Apex Embedded Systems

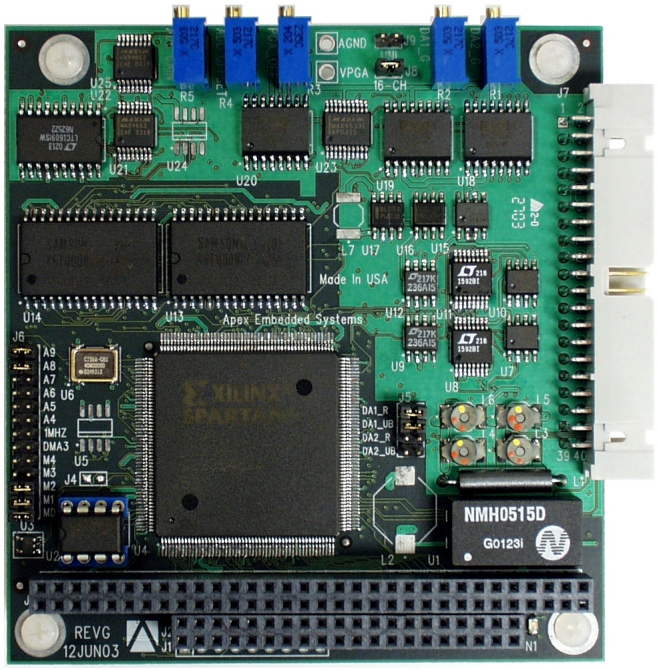
HIGH-REL PC/104 Advanced Analog I/O Module with 1M Sample Memory

STX104

January 1, 2005

The STX104 is a **High-Reliability PC/104** 16 channel 16-BIT A/D and dual 16-BIT D/A card that incorporates a large 1M sample FIFO. The list below briefly highlights many key advantages:

- **Industry Standard Form Factor**. Compliant to the PC/104 standard form factor ensuring consistent system packaging
- **Long-Term Product Availability.** Apex Embedded Systems is committed to delivering long life cycle products.
- **1 MegaSample FIFO**. Huge A/D FIFO enables applications to run without data loss even under long interrupt latency conditions.
- **Designed for operation in harsh environments.** All components and materials used in our products are designed to operate in the extended and/or mil-spec temperature range, under high shock and vibration without up or de-rating of any materials.
- **-40 to 85° C Operating Temperature.**
- **No tantalum or electrolytic capacitors used in the design.**
- **FPGA customization available.**
- **LED Read/Write Status indicator.** An LED displays card activity which is useful for both product development and field service status.
- **16 single-ended or 8 differential analog input channels with 16-bit resolution.**
- **Programmable input gain**
- **Very low noise analog inputs:** Less than 1.5-LSB RMS over all input ranges (1.1-LSB RMS typical). Noise reduction to 0.6-LSB RMS can be achieved using the jumper selectable sixteen sample moving average filter.
- **200,000 samples per second maximum A/D sampling rate.**
- **Analog input read via software, interrupt or DMA.**
- **16-bit data read (ADC data) operations** double effective PC/104 bus bandwidth
- **Burst mode** with only one interrupt generated per complete scan, thus reducing interrupt overhead and increasing effective throughput.
- **Two 16-bit D/A outputs**
- **16-bit data write (DAC data) operations reduce software overhead**



- **Four digital inputs**
- **Four digital outputs**
- **16-Sample moving average filter for data noise reduction** (jumper selectable)
- **One 32-bit counter/timer for A/D pacer clock**
- **One 16-bit general purpose counter/timer**
- **Software compatibility with:** ComputerBoards CIO-DAS1602/16, DAS-16/16jr PC104-DAS16JR/16, DAC-02 and Keithley DAS-16.
- **Single +5V Supply Operation**
- **Polarized Locking I/O Connector**
- **Designed and manufactured in Wisconsin by Apex Embedded Systems.** We will do whatever we can to assist you in designing in our products.
- **STX104 truly offers the "best-value" and in PC/104**

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Technical Specifications:

Analog Inputs

ADC Resolution: 16-bits (1/65536 of full scale). No missing codes guaranteed
Number of Channels: 8 differential or 16 single-ended
Input Ranges: Bipolar: ±10V, ±5V, ±2.5V, ±1.25V**;** Unipolar: 0 to 10V, 0 to 5V, 0 to 2.5V 0 to 1.25V
Input Bias Current: 50nA maximum
Absolute Maximum Input Voltage: ±35V
Integral Linearity Error: ±1.5 LSB (±3 LSB on 1.25V range)
Differential Linearity: ±1 LSB
Polarity: Unipolar/Bipolar jumper selectable.
Input Sensitivity: 19uV
Noise Characteristics: Gaussian behavior with maximum peak-to-peak internal noise of less than 1.5-LSB RMS over all input ranges and operating temperatures (1.2-LSB RMS typical). Jumper selectable 16-bit moving average filter drops noise to less than 1-LSB RMS over all input ranges and operating temperatures (0.6-LSB RMS typical).
Input Type: True differential or single-ended
Input Impedance: (1) Differential: 20MΩ min. resistance in parallel with 47pF; (2) Single-Ended: 20MΩ min. resistance in parallel with 27pF.
Accuracy: 0.003% of reading, ±1 LSB
Gain Drift: ±7ppm/°C
DC Drift or Zero Drift: ±2ppm/°C
Common Mode Voltage Range: ±10V
Common Mode Rejection Ratio: 70dB at 60Hz
Maximum Sampling Rate: 200,000 Samples Per Second (200KSPS)
ADC Conversion Time: 5uS
A/D Conversion Trigger: Programmable internal counter, external source (DI0/TRIG) or software polled.
A/D Trigger Sources: External polled gate trigger (DI0/TRIG)
A/D Trigger Modes: Gated pacer, software polled. (Gate must be disabled by software after trigger event)
Data Transfer: From 1MEG sample FIFO via interrupt, DMA or software read out.

Analog Output

Resolution: 16 bits
Number of channels: 2 D/A
Output voltage ranges: ±10V, ±5V, 0-5V, 0-10V or user defined range between 0 and 10V. Each channel independently configurable by jumpers.
Offset error: less than 8 LSB
Gain error: Adjustable to 0 by potentiometer
Differential non-linearity: ±1LSB max
Integral non-linearity: ±1LSB max
Monotonicity Guaranteed

Digital I/O

Number of Inputs: 4 TTL compatible
Input Voltage: Logic 0: 0.0V min, 0.8V max; Logic 1: 2.0V min, 5.5V max
Input Current: ± 1uA max
Number of Outputs: 4 TTL compatible
Output Voltage: Logic 0: 0.0V min, 0.4V max; Logic 1: 2.4V min, 3.3V max.
Output Current: ±12mA per line max

Counter/Timers

A/D Pacer Timer: 32-bit down counter (2 82C54 counters cascaded)
Clock Source Jumper selectable: 1 MHz or 10 MHz on-board clock source.
General Purpose: 16-bit down counter: (1 82C54 counter)
Interrupt/DMA Trigger: End of A/D Conversion

General

Operating temperature range: -40 to 85°C
Storage temperature range: -55 to 125°C
Factory Calibration: Full NIST Traceable
Humidity: 0 to 95% non-condensing
Power Supply: 5VDC ± 5%
Interface: PC/104 8 or 16-bit

Ordering Information

P/N: STX104-1MFIFO-DAQ
Description: HIGH-REL 16-bit PC/104 Analog I/O Module with 1M sample FIFO

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