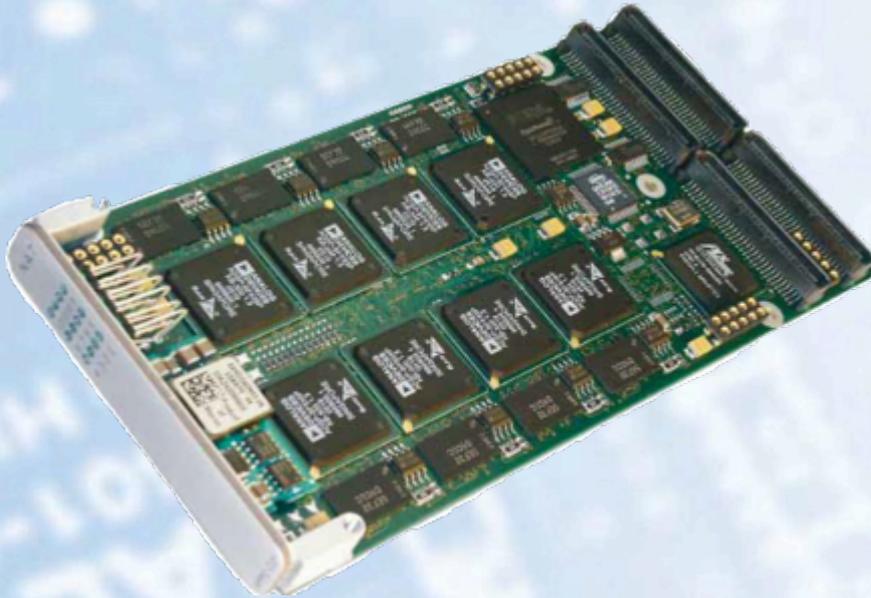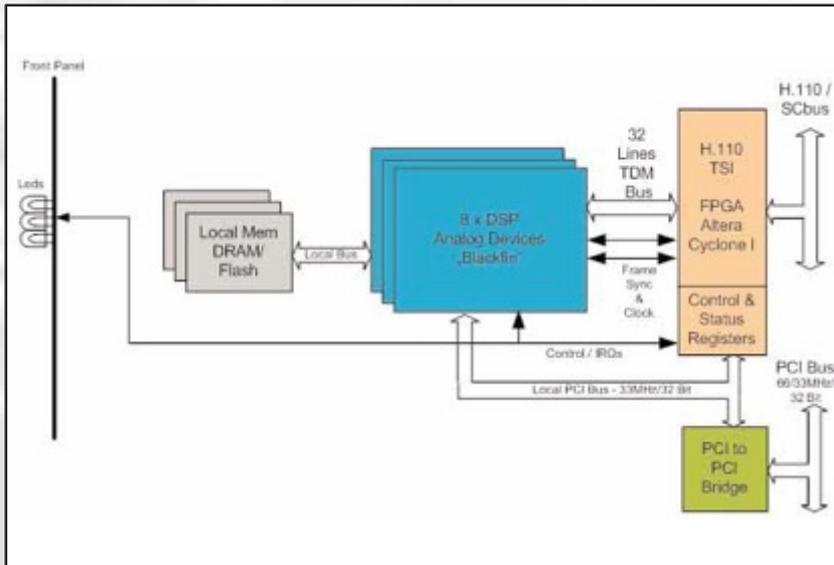# Telecommunication PMC Module

NPMC-DSP

The NPMC-DSP is a mul ti-purpose telecommuni cation resource board in PMC (PCI Mezzanine Card) form factor. The NPMC-DSP is targeted at applications in telecom environm ents with extensive need for voice or data compu tation. The modul e is designed to process standard telecom algori thms like voice/data compression/decompr ession or DTMF detection/generation. Being capable of handling individual timeslots within a TDM stream selected from the H.110 backplane the NPMC-DSP is an ideal solu tion for any voice/data application in any signalling or VoP solu tion such as in ISDN, SS7, ATM, VoIP or 3G environm ents.

Technical Data

Overview
The NPMC-DSP is a multi-purpose telecommunication resource board in PMC (PCI Mezzanine Card) form factor. The NPMC-DSP is targeted at Telecom applications with extensive need for voice or data computation. The module is designed to process standard telecom algorithms, i.e. voice and data compression and decompression or DTMF detection and generation. The module is capable of handling individual timeslots within a TDM stream selected from the H.110 backplane. The design is optimized for handling in parallel as many timeslots (TDM data) as possible. The TDM data streams are supplied by a standard H.110 backplane interface located on the PMC multi-purpose I/O connectors.

PCI Interface
The NPMC-DSP is a P1386.1/Draft 2.0 compatible PMC module that can be plugged onto any VME, cPCI or other carrier board offering a PMC extension slot. The PCI-to-local-bus bridge directly interconnects the PCI bus to the local bus and the onboard devices. The NPMC-DSP is PCI Rev. 2.2 compatible (32bit).

Backplane TDM Access
The onboard H.110 bus controller is realized by a highly flexible and progressive FPGA design, incorporated in a Cyclone I FPGA from Altera. It offers access to the backplane TDM bus supporting the complete H.110 bus (PTMC configuration type 5) or the SCSA bus subset on the PMC multi-purpose I/O connectors P13/P14.

Thus the onboard DSPs have to all 32 TDM streams, each being clocked at up to 8MHz and thus providing up to 4096 timelsots of 64kbps bandwitdh each. Due to the FPGA design of the

H.110 controller subchanneling or superchanneling is possible as well.

DSP resources
The NPMC-DSP is equipped with eight ADSP-BF535P Blackfin CPUs from Analog Devices, running at a core frequency of 350MHz.
Each of the DSPs has 32MB of individual SDRAM as well as up to 4MB 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 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

in order to name just few.

The NPMC-DSP is highly flexible and thus suitable for any voice/data application in any signalling or VoP solution such as in ISDN, SS7, ATM, VoIP or 3G environments.

PCI Interface and Compliance
PCI Rev. 2.2, 33MHz/32bit

H.110 Bus (and subsets thereof)
H.110 (PTMC conf. type 5) or SCSA subset, integrated in a Cyclone I FPGA from Altera

DSPs
Eight ADSP-BF535P Blackfin DSP from Analog Devices, 350MHz core frequency, 700 MMACS, 3.5 MIPS per TDM channel

Memory
32 MB SDRAM and 1-4MB FLASH per DSP

Indicator LEDs
4 software programmable LEDs and 1 status indicator LED per DSP at the front panel

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

Power Consumption
3.3V 0.8A (typ.) 5V 1.0A (typ.)

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

Standard Compliance
P1386 and P1386.1/Draft 2.a
PICMG 2.15 configuration type 5

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