECM* universal emulation control daughter card module for *TORNADO* DSP systems is available. *UECM* is identical to XDS510/*MIRAGE-510D* emulators and runs under the industry standard TI HLL Debugger and Go DSP Code Composer Studio IDE. When installed onto *TORNADO-54x* board, *UECM* connects to JTAG emulation port of the on-board TMS320C54x DSP. *UECM* also delivers optional external MPSD/JTAG active buffer pod facility for emulation of any external TMS320 DSP. This converts *TORNADO-54x* into universal development system for TMS320 DSP.

TORNADO-54x resident software can be developed with the TI C54x fixed-point DSP C/Assembly tools, a variety of compatible real-time operating systems, DSP algorithm development tools, DSP/vector/math function libraries and vocoder/fax/modem software tools that are available from multiple software vendors.

The vocoder/fax/modem function libraries are also available for telecommunication and telephony applications using *TORNADO-54x.*

High performance, flexible modular construction of *TORNADO-54x* and a variety of AD/DA data acquisition options deliver ready-on solutions for a wide selection of applications and is open to meet your requirements while keeping a cost of project to a minimum.

Technical Specifications

DSP
TMS320LC548/VC549/VC5402/VC5410/VC5416 DSP, fixed point, 16 bits, 80..160 MIPS

on-board memory
256Kx16 static RAM (2x64Kx16 PROG, 4x32Kx32 or 2x64Kx16 DATA)

host ISA bus interface
ISA bus UMB mapped 32KB memory page. Sixteen ports in ISA bus I/O space. Nine lines for PC IRQ.

parallel I/O expansion interface (PIOX-16)
One site for PIOX-16 daughter card module. Includes SB address and data, SB control, DSP onn-chip timer control, IRQ lines, reset, PC power lines.

serial I/O expansion interface (SIOX)
Two sites for SIOX daughter card modules. Includes the DSP on-chip serial ports and timer control lines, IRQ lines, reset, PC power lines.

physical/power
1/2 PC/AT card. Occupies one PC/AT ISA slot. Maximum power consumption (with 256Kx6 SRAM and UECM installed): 5V@2.8A

DOC: MLS-SPDS-120E 10/99

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