

NeuroMatrix® NM6404 DSP

NeuroMatrix® NM6404 is a high performance DSP oriented RISC processor designed for real time data flow processing. The architecture is based on advanced VLIW/SIMD NMC2 core and includes two main units: 32/64-bit RISC and patented 64-bit VECTOR co-processor. This co-processor supports vector operations with elements of variable bit length. NM6404 has 2Mbit on-chip memory to enhance the system performance, two 64-bit interfaces with 1.28Gbyte/sec throughput, two high-speed byte ports up to 60Mbyte/sec throughput, a JTAG port and two 32-bit timers.



Features:

- Clock frequency - 80 MHz
- Technology 0.25 um CMOS.
- 576-pin BGA package
- Supply voltage: Core-2.5 V, I/O-3.3 V
- Power consumption approx. 2 W
- Temperature range: -55 +85 ° C

RISC

- 32- and 64-bit wide processor instructions
- 2Mbit On-chip memory
- address space - 4Gx32bit
- processor executes up to three scalar operations per cycle (ALU operation, address modification, I/O operation – external memory access)
- two communication ports up to 30 Mbyte throughput each
- two parallel 64-bit external memory interface with 80 MHz clock frequency
- Serial Debug Interface, JTAG compatible
- complexity factor is 16 million MOS transistors

VECTOR co-processor

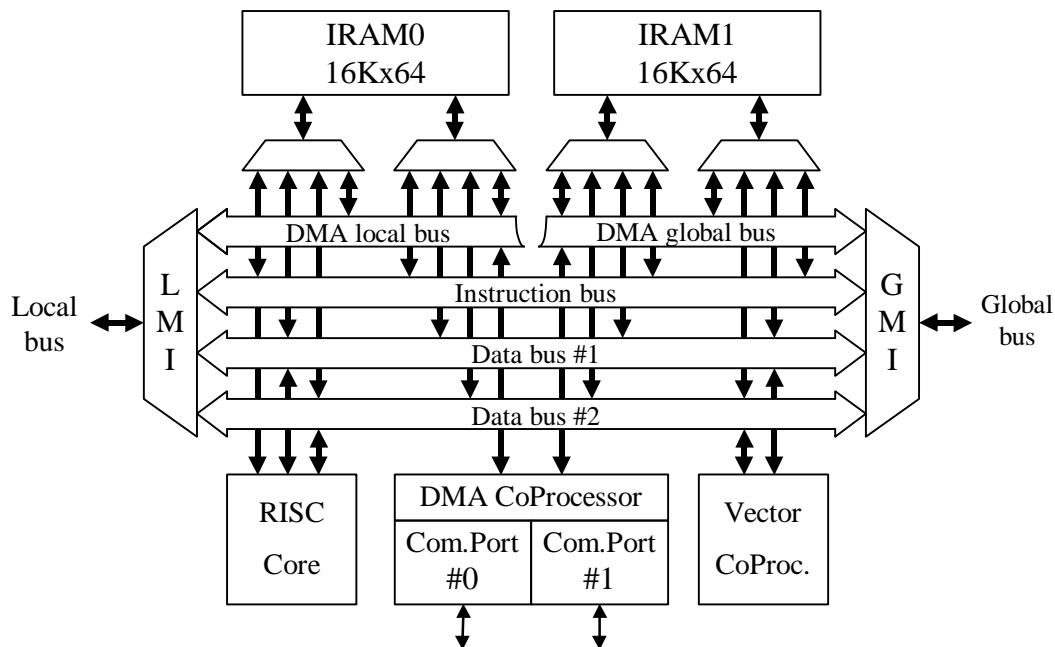
- 1-64-bit word length of the vector operands and the products
- Data format: integer data of variable length words from 1 to 64 bits each packed into 64-bit blocks
- Hardware support of vector-matrix or matrix-matrix multiplication
- On-chip saturation and threshold functions

Applications:

- Accelerators for PCs and workstations for:
 - signal processing
 - image processing
 - vector and matrix calculations acceleration
- Embedded systems
- Basic block for building large super parallel computing systems

Performance:

- Scalar operations:
 - 80 MIPS
 - 240 MOPS for 32 bit data
- Vector operations (multiplication and accumulation per cycle):
 - 2 MAC for 32- bit data,
 - 4 MAC for 16- bit data,
 - 24 MAC for 8- bit data,
 - 80 MAC for 4- bit data,
 - 224 MAC for 2- bit data;



NM6404 Functional Diagram