

## 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
- dual-channel 10 Mbps universal receiver/transmitter (USART) with synchronous (HDLC/X.25, SDLC, MONO, BISYNC) and asynchronous protocols and 115kBaud RS232 and 10Mbps RS422 external interfaces
- 12 Mbit/s USB device interface
- 10-bit digital I/O
- watch-dog timer and reset monitor
- modular design with daughter-card modules (DCM)
- industry standard 3U form-factor

## I/O expansion

- one site for serial I/O expansion (SIOX rev.B or SIOX rev.C) DCM
- one site for parallel I/O expansion (PIOX-16) DCM
- a variety of AD/DA/DIO DCM
- a variety of application specific SIOX and PIOX-16 I/O coprocessor DCM

## software development tools

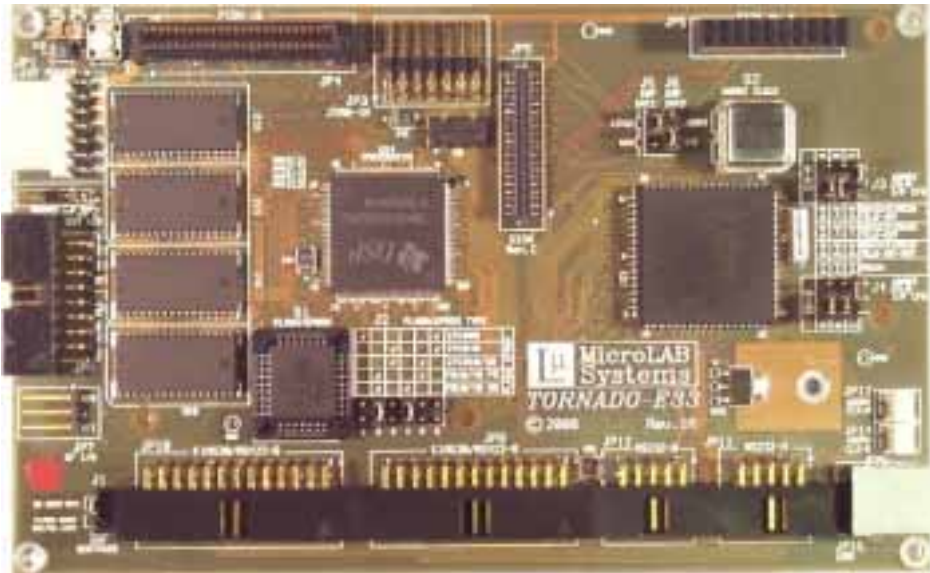
- JTAG port for TI XDS510 and MicroLAB Systems *MIRAGE-510D* emulators with Code Composer IDE
- TI Floating-point DSP C/Assembler Compiler

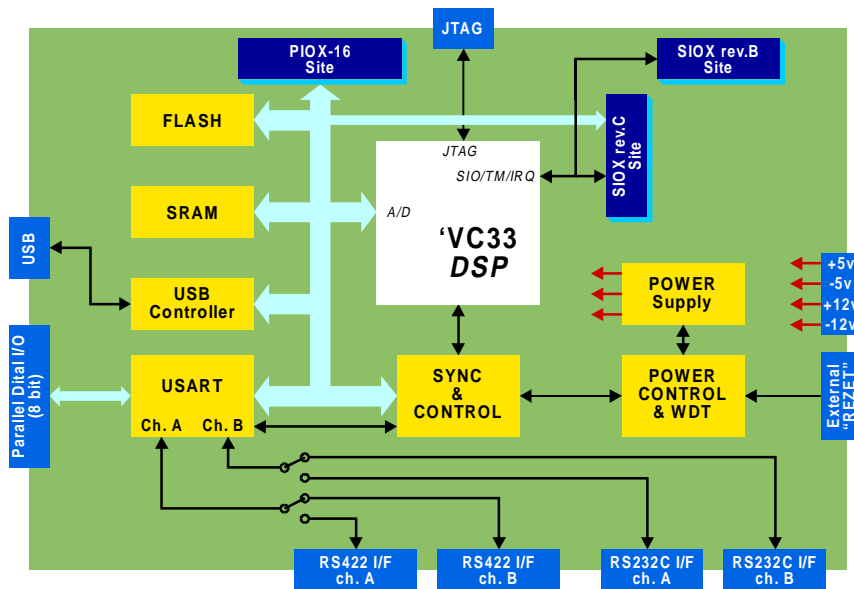
## application software

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

## applications

- vocoders, fax and modems
- telecommunication and telephony
- multimedia and audio processing
- acoustics and radar
- embedded instrumentation and industrial digital radio
- image processing
- biomedical





*TORNADO-E33* is a high performance floating-point embedded DSP controller with the industry standard 3U form-factor for real-time data acquisition and DSP. Flexible modular construction and a variety of “off-the-shelf” AD/DA/DIO and I/O coprocessor expansion daughter card modules make *TORNADO-E33* an ideal selection for embedded telecommunication, telephony, multimedia, acoustics, instrumentation, digital radio and many more application.

*TORNADO-E33* is based around the TI 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-E33* comprises of static RAM (SRAM) and FLASH/EPROM.

On-board dual-channel 10 Mbit/s USART (universal synchronous/asynchronous receiver/transmitter) with 10 Mbit RS422 and 115 kBaud RS232C interfaces, and 12 Mbit/s USB device interface deliver outstanding flexibility for networking of multiple *TORNADO-E3x/E6x/E54x* controllers and/or interfacing to external networks, peripherals and host computers. Each channel of USART can be independently configured for either synchronous (HDLC/X.25, SDLC, MONO, BISYNC) or asynchronous protocol with either RS422 or RS232C external interface.

An ultimate benefit of *TORNADO-E33* is a modular construction with daughter-card module options, which allows quick “off-the-shelf” system arrangement and to meet requirements of different DSP applications with real-time data acquisition. *TORNADO-E33* features one serial (SIOX rev.B and SIOX rev.C) and one parallel (PIOX-16) I/O expansion interface sites compatible with a variety of AD/DA, digital I/O, application specific I/O coprocessors and more.. daughter-card modules.

On-board reset monitor and watch-dog timer facilities provide reliable system functionality as stand-alone controller.

On-board 10-bit digital I/O allows control of external power switches, relays, etc and/or input from digital sensors or switches with minimum hardware.

*TORNADO-E33* on-board JTAG emulation port is compatible with TI XDS510 and MicroLAB Systems *MIRAGE-510D* scan-path emulators and is used to debug the on-board TMS320VC33 DSP software using TI Code Composer IDE.

*TORNADO-E33* resident software can be developed with the TI Floating-point DSP C/Assembly tools, a variety of compatible real-time operating systems, DSP algorithm development tools, vocoder/fax/modem and DSP/vector/math function libraries, which are available from multiple software vendors.

## Technical Specifications

### DSP

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

### on-board memory

- up to 512Kx32 1ws SRAM
- up to 1Mx8 FLASH/EPROM

### external interfaces

- dual-channel 10 Mbit/s USART synchronous/asynchronous protocols and 10 Mbit/s RS422 and 115kBaud RS232C I/F
- 12 Mbit/s USB device I/F

### on-board digital I/O

10-bit digital I/O with individual direction control and DSP interrupt mask

### serial I/O expansion interface (SIOX)

One SIOX rev.B site and one SIOX rev.C site for daughter card modules.

### parallel I/O expansion interface (PIOX)

One PIOX-16 site for daughter card modules.

### physical/power

3U (160x100mm) form-factor. Maximum power consumption (with 128Kx32 SRAM): 5V@1.3A