MicroLAB Systems

Ultimate DSP Development Solutions

TORNADO-PX/DDC4G rev.3

Quad Channel 105 MSPS Digital Radio Receiver DSP Coprocessor/Controller for TORNADO Boards and Stand-alone Applications

Key Features

- complete quad channel multi-standard digital radio receiver solution with on-board ultra-high performance DSP requires only two external RF tuners
- NEW installs into host *PIOX-2* daughter-card module (DCM) site of *TORNADO-E2/Pe2/HCX* DSP & host boards
- stand-alone capability from external power supply
- industry standard interfaces to external peripherals and PC
- multi-board expansion for multi-channel RF data acquisition and signal processing

Details

- two 105 MSPS 14-bit ADC with 650MHz bandwidth, overflow and peak-level detectors
- Graychip GC4016 quad-channel DDC with 11MHz output bandwidth and resampling capability
- quad-channel FIFO with input data formatter acquires and unpacks ADC and DDC output data
- programmable MASTER/SLAVE data acquisition controller allows synchronous multi-board expansion
- NEW ultra low phase noise high stability sampling frequency generator with external sampling frequency option
- quad 16-bit DACs for analog AGC of external I/F amplifiers, headphones output and general analog output
- two serial ports for digital AGC of external I/F amplifiers
- ultra-high performance 1 GHz TMS320C6416 32-bit fixed-point DSP with on-chip Viterbi/Turbo decoders
- 512kx32 SBSRAM, 16Mx32 SDRAM and 8Mx8 FLASH
- USB 2.0 device interface for communication to host PC
- two 384 kBaud UARTs with RS232C interfaces
- two external serial links for multi-board DSP-to-DSP communication and real-time external I/O
- NEW high-performance host 532 Mbyte/s 32-bit *PIOX-2* DCM interface with 512kx32 SDPRAM for installation into DCM site of host *TORNADO-E2/Pe2/HCX* DSP & host boards
- stand-alone capability
- NEW single wide range +5v..+14v power supply
- NEW system microcontroller for system health monitoring, fans control and system updates

DSP Software Development Tools

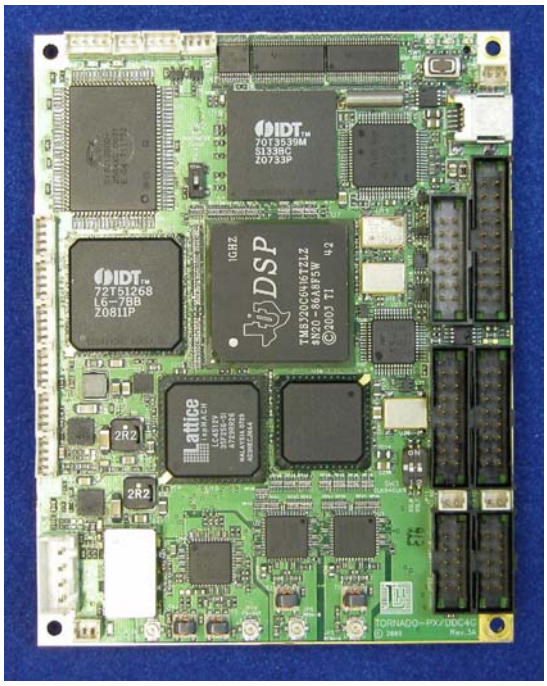
- DSP JTAG port
- TI Code Composer Studio Compile/Debug tools

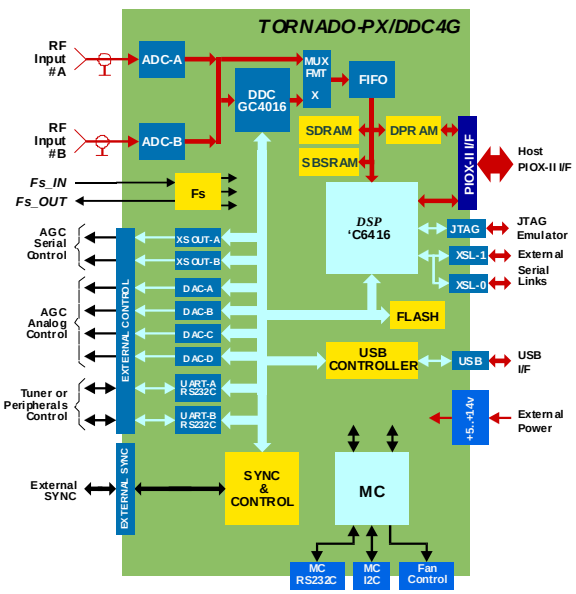
System Integration Capabilities

- multiple boards integration into one multi-channel RF data acquisition and digital radio receiver system
- NEW installs into the *PIOX-2* DCM site of host *TORNADO-E2/Pe2* DSP board for DSP post-processing
- NEW installs into the *PIOX-2* DCM site of host *TORNADO-HCX* host controller board with Freescale PPC CPU for integration into telecom networks and systems

Applications

- multi-channel RF monitoring and cellular telephony
- RF telecom and security systems
- many more …





TORNADO-PX/DDC4G installed onto *TORNADO-HCX/8349*

TORNADO-PX/DDC4G installed onto *TORNADO-E2/6713*

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Technical Specifications

A/D channels	2
A/D resolution	14 bits
input A/D signal range	±1 V @ 50 Ohm
ADC input bandwidth	650MHz max
A/D nonlinearity	±0.4 LSB differential nonlinearity (typ) ±1.5 LSB integral nonlinearity typ and ±5.0 LSB max
A/D noise	SNR 72 dB typ @ 70MHz, SFDR 85dB typ @ 70MHz
ADC sampling frequency	105 MHz max with programmable 1:1 .. 1:128 decimation factor
ADC sampling frequency source	- from on-board sampling frequency generator - from external sampling frequency input (50 Ohm 1V p-p coax input)
A/D signal level control	4-level peak-level detectors and overflow detector for each A/D channel
DDC	100MHz Graychip GC4016 quad-channel multi-standard DDC with input data multiplexer, data formatter, NCO, decimator, and resampler for each channel, 11 MHz max output bandwidth
FIFO	quad-channel with either 32Kx32, or 64Kx16, or 128Kx8 per channel
Data Acquisition Controller	continuous pass-thru or one-pass mode, MASTER/SLAVE operation
DDC inter-channel synchronization and board-to-board synchronization	from DSP software, DDC synchro-output, or external synchro-inputs (LVDS)
On-board Sampling Frequency Generator	- frequency: 100.0000 MHz and 93.3333 MHz standard, defined during product ordering. Call for other frequencies available. - frequency stability: ±4 ppm max - phase noise: -65dBc/Hz @ 10Hz, -95dBc/Hz @ 100Hz, -125dBc/Hz @ 1kHz, -135dbc/Hz @ 10kHz, -145dBc @ 100kHz
XDAC channels	4 (XDAC-A, XDAC-B, XDAC-C, XDAC-D)
XDAC resolution	16 bits
XDAC output signal output range	Unipolar 0..+4.096v @ 600 Ohm
XDAC settling time	7 us
Serial Output I/F (for AGC)	- number of channels: 2 - software configured as 8/16/24/30-bit serial data output, inversed frame synchronization, programmable polarity of serial clock, serial clock framing feature
UART I/F	- number of channels: 2 - external I/F: RS232C - maximum baud rate: 384 kBaud (all standard baud rates are available)
USB interface	USB 2.0 480 Mbit/s device interface
DSP	1GHz (8000 MIPS) 32-bit fixed-point TI TMS320C6416 DSP with on-chip Viterbi and Turbo Decoders
DSP bootmodes	no boot, boot from FLASH, boot from HPI
on-board SBSRAM capacity	128K/512K/1M x32 (defined during the product ordering)
on-board SDRAM capacity	4M/16M/32M x32 (defined during the product ordering)
on-board FLASH capacity	512K/8M x8 (defined during the product ordering)
general purpose I/O (GPIO)	4 bits (3v/5v TTL, 3.2 mA)
host TORNADO PIOX-2 interface	- automatically detected host *PIOX-2* Asynchronous/Synchronous DCM site I/F with 532 Mbyte/s synchronous I/F bandwidth - 128K/256K/512Kx32 SDPRAM in *PIOX-2* synchronous I/F (defined during the product ordering)
power supply voltage	single +5V .. +14v power supply
power consumption	7.5 W typ (+5V @ 1.5A)
physical dimensions	fits standard *PIOX-2* DCM dimensions: W=75mm, H=96mm

Product Options

Spread Spectrum Clock Option (-SSC)	- DSP EMIF clock (133 MHz, SSF = 0..-2% standard, ± 2% optional) - DSP core clock (SSF = 0..-2% standard, ± 2% optional) - power supply synchro-clock (1MHz, SSF= ±10%)

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