DS1102 DSP Controller Board

Intelligent Single-Board Solution

Software Support

- C library with control and communication functions, including initialization, A/D and D/A access, incremental encoder interface, PWM and frequency generation (included)
- Loader software (included)
- DSP device driver (included)
- Programming from Simulink with RTI (p. 30)
- C compiler (p. 42)
- Debugger (p. 43)
- Experiment tools (p. 48-67)

Cost-effective single-board solution
Ideally suited to rapid control prototyping
TI's C31 DSP featuring 60 MFlops
Comprehensive suite of on-board I/O
Fully programmable from the Simulink block diagram environment

'All-in-one' is the motto of the DS1102 DSP Controller Board. It combines the high computing performance of a TI TMS320C31 floating-point DSP with a set of I/O modules frequently required in control systems. It is therefore ideally suited to cost-sensitive applications that have a limited number of inputs and outputs but still require fast computation. Typical application fields are drives, automotive, and robotics control, but customers from many other domains can also benefit from this powerful single-board solution.

Programming the DS1102 Board ...

... is easy with Simulink and dSPACE's Real-Time Interface. You can initialize and configure all on-board I/O modules graphically within the Simulink environment. Code generation, compiling, and downloading is reduced to a single mouse click. But even without Real-Time Interface, putting the DS1102 board into operation is an easy task with the C software environment included, which is complemented by a debugger, compiler, and loader software. Any application running on the DS1102 can be fully controlled by the dSPACE experiment software, including instrument panels and data acquisition tools in ControlDesk, and various tools for test automation.

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Real-Time Interface provides Simulink blocks for a convenient configuration of A/D, D/A, digital I/O lines, incremental encoder interface, and PWM generation. The PWM dialog allows you to enter the desired PWM frequency.
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Technical Details

Processor
- TI’s TMS320C31 floating-point DSP
- 60 MHz clock rate, 33.3 ns cycle time
- 8-MBaud serial interface
- 4 external interrupts

Memory
- 128 K x 32-bit RAM, zero wait states
- 2 K x 32-bit on-chip RAM

Analog Input
- 2 parallel 16-bit channels, 4 µs conversion time
- 2 parallel 12-bit channels, 1.25 µs conversion time
- Simultaneous sample & hold
- ±10 V input voltage range
- > 80 dB (16 bit) / 65 dB (12 bit) signal-to-noise ratio

Analog Output
- 4 parallel 12-bit channels
- 4 µs typical settling time
- ±10 V output voltage range

Digital I/O
- Programmable digital-I/O subsystem based on TI’s 25 MHz TM S320P14 DSP
- 16 digital I/O lines (bit-selectable)
- Capture/compare unit with 8 channels (2 in, 4 out, 2 in/out)
- PWM generation on up to 6 channels (40 ns resolution)
- User interrupt

Incremental Encoder
- Fourfold pulse multiplication

Interface
- Two parallel input channels for two phase lines and one index line each
- 8.3 MHz max. count frequency
- Noise filter
- 24-bit position counter

Physical Characteristics
- ±5 V, 1.5 A and ±12 V, 100 mA
- Requires half-length 16-bit ISA slot
- 62-pin female high-density Sub-D connector

Application Frequencies

The table above shows the maximum frequencies of the included timing applications for different numbers of channels in use, assuming that only one type of application is running at a time.

Order Number

DS1102 DSP Controller Board
- DS1102

Connector Panel (p. 156)
- CP1102

Combined Connector/LED Panel (p. 156)
- CLP1102

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### Table: Application Frequencies

<table>
<thead>
<tr>
<th>Channels in use</th>
<th>F/D [kHz]</th>
<th>D/F [kHz]</th>
<th>PWM [kHz]</th>
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