NAMC-ADSP

Overview

The NAMC-ADSP is a multi-purpose (tele)communication resource board in AMC (Advanced Mezzanine Card) form factor, being equipped with either 8 or 16 Blackfi n DSPs from Analog Devices. The NAMC-ADSP is targeted at applications in telecom environments with extensive need for voice or data computation
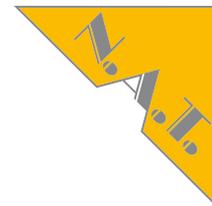
The module is designed to process standard telecom algorithms like voice/data compression/ decompression or DTMF detection/generation.

Because of its capability to let any single or a group of DSPs process any indi-vidual timeslot transmitted via I-TDM protocol over backplane Gigabit-Ethernet, the NAMC-ADSP is an ideal solution for any voice/data application in any signal-ling or VoP solution such as in ISDN, SS7, ATM, VoIP or 3G environments.

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AMC-Interface

The NAMC-16ADSP is a single-width, halfheight AMC module, also available in fullheight. The PCIe-X1 lane directly connects the local bus and onboard devices to the backplane.

Backplane I-TDM Access

The TSI (Time Slot Interchanger) as well as the TDM-to-iTDM bridge are incorporated in a ECP2M50 FPGA from Lattice. The TSI allows flexible routing as well as multi-casting of 64kbps timeslots between the various DSPs. The TDM-to-iTDM bridge converts the TDM oriented bit stream into Ethernet packets and vice versa. The Ethernet packets are sent and received via a 1000BaseT-BX Ethernet interface. Each DSP is able to handle 256 bidirectional TDM channels. The NAMC-ADSP is providing up to 4096 timeslots of 64kbps bandwidth. Due to the FPGA design of the TSI controller sub-channeling or super-channeling is possible as well.

DSP resources

The NAMC-ADSP-8 is equipped with 8 ADSP-BF535P Blackfin CPUs from Analog Devices, running at a core frequency of 350MHz. The NAMC-ADSP-16 is equipped with sixteen ADSP-BF535P Blackfin CPUs in total. Each of the DSPs has 32MB of individual SDRAM as well as 1MB individual FLASH aside to ensure a most flexible and individual utilization of its resources. Due to its internal design the Blackfin DSP is a very powerful but cost efficient processing engine with 700 MMACs (max.) and 3.5MIPS per TDM channel. Special coding algorithms that are often used in telecom environments, i.e. G.711, are built-in features.

Beside special DSP cores from N.A.T., Analog Devices and other third parties offer cores for most commonly used applications including
· Multi-Rate Filter
· FFT
· Convolutional Encoders
· QAM, BPSK and QPSK modulation
· Image Processing
to name just a few. The NAMC-ADSP is suitable for any voice/date application in any signalling or VoP solution such as in ISDN, SS7, ATM, VoIP or 3G environments are suitable.

Key Features

PCIe Interface and Compliance
· x1 on port 4
· PICMG AMC.1 R1.0

GbE Interface and Compliance
· GbE on port 0 and 1

IPMI and Compliance
· PICMG AMC.0 R2.0
· PICMG 2.9 R1.0

I-TDM
· 4096 bidirectional iTDM channels
· connecting to the DSP's serial ports

DSPs
ADSP-BF535P Blackfin DSPs from Analog Devices, 350MHz core frequency, 700 MMACS, 3.5MIPS per TDM channel, 8 pcs ADSP (NAMC-ADSP-8), 16 pcs ADSP (NAMC-ADSP-16)

Memory
32 MB SDRAM and 1MB FLASH per DSP

Indicator LEDs
16 software programmable LEDs (1 status indicator LED per DSP) front panel

Clocks
TCLK A-D as input supported, FCLKA or local 100MHz osc. as fabric reference clock

Host Operating System Support
OK-1, VxWorks, LINUX, dependent on application

Power Consumption
· 3.3V MP 0.1A (typ.)
· 12V 1.1A (typ.) (NAMC-8ADSP)
· 12V 2.0A (typ.) (NAMC-16ADSP)

Environmental
· Temperature (operating):
  0ºC to +60ºC with forced air cooling
· Temperature (storage):
  40ºC to +85ºC
· Relative Humidity:
  10% to 90% at +55ºC (non-condensing)

Applications
· voice and data compression and decompression
· voice and data encryption and decryption
· DTMF detection and generation
· VoP
· special handling of signalling protocols (i.e. SS7, 3G TFO, etc.)