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Model 4280

Dual TMS320C31 Processor VME Board with Analog I/O



General Information

Model 4280 is a general purpose digital signal processor board for VMEbus. It incorporates two Texas Instruments TMS320C31 floating-point DSP chips operating at a clock frequency of 40 or, optionally, 50 MHz and providing 80 or 100 MFLOPS of processing power. In addition, Model 4280 provides four channels of analog I/O to offer a single-slot Analog In/Analog Out solution to DSP problems.

On-board Analog I/O

Each C31 is equipped with a 2-channel 16-bit delta-sigma A/D and D/A converter capable of sampling at up to 48 kHz. The converters include integral input amplifiers, output attenuators, and anti-aliasing digital filters. These linear phase filters track the sampling rate and exhibit extremely sharp rolloffs and flat passband response. Due to the delta-sigma conversion technique employed, all channels may be sampled simultaneously with virtually zero phase delay.

In addition to the analog interfaces, serial TTL input and output data streams can be used for I/O to the 'C31 serial ports. Both clock and data are available through the P2 VMEbus connector, and all serial I/O signals are fully buffered. Contact Pentek if additional I/O is required.

Local SRAM and EPROM

Each C31 is equipped with a local 256 kbyte zero-wait state SRAM (optionally, 1 Mbyte) and a 32 kbyte EPROM.

Shared Global SRAM

A shared global 256 kbyte SRAM (optionally, 1 Mbyte) is accessible by both 'C31s and by the VMEbus. The entire global SRAM is mapped into A24 and A32 VMEbus slave memory space with a relocatable base address.

The shared global SRAM is ideal for downloading programs and data from the VMEbus. To speed execution, programs may be moved from the global SRAM into the local SRAM. Each C31 can then execute simultaneously from its local SRAM, processing analog inputs and outputs completely independent of the other processor. The shared global SRAM is ideal for interprocessor communication and for passing data to and from the VMEbus.

VME Interface

Each C31 can generate an interrupt to the VMEbus on any of seven levels. An interrupt vector register is included for interrupt source identification.

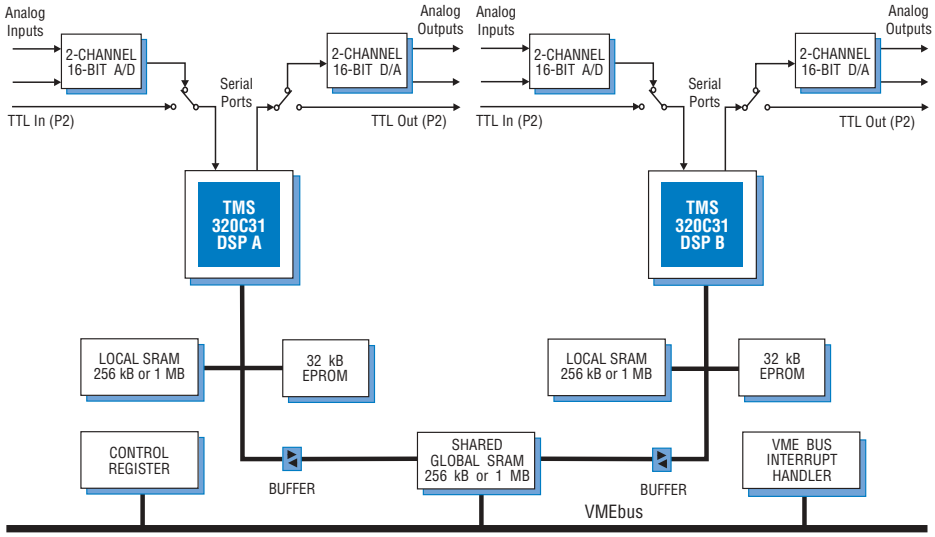
The control register is mapped into relocatable A16 VMEbus address space and allows a VMEbus master to control reset and interrupt operations to each C31.

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Features

- Two TMS320C31 DSPs with 100 MFLOPS peak processing power
- Up to 1 MB shared global SRAM
- Up to 1 MB local SRAM per processor
- 2-channel 16-bit sigma-delta A/D and D/A converters per processor
- Single-slot solution for Analog In/Analog Out DSP applications

Block Diagram, Model 4280



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Applications

- spectrum analysis
- on-line monitoring
- digital audio
- radar signal processing
- sonar signal processing
- digital filtering
- robotic control

SwiftNet

TI Third Party Network Member DSP TEXAS INSTRUMENTS

Support Software

Pentek **SwiftNet** supports a network of distributed VMEbus systems and allows the developer to run development tools on the host, while maintaining remote access to the VMEbus target systems.

Among others, third party software products include the Texas Instruments **Code Composer** integrated development environment.

Specifications

Processors
Two Texas Instruments TMS320C31s, 40 or 50 MHz clock

Emulator Access
XDS-500 connector located near center of board

Shared Global SRAM
Size: 256 kB, 1MB optional
Access: VMEbus slave, both C31s

Local SRAM
Size: 256 kB, 1MB optional, for each C31
Access: C31 primary bus
Access time: zero wait state

EPROM
Size: 32 kB for each C31
Access: C31 primary bus

Analog Input Channels
Number: two per C31, four total
Input: ±2.8 V full scale for 0 dB gain setting; 100 kohm input impedance, single-ended
Input gain range: software programmable from 0 to +22.5 dB, in 1.5 dB steps
A/D resolution: 16 bits
Frequency response: ±0.5 dB

Analog Output Channels
Number: two per C31, four total
Output: ±2.8 V full scale at no load and 0 dB attenuation; 600 ohm output impedance, single-ended
Output attenuation range: software programmable from 0 to 94.5 dB, in 1.5 dB steps
D/A resolution: 16 bits
Frequency response: ±0.5 dB

Input and Output Low Pass Filters
Type: digital
Number: 4 input , 4 output
Passband: 0 to 0.45 f_s
Passband ripple: ±0.1 dB
Transition band: 0.45 f_s to 0.55 f_s
Stopband: ≥ 0.55 f_s
Stop band rejection: 74 dB min
Group delay variation: 0 us

Sampling Rate Generator
Internal rates: 5.5125, 6.615, 8.0, 9.6, 11.025, 16.0, 18.9, 22.05, 27.42857, 32.0, 33.075, 37.8, 44.1, 48.0 kHz
External sample clock input: front panel BNC jack, TTL level square wave; sampling clock divided by one of eight programmable dividers from 384 to 3072

Digital I/O
Serial I/O data and clock pins for both C31s are brought to reserved pins on VMEbus P2 connector for digital I/O functions

VMEbus Interface
VME compliance: slave device, A32 D32 I(1-7)
Interrupts: generates interrupts on levels 1 to 7
Memory map: shared global RAM control registers

Power: 3.0A at +5 V; 0.5 A at +12V, 0.5 A at -12 V

Size: standard 6U VMEbus board, single slot; board 160 mm (6.3 in.) x 233.5 mm (9.2 in.), panel 0.8 in. wide

Ordering Information

Model	Description
4280	Dual TMS320C31 Processor VME Board with Analog I/O, 40 MHz clock
Options:	
-001	1 MB local SRAMs
-002	1 MB global SRAM
-003	SMA analog I/O connectors
-015	50 MHz clock

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