TORNADO-PX/DDC4

PIOX-16 I/O Coprocessor Daughter-Card Module with Quad Digital Radio Receiver for TORNADO DSP Systems and Controllers

features

- daughter-card module fits to *TORNADO* PIOX-16 site
- complete quad-band digital radio receiver solution requires only external digital tuner(s) and IF amplifier(s)
- high-performance DSP allows signal pre-processing and outstanding flexibility
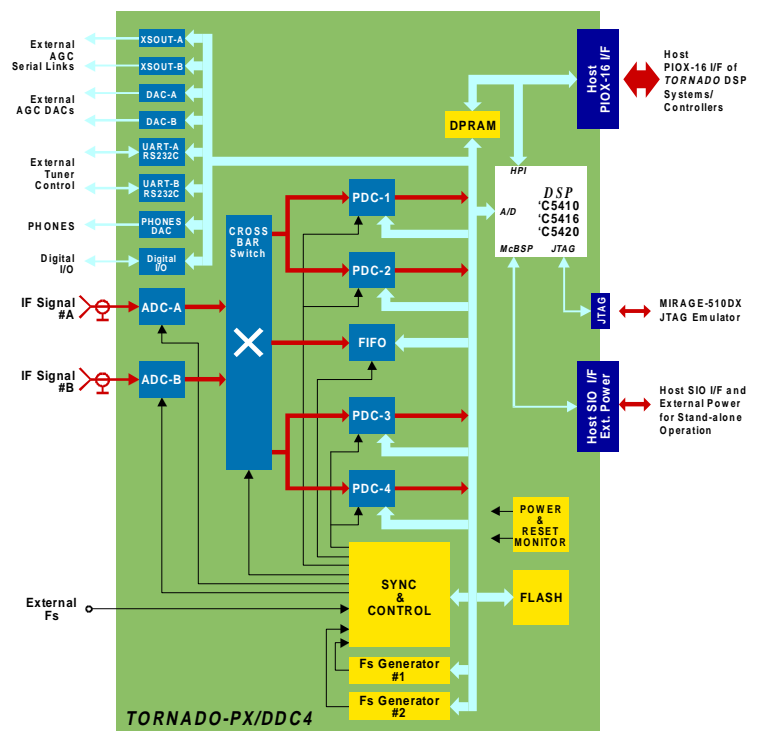- stand-alone operation with external power

construction

- two high-accuracy 65 MSPS 12-bit ADC with 240MHz bandwidth (allow undersampling)
- 2:3 programmable ADC streams cross-bar switch
- 2x2 quad 65MSPS HSP50214 PDCs with built-in resampling and demodulation
- two programmable high-resolution sampling frequency generators for ADC/PDC
- external sampling frequency option for ADC/PDC
- PDC bypass channel with 256KW FIFO and ADC overflow detectors allows 250Hz frequency resolution at 65MSPS FFT
- two 115kBaud UARTs with RS232C interface for external tuner control
- two 12-bit DACs and two output serial links for external IF amplifier(s) gain control
- headphone output for local audio monitoring
- two digital I/O pins for external synchronization events
- high-performance TMS320C5410 fixed-point DSP (100 MIPS, 16-bit, 64Kx16 on-chip RAM) with further upgrade to TMS320C5416 (160 MIPS) and TMS320C5420 (200 MIPS) DSP
- DSP communicates with host *TORNADO* DSP via 32Kx16 dual-port SRAM, on-chip HPI port and interrupts
- 128Kx8 FLASH for DSP boot code
- power and reset monitor for stand-alone operation
- bootmodes for DSP include no-boot and boot from FLASH
- communication with external host in stand-alone operation via DSP McBSP-0 serial port
- on-board environment is open for user programming

'C54x DSP software development tools

- JTAG port for TI XDS510 or MicroLAB Systems *MIRAGE-510DX* emulators
- TI C5000 Code Composer Studio Compile/Debug tools
- Virtuoso and Nucleus Real-Time OS tools

applications

- multi-channel digital radio receivers
- cellurar telephony
- multi-band radio-monitoring
- multi-channel radio-modems
- security systems

Technical Specifications

A/D channels	2 (Analog Devices AD6640 chips)
A/D resolution	12 bits
input A/D signal range	±0.5 V SE @ 50 Ohm
input signal bandwidth	10 kHz … 240 MHz
A/D nonlinearity	±1 LSB max differential nonlinearity ±2 LSB max integral nonlinearity
A/D SNR	68 dB typ
ADC streams cross-bar switch configuration	2:3 (three 12-bit output streams from any of two 12-bit input streams) built-in overflow detectors
PDC	Harris HSP50214B with built-in resampling and AM/FM/PM/SSB demodulation
maximum ADC/PDC sampling frequency (Fs)	65 MHz
ADC/PDC Fs source (independent for each ADC/PDC)	two on-board Fs generators two external Fs inputs
Fs generators frequency range	80kHz .. 65 MHz
Fs generators frequency resolution	300 Hz min
number of UART channels	2
maximum UART baud rate	115 kBaud (all standard baud rates are available)
external I/F for UART	RS232C
D/A channels	2
D/A resolution	12 bits
D/A signal output range	software programmable as (0..4 V DC) or (0..2 V DC) @ 600 Ohm
D/A SNR	68 dB typ
D/A settling time	10 us
number of output AGC serial links	2
communication parameters for AGC serial links	software programmable 8/16/24/30 data bit package, inversed frame synch pulse, programmable polarity of serial clock
headphones D/A resolution	16 bits
headphones D/A output range	±3 V AC @ 600 Ohm
maximum headphones D/A sampling frequency	300 kHz (defined by on-board DSP)
PDC bypass FIFO	256Kx12
DSP type	TMS320VC5410 (upgrade to TMS320VC5416 and TMS320C5420)
DSP performance	100 MIPS (upgrade to 160 MIPS and 200 MIPS)
DSP bootmodes	no boot, boot from FLASH
FLASH capacity	128Kx8
dual-port SRAM capacity	32Kx16 with mutual interrupts and h/w semaphores
number of programmable digital I/O	2 bits
digital I/O and external Fs signal level	TTL @ 3.2 mA
host TORNADO I/F	PIOX-16
host communication for stand-alone operation	DSP McBSP-0 serial port, 100 Mbit/s maximum data rate, 3v/5v logic levels
power consumption	5 V @ 3.8 A, +12 V @ 400 mA, -12v @ 400 mA